
NEWS

OF THE

LEPIDOPTERISTS' SOCIETY

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Butterflies and fire, a case for pyrodiversity

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***Apamea lithoxylaea* in North America**

Membership Updates, Announcements, Book Review, Marketplace, Metamorphosis

... and more!



Enaemia pupula larva (Lacturidae) on *Sideroxylon* species. Chattahoochee Fall Line Sandhills Wildlife Management Area, Talbot County, Georgia, October 25, 2021. Image by Giff Beaton.



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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Conservation Matters: Contributions from the Conservation Committee**Butterflies, fire and the case for pyrodiversity**

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Butterflies are important components of ecosystems for many reasons including pollination, nutrient cycling, and as prey for higher trophic levels. Current research on the impact of fire on butterflies shows both positive and negative effects to butterfly communities producing a variety of opinions on the use of fire in butterfly conservation. Broadly, fire acts as a 'global herbivore,' primarily consuming only the above-ground portions of plants. Fire promotes early successional vegetation providing larval host and adult nectar plants for many species of butterflies. However, fire can also cause direct mortality of butterfly eggs, caterpillars, chrysalids, and occasionally adults. These opposite effects of fire on butterflies may seem paradoxical, however, whether fire is 'good' or 'bad' for butterflies is a false dichotomy with the nuanced truth lying somewhere between the two.

Fire can shape ecosystems by impacting the assemblage of plant species that in turn impacts the behavior of fire in a feedback loop (Figure 1). Some ecosystems are so heavily tied to fire that even a short lapse in the application of fire would result in alternate community assemblages. As nearly all land plants are flammable, one could argue that as long as a terrestrial system has vegetation, there is a natural fire regime of some sort. Today, land managers are the primary arbiters of fire. As such, humans have used or omitted fire from landscapes with sometimes drastic outcomes for ecosystems and even wildfire risk. This has led to much research and debate as to how to use fire to achieve goals and objectives for managed lands. Butterflies are one such taxon where there is apprehension around the use of fire for conservation. Here, we unravel some misconceptions and demonstrate how fire is an integral part of the landscape and can facilitate diverse communities of butterflies.

Key to understanding fire is an understanding of its spatial and temporal variation. Sources of fire variation include different assemblages of plant communities (fire fuels) as well as weather conditions such as wind, temperature, and humidity. The interaction of these environ-

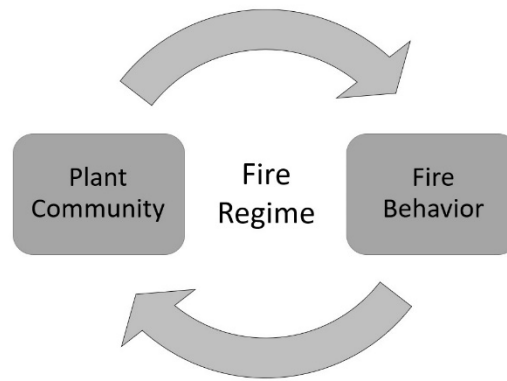


Figure 1. A conceptualization of a fire regime where the plant community and fire each affects the other. The plant community influences the continuity of fuels and the occurrence of fire impacts plant assemblages. External factors such as weather influence this relationship.

mental factors results in varied fire frequency (how often fire occurs), fire intensity (amount of energy [particularly heat] released), fire seasonality (when fires occur in a year), and fire heterogeneity (how 'patchy' a fire is; Figure 2). The term 'pyrodiversity' is used to describe such variation in fire across a landscape. Pyrodiversity in the southeastern United States has been particularly well studied, and we use this region as an example with the understanding that fire effects, behavior, and the historical context of fire may differ across different landscapes.

The southeastern US includes a mixture of habitats including the fire-prone pine savanna that once covered over 36-million hectares ranging from Texas to Florida and north to Virginia. This savanna, dominated by longleaf pine (*Pinus palustris*) and wiregrass (*Aristida beyrichiana*), is botanically rich, with as many as 400 plant species co-occurring within one-square kilometer. Research on fire regimes prior to European settlement in the longleaf savanna estimate frequent fire-return intervals ranging from 1–5 years in some parts of the range



Figure 2. A typical low-intensity prescribed fire in a longleaf pine (*Pinus palustris*) savanna in the southeastern United States. This photo captures both variation in fire heterogeneity and fire intensity at a single point in time.



Figure 3. A time-lapse of fire in a longleaf pine (*Pinus palustris*) forest. Needles shed by pines provide fuel to fires moving through the landscape (A). When pine trees die, the lack of needles reduces fire fuels resulting in unburned areas (B). Over time, the unburned areas around dead pines accumulate additional fuels until a point where fire can move through the area again (C).

with most fires occurring June through August; these fires are attributed to lightning strikes and native peoples, who used fire to increase food plants, clear land, and other reasons (Huffman 2006, Stambaugh et al. 2011, Rother et al. 2018). Other habitats intermixed within the savanna such as riparian corridors, ponds, swamps, and hardwood forests, generally incurred fire less often than drier upland areas.

Before European settlement, longleaf pine savannas burned for many days on end, which likely created a diversity of post-fire conditions. For instance, fires occurring at night during the summer were likely reduced in intensity due to decreased ambient temperatures and increased humidity with the opposite true of the daytime. Differences of conditions created spatial discontinuity of the fire and likely increased fire heterogeneity. Landscape features such as riparian corridors could have reduced the fire front's intensity (increasing heterogeneity) or stopped the fire entirely. These so-called 'fire-shadows' would then provide conditions allowing fire-sensitive plant and animal species to persist.

Additionally, small-scale impacts of vegetation structure can affect how fire proceeds through the landscape. Fine fuels that dry quickly, including pine needles, are highly combustible, ubiquitous fuels in pine savannas that carry fire throughout the landscape. Without pine needles, areas previously burned may not burn as well or at all. These unburned areas often serve as sites of longleaf pine regeneration as seedlings are more susceptible to fire. Eventually, as fuels build in the absence of fire, the area becomes more prone to burn which returns fire to these small-scale landscape features (Figure 3). Both small-scale (ex. pine needles) and large-scale (ex. wetlands and riparian corridors) habitat features, in combination with weather, create pyrodiverse conditions which produce a mixture of post-burn conditions for butterflies.

Finally, one must also consider how habitat conditions change through time after fire. These time-scale effects are

divided into: first-order effects which involve short-term impacts from fire itself (e.g. direct mortality), second-order effects which involve mid-range time scales such as immediate post-fire conditions, and third-order effects which include the impact of fire on long-term population trends. Each order of fire effects on a species are linked to the preceding order and should be considered holistically when considering fire's overall effect on species persistence. For example, if populations have not recovered sufficiently after fire occurs (third order) then when fire is applied again populations may be insufficient in size to sustain themselves (first order).

We can demonstrate the diversity of responses to post-fire conditions by investigating members of the Lycaenidae. *Satyrium liparops* (striped hairstreak), *S. favonius* (oak hairstreak), and *S. calanus* (banded hairstreak) have host plants that are susceptible to fire or would otherwise be unlikely to occur in high enough abundance to persist long-term in frequently burned areas that are common within the longleaf savanna. For example, sparkleberry (*Vaccinium arboreum*), both a primary host and nectar source for *S. liparops*, occurs in wet areas (i.e. low flatwoods, riparian corridors) and lacks adaptations that would allow it to persist if burned. Within the Southeast, *S. liparops* likely persisted in these same areas, and subsequently would experience lower intensity fires as ground/leaf-litter moisture would stifle the fire. Given enough time, extreme weather conditions (i.e. drought) would eventually permit fire to proceed through the area, albeit infrequently, patchily, and of lower intensity as compared to fires in the drier uplands, allowing for the persistence of fire-intolerant species of butterflies and their fire-intolerant host plants and nectar sources.

Other species, however, persist in landscapes that require fire to support the long-term viability of their populations; these species are referred to as 'fire-dependent.' Among them is *Callophrys irus* (frosted elfin), a univoltine species that breeds in spring and lays eggs on one of two host plants: wild indigos (*Baptisia* spp.) or sundial lupine

(*Lupinus perennis*). The caterpillars feed for about a month before pupating at or below the soil surface until they emerge as adults the following year. In *C. irus* habitats, fire serves to suppress hardwoods like oaks (*Quercus* spp.) that can outcompete the *Baptisia* species and *L. perennis* for sunlight. While the host plants can survive fire, all life stages of *C. irus* are likely impacted by fire directly. Fire causes high direct mortality to eggs, caterpillars, and chrysalids whereas adults may survive by flying away (Jue et al. 2022, Meyer et al. 2023b). However, if the above-ground portions of the host plants are killed, the adults may not live long enough (~6-8 days) to lay eggs on resprouting host plant (Meyer et al. 2023a). Even if there is a high rate of adult survival, there may be little to no reproduction that year. Thus, while *C. irus* requires frequent fires to maintain its host plants, it is vulnerable to fire itself. In order to persist, sufficient areas of burned and unburned habitat

must exist within a landscape where host plants occur, with unburned areas serving as refugia (or reservoirs) and burned areas serving as future sites for recolonization (Figure 4). The benefits of this 'mosaic management' has been noted elsewhere for other species (Swengel 1996, Swengel and Swengel 2007, Moranz et al. 2014).

When considering butterfly conservation in regards to fire, *C. irus* offers a good example of how pyrodiversity contributes to population persistence and both first- and second-order fire effects. Direct mortality from fire and reduction in available habitat for *C. irus* can be overcome by increased reproduction and increases in habitat quality months or years after a fire if available (unburned) habitat occupied by *C. irus* occurs in the vicinity. When taken holistically, any question of whether fire is 'good' or 'bad' for a species becomes one of how fire is used, weather conditions, and the time-frames in question.

The diversity in fire conditions resulting in a diversity of supported organisms has been dubbed the 'pyrodiversity begets biodiversity' argument. While we feel this is an apt statement it should be further specified that pyrodiversity in all its forms may be counterproductive to contemporary conservation efforts. For example, the longleaf pine savanna has faced dramatic declines range-wide, thus, stand-replacing fire—a form of pyrodiversity—would cause dramatic alterations to an already rare resource. While this may have occurred historically, the relatively long-

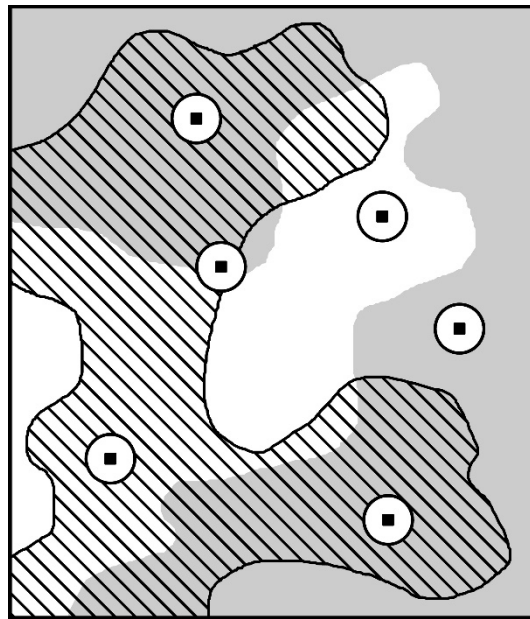


Figure 4. An example landscape where two fires occurred in different years (year 1 [black outline “\”], year 2 [gray shading]). The overlap between the two fires indicate where annual fire occurred whereas areas with neither fire indicate a longer time since fire (> 2 years). Host plant patches (■) may encounter many fire-return intervals across a pyrodiverse landscape.

imperiled wildlife.

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Life history and distribution update for Belfrage's Plume Moth

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Background and Life History

On May 16, 1879, Gustaf Wilhelm Belfrage collected a tiny female plume moth in Clifton, Texas. Two years later, Charles Fish (1881) described *Aciptilus belfragei* from this single holotype specimen which currently resides in the National Museum of Natural History, Washington, D.C. (see image in Matthews et al. 2014). Belfrage died the following year at the age of 48, a poverty-stricken Swedish immigrant and loner who had supplemented his meager income by selling his collections of Texas insects. While his name and reputation as a meticulous and pioneering collector lives on through patronyms and specimens, his personal life is a sad anecdote with no portraits ever found or kept by his estranged family in Sweden (Geiser 1937, Orbeck 1987).

Pselnophorus belfragei (Fish) is perhaps the most frequently encountered plume moth species in the Southeastern United States, occurring in both natural and suburban habitats, and now well known amongst moth photographers and community scientists. Despite the frequency of adults at lights, the immature stages, like the man behind the eponym, have remained poorly known. My first clue in discovering the larval foodplant of this species came from offering a "salad" -- bits and pieces of leaves plucked from vegetation collected in the vicinity of my porchlight in Gainesville, Florida -- to first instars hatched from eggs obtained from females collected at the same light in 1988. The larvae thrived on Carolina Ponysfoot, *Dichondra carolinensis* Michx. (family Convolvulaceae) and I reared several series of adults and preserved dozens of larvae and pupae. Six years later in 1994, Dale Habeck and I dug up a small clump of the plants in Gainesville and found a larva feeding on the plants, finally confirming *Dichondra* Jurors. & G.Forst. as a natural larval host.

Dichondra carolinensis (Fig. 1) grows naturally in moist hammocks and floodplain forests as well as disturbed sites (Wunderlin 1998). As a common lawn forb, it thrives in moist shady areas where it creeps along the ground and forms mats. The small round leaves only reach a few inches above the ground, so the mats are tolerant of frequent mowing. Larvae skeletonize the leaves (Fig. 2) and pupate on the host leaves or nearby vegetation. The interval from first instar hatching to adult emergence is about 34 days with continuous broods. Adults are present throughout most of the year in the southern part of the range with populations peaking in July.

Matthews 1989, Matthews et al. 1990, and Matthews and Lott 2005 first reported the larval hostplant (subsequently listed without citation by online data aggregators), and Matthews (2006) described the larva and pupae in detail. Brief diagnoses (setal nomenclature follows Stehr (1987)) are extracted from Matthews (2006) to accompany new (now digital) images from a series of *P. belfragei* reared from a captive female depositing eggs in April 2021 (Figs. 1-9). Upon hatching, first instar larvae were transferred from the snap cap vial of eggs and transferred to small petri dishes containing hostplant leaves and a wadded-up piece of wet Kimwipe. Later instar larvae were contained in potted flats of growing *Dichondra* for observation and photography. Images of larvae, pupae, and adults were taken with a Canon 70D equipped with a Canon 100mm IS macro lens and Canon Macro Twin Lite.

Final instar larva (Figs. 1-4) reaching 9 mm in length, 1.5 mm in width. Head pale yellow, body cream-colored with thin, broken reddish longitudinal stripes and a bold dark brown middorsal stripe. Segments A1-A7 with the posterior half of each middorsal stripe section resembling a shiny bubble. The middorsal stripe pigmentation persists in the cast larval exuvium (Figs. 6, 7). Primary and secondary setae on verrucae and verruca-like tubercles (D and SD). Setae clear or brownish tinged, most simple with pointed tips. Some primary setae on dorsum very minutely spiculate, some XD, D, and SD setae with very minutely tined tips. A few minute, blunt-tipped setae present on prothorax, D, and SD tubercles. Dorsal (D) setae long, reaching 1.25 mm. Lateral verruca (L1+L2) with short to long setae and two very long setae reaching 2.3 mm (Fig. 3). The larvae are best recognized by the long lateral setae and the middorsal stripe. The prepupa (Fig. 5) is pale grayish green with the dark middorsal stripe still present.

Pupa (Figs. 6, 7) reaching 8.5 mm in length. Body pale yellowish green, wings, pale green. Dorsal and subdorsal setae long. Subdorsal setae appearing lateral and projecting slightly anterad on A2-A4. Body with numerous short spinose secondary setae, most in longitudinal rows associated

Figure 1-9. *Pselnophorus belfragei* (Fish). **1)** Larva, dorsal view on leaf of *Dichondra carolinensis* Michx. **2)** Dorsal view of larva on leaf showing feeding damage. **3)** Dorsal view of larva showing extensive length of lateral setae L1 and L2. **4)** Lateral view of larva. **5)** Dorsal view of prepupa. **6)** Lateral view of pupa with adjacent larval exuvium. **7)** Dorsal view of pupa with adjacent larval exuvium. **8)** Ventral view of freshly emerged adult. **9)** Dorsal view of adult male.



with primary setae. Forewing with three main rows of short secondary setae. Hindwing with loosely organized row of short secondary setae. Antenna with a row of about 14 setae at base. Legs and maxilla naked. Spiracles on A2-A7 appearing as conspicuously elevated rods.

Adults (Figs. 8, 9) are often confused with the Ragweed Plume Moth, *Adaina ambrosiae*, but can be distinguished by the attenuate, curved first lobe of the forewing in combination with the gray ground color and distinctive spot pattern arranged in a smooth arc composed of the oblique cleft spot and spots at the terminus of veins R_2 , R_3 , and R_5 . The spot at R_3 is characteristic in appearing inset from the costal margin. The abdomen of *P. belfragei* is buff colored with conspicuous shiny white subdorsal and lateral longitudinal stripes, medially flecked by thin dark brown dashes. In contrast, the abdomen of *Adaina ambrosiae* is characterized by dark middorsal spots along the posterior margin of each segment which may be contiguous with more diffuse triangular patches on the anterior half of each segment. Matthews et al. (2014) described three other species of *Pselnophorus* from the Southern United States, distinguishing these from each other and *P. belfragei*, based on wing characteristics and male and female genitalia.

Range and Distribution Update

The range of *Pselnophorus kutisi* Matthews, Gielis, and Watkins, overlaps with *P. belfragei*, in Florida and eastern Texas, while *Pselnophorus hodgesi* Matthews, Gielis, and Watkins and *Pselnophorus chihuahuaensis* Matthews, Gielis, and Watkins, may meet in southwestern Texas but are not yet known to co-occur (Matthews et al. 2014). The life histories of all except for *P. belfragei*, are completely unknown. Given the ability of *Dichondra* to spread with suburban development and irrigation, it is possible that the range of *P. belfragei*, may expand further west.

To better understand the distribution and range limits of *P. belfragei*, I recently dove into what for me was uncharted territory, namely the accumulation of more than 39,479 United States Pterophoridae images on iNaturalist. This data mining quest led me to review observations on a state-by-state basis for the USA as well as all the bordering states of Mexico. I was able to confirm correctly identified *P. belfragei* images as well as identify undetermined and misdetermined images. A total of 1,837 *P. belfragei* observations were reviewed as of 1 January 2024.

Methods

While iNaturalist records are easily displayed using the mapping feature option, these may include incorrectly identified images at any given time, including those rated as “research grade” status. At present, most of the *P. belfragei* images have been vetted and a plot of records can be viewed along with those of the *Dichondra carolinensis* by using the following link:

<https://www.inaturalist.org/taxa/map?taxa=349724,%20128939#5/31.654/-89.944>.

To combine verified iNaturalist records with specimen-based county centroid records shown in Matthews et al. (2014), I started with the USA base map in Matthews et al. (2014) which was derived from a county boundary census map (Wikimedia Commons 2024). Black dots are used for specimen records, while gray dots are used for iNaturalist records. County centroids were merely eyeballed and plotted with the Adobe Photoshop paintbrush tool set at 30-pixel diameter. Specimen records were given priority so counties with black dots may also have iNaturalist records.

Results

The combined distribution map (Fig. 10) shows the significant contribution of community or “citizen” scientists. Western range extensions for *P. belfragei* were added for Texas and Oklahoma, and southern range extensions

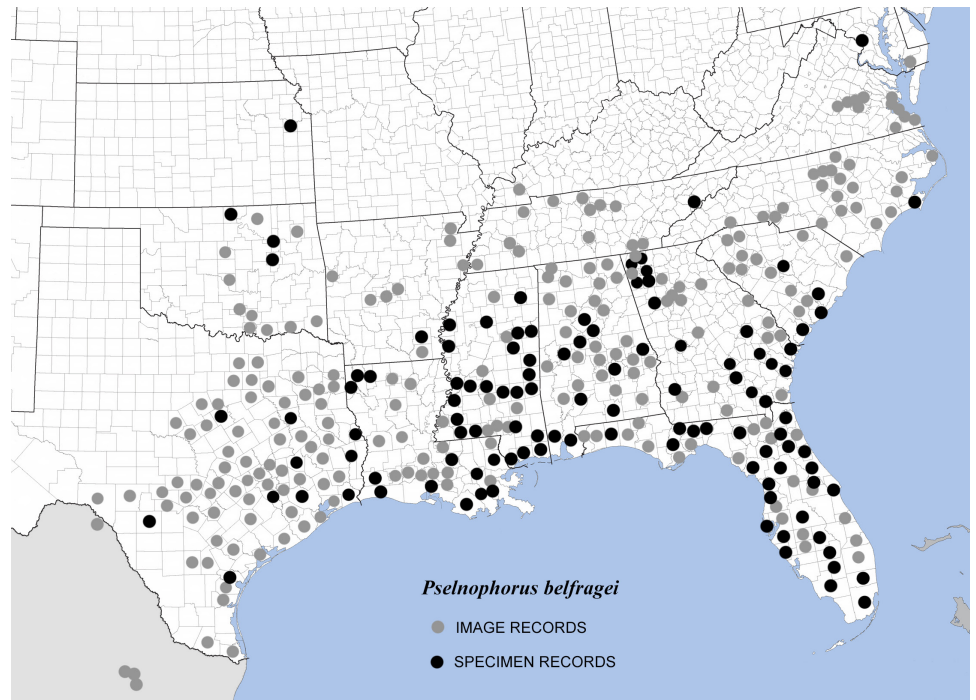


Figure 10. Distribution map of *Pselnophorus belfragei* showing center of county records. Black dots indicate records based on pinned specimens. Gray dots indicate center of county record or multiple records based on image vouchers available via iNaturalist. Image records may also be present in iNaturalist for counties previously established with specimen records.

included the southern tip of Texas and the states of Coahuila and Nuevo León, Mexico. While not extending the overall range northward, the states of Kentucky and Virginia were added to the species distribution. *Pselnophorus belfragei* is now known to occur in 15 USA states. County distribution records were noticeably filled in for several states, especially Texas, Alabama, Florida, and North Carolina. Table 1 shows the number of county records by state based on specimens alone and iNaturalist images. The number of individual observation records on iNaturalist was highest for Alabama and Texas. Individual records are higher in the states where several devoted iNaturalist photographers run light sheets on a nightly basis.

Discussion

Of the 168 described species of Pterophoridae of North America north of Mexico (Matthews 2023) fewer than 80 species can be reliably determined by images of live adults. Several problematic species complexes of pairs or triplets in multiple genera as well as larger sets of similar appearing species in the genus *Hellinsia* Tutt limit our ability to provide species level determinations without genitalia dissection. Nonetheless, iNaturalist is a valuable resource for biodiversity research and should not be ignored by systematists. For taxonomic specialists, the return is based on our efforts to contribute identifications. Many community identifications are based on superficial features and suggestions by the iNaturalist AI tools. The latter improve with time but are not a replacement for authoritative human input.

For *P. belfragei*, northern state distributions remain spotty with more collecting and photographic efforts needed north of 36th parallel in Virginia, Kentucky, Kansas, and especially in southern Missouri, the latter state having no records of *P. belfragei* at all. When looking at both the distributions of the larval hostplant and moth, it appears that these may be interrupted by the Appalachian Mountains and possibly by the Ozark Mountains in Arkansas and Missouri. The northernmost records of *P. belfragei* in Maryland and

Virginia follow the Atlantic Coastal Plain, suggesting records further north may be possible in Delaware and New Jersey.

Identifications of the other three species of *Pselnophorus* should be confirmed with genitalia dissection. Once the life histories of these species are discovered, it will be interesting to see where and if these species meet *P. belfragei* and if isolation by physical geography, habitat, and larval hosts were likely components in the evolutionary histories of these species.

Acknowledgments

I would like to thank Timothy Reichard for review comments and for all his efforts in the curation of iNaturalist Pterophoridae images, help in locating records and instruction on how records are processed, as well as for providing co-identifications to establish “research grade” status for many *P. belfragei* records. James Adams also kindly provided additional specimen records for Georgia, adding several counties. Thanks also to Laura Gaudette and Terry Lott for additional comments on the text.

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Table 1. Number of county records by state and individuals by state as of 1 January 2024

	Specimen County Records	iNaturalist County Records	Individual iNaturalist Records
Alabama	10	26	424
Arkansas	1	8	19
District of Columbia	1	0	0
Florida	28	21	206
Georgia	17	17	49
Kansas	1	0	0
Kentucky	0	1	2
Louisiana	12	15	193
Maryland	0	1	1
Mississippi	24	9	73
North Carolina	1	21	66
Oklahoma	3	10	134
South Carolina	4	12	109
Tennessee	1	12	36
Texas	10	66	498
Virginia	0	11	21

Morpho eugenia Deyrolle, 1860, an early riser

Mike McInnis

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During October 2003, Loran Gibson and I visited Yasuní National Park, Orellana Province, in Amazonian Ecuador. We spent most of our time in the vicinity of the Estación Científica Yasuní, at an elevation of 220 meters. We were primarily interested in observing Lycaenidae and Riodinidae, but attempted to catalogue all butterflies encountered, regardless of family. While dining at the research station, another researcher told us about a strange *Morpho* butterfly that only flew during very early morning, before sunrise. We were familiar with the pre-dawn flights of Brassolids and crepuscular skippers, but neither of us were aware that a *Morpho* flew before sunrise. Determined to see such a strange event, we positioned ourselves along the dirt road to the Estación, before 6:00 AM, in the hopes of seeing this mysterious *Morpho*. Sure enough, we observed several medium-sized pale blue *Morphos* that morning. Capturing the butterflies was a different story. Loran captured the only specimen and determined it to be *Morpho eugenia* Deyrolle, 1860.

I was fascinated by the flight habits of this strange *Morpho* and determined to observe it again, should an opportunity arise. Despite my interest and numerous trips to the neotropics, it was October 2015 before I saw another putative *Morpho eugenia*. That sighting was along a forest trail in Loreto Department, Peru (near Iquitos). Rather than being in flight, that individual was spooked from the trunk of a small tree, at approximately 9:30 in the morning. It quickly disappeared into the forest, making further observation impossible.

In October 2023, I finally made a long-anticipated trip to French Guiana with two friends. My interest in visiting this Department of France began 50-years ago when I first enjoyed the 1973 movie *Papillon*, a drama focused on France's former penal colony that tangentially showed convicts chasing *Morphos*.

One of the localities that we visited in French Guiana was Kaw Mountain, a narrow tepui with a maximum elevation approaching 340 meters. Kaw Mountain is known to support populations of all nine *Morpho* species that occur in French Guiana, including *Morpho eugenia*. Since we were staying on the tepui (at the Amazone Lodge), access to potential *Morpho eugenia* flyways before sun-up was certainly possible. However, I needed to both locate an active flyway and determine the correct flight time. Two potential flyways were easy to access and investigate. The first was a dirt road to the Lodge from the Roura-Kaw Road. This road was four to five meters wide and approximately 500 meters long, with mature secondary forest overhanging much of its length. The second potential flyway was the Roura-Kaw Road itself. That road is approximately 10 meters wide and described generously by locals as being "more or less paved". In the vicinity of the Amazone Lodge, much of the road is "less paved" gravel with numerous potholes. While forest borders both sides of the Roura-Kaw Road, some sections are relatively open while others are partially enclosed with over-hanging foliage. I decided to search both of these potential flyways, beginning at 5:45 AM.



Figure 1: *Morpho eugenia* (Deyrolle, 1860), photo by Didier Descouens, Muséum de Toulouse, Accession number MHNT. CUT.2011.0.161, copyrighted and licensed under Creative Commons Attribution-Share Alike 4.0 International.

On the first morning of my search, I observed two *Morpho eugenia* flying along the Roura-Kaw Road at heights of two to four meters. No *Morphos* were observed along the dirt access road. For the next four mornings, I searched the access road and approximately a kilometer of the Roura-Kaw Road from 5:45 to 6:45 AM. Over the five mornings, I was fortunate to observe twenty-two *Morpho eugenia*, all along the Roura-Kaw Road. Observations ranged from a minimum of two on the first day to a maximum of eight on day four. Greater numbers were observed along stretches of the road that were partially enclosed with vegetation, forming a narrower flyway. The earliest observed flight was at 6:01 AM and the latest was at 6:20. However, the total flight period never exceeded fifteen minutes on any given morning. Surprisingly, the flight time did not vary materially in response to weather conditions. On one morning the sky was clear; two mornings had partially cloudy skies; two mornings were mostly cloudy with brief periods of light rain.

On the first day, both individuals were flying east along the Roura-Kaw Road. However, on each of the next four days *Morpho eugenia* flew in both directions, rather than proceeding in a single direction. Twenty of the twenty-two observations were of individuals flying along the road (for at least 15-20 meters) rather than across it. If disturbed, these butterflies would veer off-road into the sanctuary of the forest. Most individuals flew at heights of three to five meters with a bouncy flight that seemed designed to confuse potential predators. The butterflies appeared to briefly disappear in the dim light when their brilliant dorsal surface was obscured by their wings closing in flight. Although *Morpho eugenia* has reportedly been attracted to pale blue lures and to light sources, I did not observe any

response to either blue or silver lures or to a flashlight.

Curiously, on each of the five days a large swarm of what appeared to be a species of horsefly began flying around my head shortly before the first butterfly was seen. When the flies quit swarming the *Morpho eugenia* flight was over and I did not observe a single additional butterfly. Both butterfly and horsefly were apparently stimulated to fly by the same levels of light intensity.

Morpho eugenia is a fascinating butterfly. Those visiting tropical lowlands, would be well-rewarded by locating a flyway and observing this beautiful species in flight. An additional benefit of searching for *Morpho eugenia* is that tropical forests at dawn are both beautiful and offer fascinating opportunities to view a myriad of other wildlife.

Editor's Note: In 1985, I was on an Organization of Tropical Studies course for graduate students in Costa Rica. One of our study sites was just outside of Corcovado National Park on the Osa Peninsula in southwestern Costa Rica. I observed the same phenomenon that Mike McInnis did, only in my case it was with the species *Morpho amathonte*. I was involved in a number of different quick studies on various organisms, and each morning as I walked along an open dry creekbed (which seemed to be a natural flyway). I observed males flying between 6:00 and 6:30 a.m. in both directions along the creek bed, sometimes interacting with each other when their paths intersected. I never saw a female at this time (though I did see some later in the day). It makes me wonder what sort of selective advantage this early morning flight provides to the males, since it is not immediately obvious that this has anything to do with mate attraction/interaction or obtaining food.



Two species of recently described Notodontidae: *Baltodonta broui* Miller and Franclemont, 2021, and *Schizura matheri* Miller and Franclemont, 2021. These species are both quite local in the southeastern United States, but at least *B. broui* can be found in numbers in the right places. Both of these specimens were collected in May 2019 at the Fall Line Sandhills (West) Wildlife Management Area, Taylor Co., Georgia (U.S.A.). Images by James Adams.

Announcements:

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 trolep.org website for further information and a sample journal. Send dues to ATL Secretary-Treasurer, PO Box 141210, Gainesville, FL 32614-1210 USA. We hope you will join us in sharing studies on the fascinating world of tropical butterflies and moths.

The 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.

The annual meeting is typically in September or October, often in a shared venue with ATL (see above).

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.

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 annual meeting is in the fall, typically in November. 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.

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

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>

Wedge Entomological Research Foundation Student Award

The Wedge Entomological Research Foundation (WERF) was founded to promote the study of insects, their evolution and diversity, and in particular to research and publish information on the moths of North America. WERF's flagship publication is the *Moths of America North of Mexico* (MONA) series, of which many fascicles are available for free in PDF form at http://wedgefoundation.org/publications_paypal.asp. The Foundation runs an award program for students. This Student award is up to \$1,000 per year, and can be used for expenses related to the study and conservation of moths, butterflies, and related insects (e.g., travel to meetings, field station room/board, biosystematics research costs, etc.). High school, undergraduate, and graduate students are eligible. WERF is especially committed to supporting underserved groups. Applicants should submit a one page (500 word) project description with an indication of how the funds will be used. The committee will begin making awards after **MAY 15, 2024** although applications may be considered through June. The application should be accompanied by a resume or curriculum vitae, and a letter of recommendation from the student's major professor or academic advisor. Please email all application materials to the committee chair, David Wagner, at david.wagner@uconn.edu. Preference will be given to proposals that focus on Lepidoptera. Completion of a 350-word summary of project findings, with one to two appropriate images, is required by 31 December of the award year. Support from WERF should be acknowledged in relevant presentations, publications, web products and similar deliverables.

Summer Internship -- Idaho Moths

We are looking to employ a summer intern to sample moths in a remote part of southwestern Idaho from early June through at least mid-August. Primary goals will be to collect baseline surveys of moth populations using light trap samples and collect and photograph macrolep caterpillars. An important aspect of the caterpillar surveys will be to document tri-trophic interactions between caterpillars, their hostplants, and parasitoids. The intern(s) will learn basic plant identification, DNA barcoding (for caterpillar and parasitoid identification), insect macrophotography, and have an opportunity to interact with entomologists, botanists, and BLM wildlife biologists. Data from the survey will be used to inform conservation and BLM management decisions, yield baseline data on insect diversity in the region, and contribute to ecological studies examining trophic specialization (diet breadths) and food web structures across latitudinal gradients. Additionally, caterpillar collections and images will be used in species accounts for a book on the caterpillars of Western North America. The position will include free lodging and a summer stipend. For more information about the position contact David Wagner (david.wagner@uconn.edu).

Monarch Research Award

The Monarch Butterfly Fund is pleased to announce the next round of our Lincoln P. Brower Awards. In honor of Dr. Lincoln Brower's extraordinary dedication and commitment to monarch conservation, the Monarch Butterfly Fund has established the **Lincoln P. Brower Award**, a \$3,000 grant to support undergraduate or graduate students in research on the conservation of monarch butterflies and their habitats. This award is open to students in Canada, the U.S. and Mexico and may apply to research anywhere along the monarch's migration route.

More information can be found at <https://monarchconservation.org/grants/lincoln-p-brower-award>.

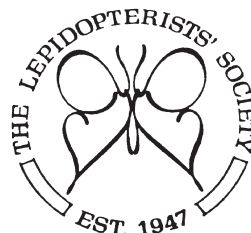
The deadline for applications is **March 31, 2024**.

We hope that you will encourage your students to apply for this award, or forward the information to others who advise undergraduate or graduate students working on monarch conservation.

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, attachments, 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.



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

72nd Annual Meeting of the Lepidopterists' Society

Ithaca, New York, July 14 – 18, 2024

Please join us for the 72nd Annual Meeting of the Lepidopterists' Society in beautiful Ithaca, in upstate New York on the traditional homelands of the Gayogohó:nq? (the Cayuga Nation). July is a beautiful time to explore the multitudes of waterfalls and gorges in the area as well as peak diversity in the local Lepidoptera. Dozens of protected areas blanket the region from state parks and forests to many nature reserves managed by the Finger Lakes Land Trust or Cornell Botanical Gardens.

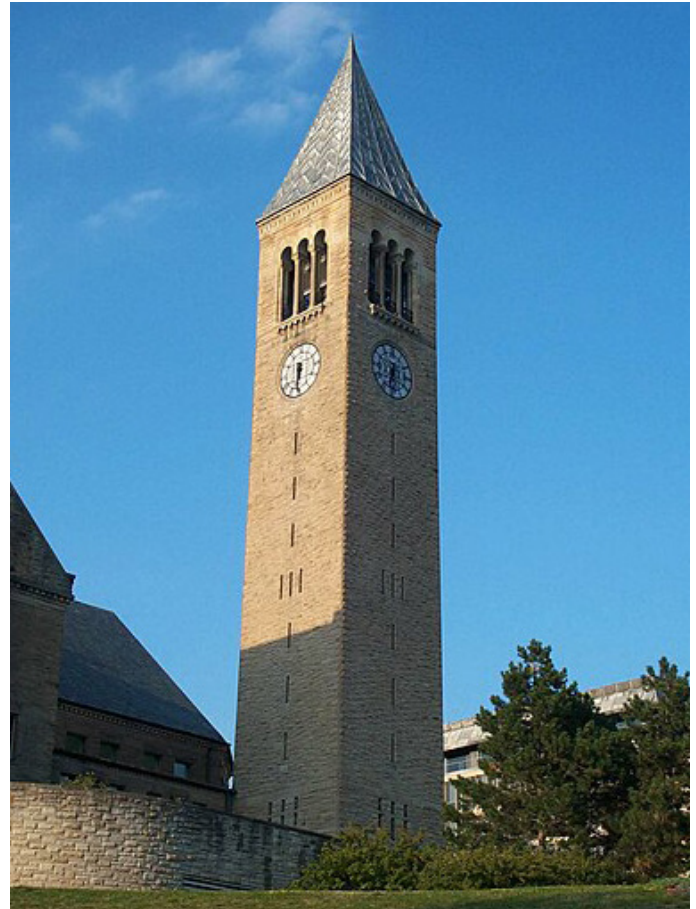
Beyond the natural beauty of the area there are numerous wineries, cideries, breweries, distilleries, fromageries, farms, and a world class farmer's market. These can all be enjoyed as well at our excellent diversity of restaurants including the world-famous Moosewood Restaurant.

The Cornell University Insect Collection will be available for both tours and research. This collection began in the 1870s as a local collection of insects of agricultural importance and rapidly grew through numerous global expeditions. The current holdings are about 7 million specimens from nearly every country of the world, with about 1.2 million of these being Lepidoptera.

Diurnal and nocturnal field trips will be held for both collectors and observers in nearby natural areas. Details to follow.

The executive council meeting will be held on July 13th, 2024 in Comstock Hall. The full schedule of events will be available shortly.

The organizing committee consists of Jason Dombroskie, Bob Reed, Noah Brady, Kanika Jakhmola, Jeanne McDonald, Kevin Schermerhorn, Jarrod Varnell, Jack Whisenant, and Maddie Worth. For queries, please contact meeting@lepsoc.org. We look forward to seeing you in Ithaca!



Upper right: Cornell's McGraw Tower. **Lower left:** Drawer of acronictine noctuids from the Cornell University collection. **Lower right:** Taughannock Falls

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 impressions 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 unforeseen 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

Corrections to the Winter 2023 News Table of Contents

As always, I am deeply appreciative of all the contributors to the News. In the last issue, there was an article on the Seminole Crescent (*Anthanassa texana seminole*) on pages 172-182 by Gary Ross and John Edward Hartgerink. Similarly, Bill Berthet and Sonam Dorji provided an excellent photoessay on the Butterflies of Bhutan on pages 188-197. However, for some reason, when I constructed the Table of Contents, I left out the co-authors for BOTH of the above papers. So I wanted to make sure and give a shout out to both **JOHN EDWARD HARTGERINK** and **SONAM DORJI** for their contributions to the Winter 2023 issue of the News!!

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!

Matthews *Pselnophorus* *belfragei*, continued

Continued from p. 9

- Matthews, D. L. 2006.** Larvae and Pupae of Nearctic Pterophoridae: A Synopsis of Life Histories, Morphology, and Taxonomy (Lepidoptera: Pterophoroidea). PhD Dissertation, University of Florida, Gainesville. 959 pp.
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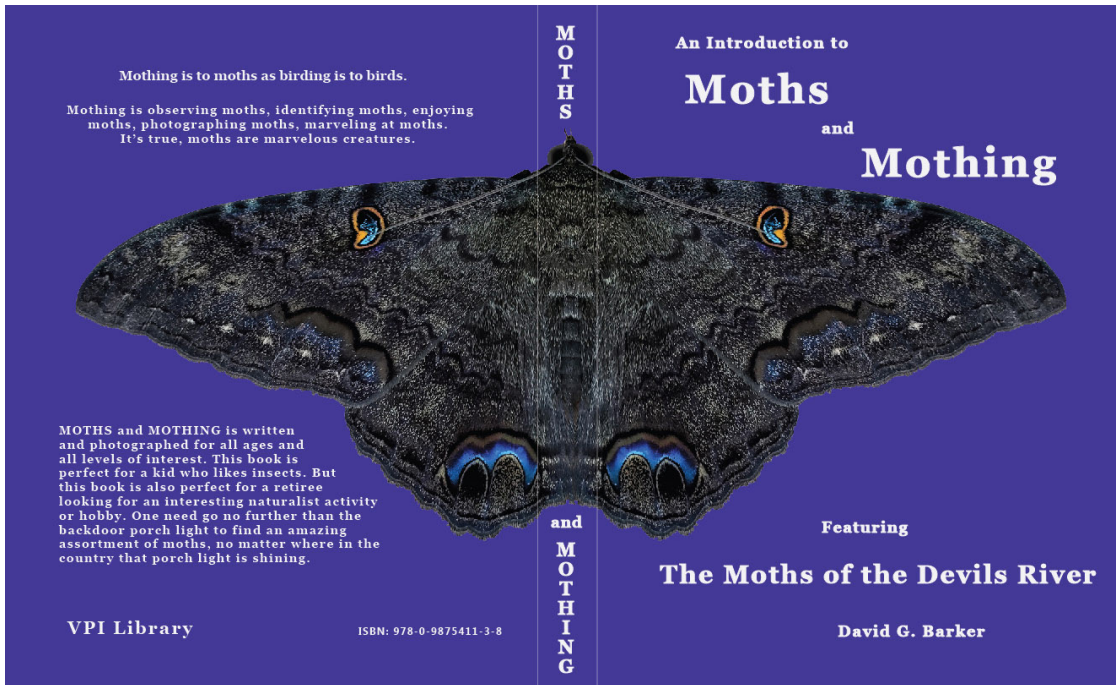
Book Review

images below). It is well written with a lot of detail for moth newcomers. The writing and images indicate that the author clearly targeted this book for those who have

never contemplated turning their attention to moths. The author, who hails from the world of reptiles (so there are a few images of snakes, one eating a sphingid caterpillar), explains in the Epilogue that he was a lepidopterological newbie at one time, and because he came from the world of comparatively species depauperate vertebrates, had no idea that there were so many species of moths.

The author covers all the relevant topics for

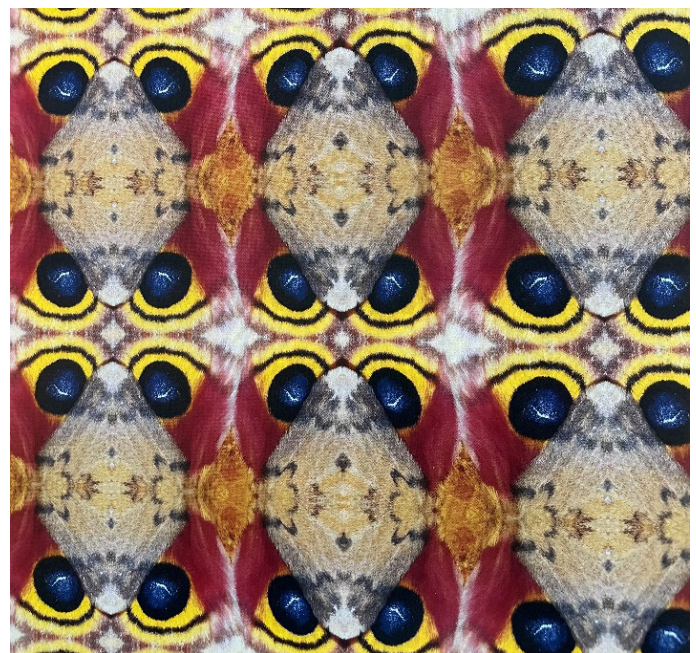
someone who is just dipping their toe into the vast world of moths: classification, diversity, life cycle, cuticle and scales, body, color and pattern, sensory organs of the head, hearing, sound generation, and many other ecological interactions. He provides several how-to chapters: mothing, identification, and his forte, photography. I can tell his photography is outstanding because many snout moths, or pyraloids, my favorite group, have a “sheen” or iridescence that he sumptuously captures in his images. The chapter on “The names and numbers of moths” explains the use of



An Introduction to Moths and Mothing featuring The Moths of the Devils River. By David G. Barker. Hardback. 244 pages. ISBN: 978-9785411-3-8, published by VPI Library, P.O. Box 300, Boerne, Texas, 78006, and is available from their website at <https://vpi.com/store> (regular edition \$45 + shipping; leather bound edition \$144 + shipping; contact the author for international shipping).

In 2019, I visited Delmar Cain’s beautiful property in Boerne, Texas, to study aquatic snout moth caterpillars (Smith-Rodgers, 2019). While I was there, Delmar mentioned that I should visit David Barker, who lives and collects moths on the Devils River. Fast forward to December 2023, when I received an email from Delmar suggesting that I take a look at David Barker’s new book: *An Introduction to Moths and Mothing, Featuring the Moths of the Devils River*. I contacted the author who very generously sent me a copy of his book. I am from Texas, and yet my first question was “Where is Devils River?” It is west of San Antonio, Texas, just as the U.S. border with Mexico is bending northwest and before it goes south again toward Big Bend National Park. The author explains that the term “devil” refers to a “canyon or watercourse” where it is impassable on horseback. Nearby, the Devils River State Natural Area has paddle-up campsites and is visited by about 1000 paddlers every year. And if you want to visit one of six darkest places in the world, it is also designated an International Dark Sky Sanctuary (Oko, 2019).

This is a splendidly illustrated book, including the end papers and “full page pattern images” that were created in Photoshop® from magnified images of moth patterns (see



Hodges species numbers to “name” the moth species if a neophyte chooses not to use scientific names.

He follows this with the last chapter about the Devils River. Frankly, I would have liked to have seen this extensively illustrated chapter right up front. He introduces this fascinating area to readers by describing and illustrating the plants and animals, including photographs of the landscape. He writes “The river is a spiritually magnificent place, beautiful and almost ethereal to gaze upon from a high bluff. The blue-green water is the clearest and purest to be found in a Texas river.” This chapter makes me want to get into a plane or car and visit as soon as possible.

The final section is “The Plates” and includes over 710 stunning images of 558 species of live moths, each with the scientific name and the Hodges species number. This is a large format book (11 ¼ x 8 ¾), so the images are large enough to appreciate the intricate patterns of the moths, including micromoths. And because the moths are alive, the colors are still in place and vivid, particularly the green colors that are most often lost with time. The moths are photographed in their resting state, so often only the forewings are visible.

The author has observed about 558 species at Devils River, and he reckons that 12% of the species are probably northernmost records that also occur south of the border with Mexico. The southern U.S. border is where Nearctic and Neotropical species can overlap, and there is a general lack of knowledge about distributions in Mexico for many moth species and, therefore, an underestimate of moth diversity (Solis et al. 2023). The unspoiled area of the Devils River is poised to be a source of knowledge about moths, their biology, diversity, and distribution for many years to come. I highly recommend this book for its beauty and as an introduction to moths, and also a visit to this beguiling area.

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Metamorphosis

Paul J. Russell (1945-2023)



Paul Joseph Russell enjoyed a life-long interest in Lepidoptera, from summer camps as a boy, to slogging through rainforests and skittering on mountain slopes as an adult, to recording and rearing, to compiling local species lists and new records of appearance, to public education and awareness, to work on the proper dispositions of collections. He and wife Sandy have been long-time members of the Lepidopterists' Society, Tropical Lepidoptera, Xerces Society, NABA, Lorquin Society, Monarch Project, and Santa Barbara Entomology Group. He has served as volunteer and Trustee at the Santa Barbara Museum of Natural History, and before that at the Los Angeles County Museum of Natural History.

While Paul enjoyed a professional business career as an analyst at Wall Street investment firms in New York, and as Vice President of several California based companies, after retirement he found the most satisfaction in Santa Barbara, maintaining and sharing the Lepidoptera collection of global species. The North American Lepidoptera Collection, of 50,000 specimens, spanning 50 years, representing western mountain areas and the West Coast from Alaska and Canada to Mexico, has been deposited at the Santa Barbara Museum of Natural History. Paul and Sandy volunteered weekly in the collection, incorporating their specimens and those from other donated collections (from Tom Dimock, Ken Denton, Ed Pfizer, Chris Grinter and others) into the main collection in the revised order, doubling the size of the museum's former collection. The Collection represents a fine resource over time of the western and local species, made available for study.

Paul was born in Kalamazoo, Michigan, the second of five children of Edward Paul Russell and Josephine Gibbens Russell. In school, Paul excelled in science and math, qualifying for advanced programs, turning the family's backyard underground bomb shelter into a laboratory. He was the first Ivy Leaguer in his family, attending Yale University as an Economics major. In his senior year, his student job was attendant at Yale Art Gallery, where on a day in March he met Sandy. She was working at Yale School of Medicine as a research assistant while completing her MA at Duke University. She came to see the art, but left

her correct phone number with the attentive receptionist. Butterflies were never mentioned during the courtship, but soon after marriage and a move to New York, they discovered that both had collected butterflies and moths and had maintained scientific collections as kids. Thus began a mutual life interest, as vacation and avocation.

Paul began his first Wall Street job, married Sandy, and moved to New York, eventually settling in to an 1890's brownstone in Brooklyn Heights. Their daughter Beth was born there, giving a new perspective to urban life. Paul helped organize a block association that cleaned up the street, saved ancient trees, and opened a play park for neighborhood kids. They discovered that several hardy species could be found living in the city. In an urban setting that can be humorous. The neighbors were puzzled to see Paul on the streets of Brooklyn Heights with a huge bundle of ailanthus stalks slung over his shoulder. Sandy was rearing *Samia cynthia*, discovered in a dangerous vacant lot under the Brooklyn Bridge. The broken dumb waiter in the brownstone apartment was turned into a cabinet for drawers. And when the family, including daughter Beth, moved to Greenwich, CT., they had reconnected with Yale University, especially with their Entomology department and Dr. Charles Remington, who became a mentor to the Russell's collecting field trips, on-site studies and rearing of Lepidoptera. The collection now occupied a full room in their home.

Paul's next professional move took him to California, where the family lived in Mission Viejo, then Malibu, and finally Santa Barbara. With each move came a more extensive black-light set up, recording and rearing of local moths, more drawers of specimens, more cabinets and bookshelves. In Malibu, Paul and Sandy became neighborhood organizers, forming a block association, and the West Malibu Community Council, defending against development of natural areas. The couple were supporters of the Charmlee Natural Area Park, especially of the park docents who led school groups on the trails, improved a Nature Center, and hosted public park programs, such as "Moth Night" and live insect "petting zoos".

On moving to Santa Barbara, they gravitated to the Santa Barbara Museum of Natural History. Both volunteered for docents and special programs featuring education and up close contact with live insects. The couple were also supporters of the Museum's Butterfly Pavilion. Paul decided to give the North American Lepidoptera Collection of 50,000 specimens from the western

US, over 50 years effort, to the Museum's Entomology Department, which has been accomplished. In addition, Paul had been a Trustee of the Museum's Board of Directors, serving mainly on financial committees, helping to guide the non-profit institution through uncertain economies.

Paul had an early interest in botany, introduced as a student working at a florist and plant nursery, and encouraged by his mother's service as President of the Michigan Garden Clubs. He enjoyed getting out into wild nature, hiking, camping; and in collecting butterflies became knowledgeable of the flowers and plants that nurtured them. In Malibu and in Santa Barbara, Paul was an advocate of native plantings, to restore the natural ecology. Most especially in Santa Barbara, he restored the fire scorched landscape with professional guidance, and delighted in the rich spring bloom of the native flora, and the butterflies they fed.

In Santa Barbara, Paul also discovered the resources of UCSB, and enrolled in many classes in geology, archaeology and architecture. Architecture classes led to tours of European Gothic cathedrals, and encounters with French cuisine, cheeses, and wines. Archaeology led to treks through ruins, henges, temples, and caves throughout Europe and Central and South America. He followed exciting new science, attending lectures at Kavli Institute for Theoretical Physics. Paul and Sandy were also regulars at the Santa Barbara Symphony, and attended many fine art events and receptions, as both art collectors and artists.

Paul let his interests guide him socially, and was known for years as a congenial host of many Lepidopterist parties. He was supportive of the Lorquin Society in Los Angeles, and the Entomology Group in Santa Barbara.

Perhaps his favorite pastime was to enjoy dinner with wine outside on the patio, overlooking the Pacific with a glorious winter sunset over the water, listening as the night sounds began with the stirrings of owls. Paul enjoyed his life in both professional and amateur pursuits, and gave back wherever he could with experience, support, and physical involvement.

His illness seemed brief, with a few subtle symptoms; when diagnosed, lung cancer moved quickly, and his passing was sudden. His family has needed time to adjust and heal from the shock. Paul is survived by his wife Sandy, daughter Beth, married to Kurt Russell, and grandson Ronan, of Goleta.



A Memorial Celebration of Life is planned for March, when his favorite wildflowers will be in bloom, at the SB Museum of Natural History. The family suggests that in lieu of flowers, a contribution to the SBMNH would be appreciated. For Memorial details, and a possible Zoom connection for those at a distance, please send your email address to Sandy at malimoth10@gmail.com.

Sandy Russell

Eric Metzler (1945 - December 3, 2023)

It is with heart felt sadness that the Metzler family announces the death of Eric H. Metzler, 78, of Alamogordo, NM. Eric passed away December 3, 2023.

He was preceded in death by his parents, Lois M. (Bastian) Metzler, Clarence H. Metzler; and son, Meredith Gene Metzler. Eric is survived by wife Patricia Ann of 56 years; daughter-in-law, Kelly M. (Riley) Metzler and grandsons, Riley Quinn Metzler and Kieran Jackson Metzler of Gaithersburg, MD. Eric is also survived by siblings, Alyson L. (Jim) Baker, of Dent MN; Todd E. (Regina) Metzler, of Hart, MI; Mitzi F. Metzler, of Iron Mountain, MI; and sisters-in-law, Margaret R. Peggy Trescott, of Lansing MI, Vickie Z. (Gregory) of Pence Wheeling, IL; Robin F. (Edward) Messing, of Sandusky MI; and numerous other family members, nieces and nephews.

Eric was born and reared in Michigan. In his words, he started studying insects when he was “knee high to a grasshopper” and he never stopped this study. Eric served as an officer and was honorably discharged from the United States Coast Guard. He received a BS in Park and Recreation with Minor in Entomology from Michigan State University.

Eric enjoyed his career with the Ohio Department of Natural Resources' and retired from the position of Acting Chief of the Division of Watercraft. When Eric retired he was named Ambassador of Natural Resources by Governor George Voinovich. After retirement, Eric intensified his study of moths and butterflies and in 2005 he was inducted into the Natural Resources Hall of Fame for his efforts promoting insects as a natural resource. Eric was a researcher, prolific writer of many scientific papers, books, naming moths new to science. Eric also was a bibliophile, and natural history book collector. He continued the Long Term Study of the Moths of White Sands and Carlsbad National Parks up to his death. Eric also was an associate at the Natural History Museum at the Smithsonian in Washington, DC.

Eric was a member of numerous Lepidopterist Societies, co-founded the Ohio Lepidopterists where he served as president and was news editor for 20 years. He also served as Secretary, President and Director of the Wedge Entomological Research Foundation, and served as President

of the Lepidopterist Society.

Eric loved life. His joy was his son and his two grandsons. Eric also had a rare sense of humor. He always practiced “paying it forward” by always finding teachable moments, being an educator, speaker, sharing all research, teaching and mentoring students of all ages.

Eric requested that the following short paragraph attributed to teachings from the Bible be recited by each person feeling the loss of Eric's passing to the next stage of his life.

“There is No Death”

I am standing on the seashore. A ship at my side spreads her white sails to the morning breeze and starts for the blue ocean. She is an object of beauty and strength, and I stand and watch her until at length she is a speck of white cloud just where the sea and sky come to mingle with each other. Then someone at my side says “There! She's gone!” Gone Where? Gone from my sight. That is all. She is just as large in mast and hull and spar as she was when she left my side and she is just as able to hear her load of living weight to her destined harbor.” “The diminished size is in me, not in her. And just at the moment when someone at my side says “There! She's gone!” there are other eyes watching her coming and other voices ready to take up the glad shout.

“There She Comes!!”

“And that is dying.”

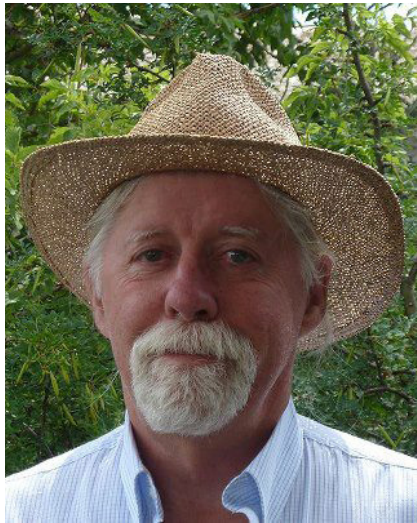
Eric, as a 2-time survivor of cancer, requested in lieu of flowers donations be made to the cancer society.

The Metzler family has entrusted their loved one to the care of PCS Direct Cremation Service for direct cremation.

Pat and Kelly Metzler



Gary Gustav Anweiler (March 6, 1944 - October 12, 2023)



The Lepidopterists' community is honoured to mark the passing of Gary Anweiler, at the age of 79 years. Gary was a longtime member of the Lepidopterists' Society, and was instrumental in forming the Alberta Lepidopterists' Guild. He was a world-class noctuid expert, a generous mentor, and beloved friend to so many; a truly unique soul who leaves a

huge mark on everyone he touched.

Childhood

Gary was born on March 6, 1944, in Saskatoon, and grew up in Melville, SK. The family also had a property at nearby Crooked Lake, in the Qu'appelle Valley, and Gary and his four younger sisters grew up exploring there. Gary was always crazy about birds and butterflies. By the age of 7, he was collecting insects and bird eggs. The local newspaper ran a story about him when he was 11 years

old, where Gary explained how he got the eggs: "It wasn't just a matter of climbing a tree... the idea is to stick them in your mouth, so as not to damage them on the way down from the tree. Some of them break, though".

By the time Gary was in his teens, he was a noted local naturalist, and had come to the attention of Robert W. (Bob) Nero, Assistant Director of the Saskatchewan Museum of Natural History. Gary, along with several other youngsters, formed a cadre of bird-crazy youngsters who were mentored by Bob; all of them went on to careers in ornithological research.

Early Birding Career

In 1959, Bob Nero organized a meeting of the American Ornithological Union in Regina. This was a key event for Gary and the other young birders. The boys were taken out on field trips to experience ornithological work with professional ornithologists. Gary's first scientific article was a note about an influx of Boreal Owls in Melville, published in *The Blue Jay* in 1961. That spring, Gary had to finish his grade 11 exams early in order to go on an expedition to the South Saskatchewan River valley with provincial museum employees. Later that summer, he and fellow birder Ross Lein were invited by American researcher Fran Hamerstrom to a research station in Wisconsin.

Gary's classroom was the great outdoors, and he was not comfortable with school and the academic world. After graduating in 1963, he enrolled at the University of SK,

but he only lasted one year there. His friend Glen Fox relates: "Gary was not an academic ... he was a hands-on guy, full of practical skills. Those introductory classes at university bored him silly."

Through the early 1960s Gary and the other young birders spent their summers working on various field projects for Bob Nero in northern SK. In the summer of 1964, Gary and Ross Lein set out on a survey of birds in northern SK. Many years later, Ross tells the story as follows:

On July 7 we flew to Milton Lake, 100km northeast of Black Lake. We flew in a single-engine float plane with a 14 foot canoe strapped to the floats. The plan was to canoe back to Black Lake along the Porcupine River,



Left: Gary 2-3 years old. **Right:** Gary, 11 years old, with insect and egg collections.



Gary at 15 yrs with a kestrel, taken during the ASU meeting in Regina in 1959 (photo by Glen Fox).

documenting and collecting birds as we went. The pilot asked us if we wanted to follow the river, or fly the most direct route. Fortunately we chose the river... [on the flight up], we spotted a 10-foot waterfall between sheer cliffs. Our portage had to be started almost half a mile above the rapids. If we had paddled down the gorge, it would have been the end of the story. [The Porcupine River is now popular for remote white-water adventure canoeing, but at that time it was poorly known and Indigenous peoples ventured onto it only when it was frozen in winter].

On the late afternoon of July 11, our first day on the river, we got caught in a summer thunderstorm in the middle of a small lake. Both of us, and all of our gear, were soaking wet. We pulled over to shore to set up camp and dry out. Starting a fire was difficult - all of the wood was wet. An old trick is to find rotting logs and get dry wood out of the center. I was chopping at a log with a hunting knife with no blade guard. The handle was wet and my right hand slipped down the blade, cutting the ring and little fingers to the bone. We poured iodine from our limited first-aid kit on the cuts, and bandaged my hand with part of a clean T-shirt. We decided to get back to Black Lake as quickly as possible. I could not pull on a paddle with my right hand, but I could hold the butt with it. This meant that I could paddle only on the left side of the canoe. Gary was stuck doing all the work steering the canoe through the rapids from the back seat. We arrived at the fishing camp on Black Lake on the morning of July 15, after crossing the lake at night to take advantage of the calmer wave conditions. In an email that Gary sent to me in 2006, he recalled: "we damn near were ghosts. When I think about that all-night night paddle across Black Lake in the beat-up old 14-foot canvas canoe with about 3 inches of freeboard, I still shudder. Even a light breeze that night probably would have killed us."

I was flown to the hospital in Uranium City the same day. It was too late to do any repairs on my fingers - I still have limited flexibility in the last joints of the two fingers and

they are the first to get cold when I go outside on a cold day. They remind me of the amazing times that Gary and I had together. I think I can honestly say that I owe Gary my life, in more than one way. I might not have returned from Milton Lake without his efforts. In addition, our time spent together solidified my decision to go on to graduate school and complete a Ph.D. in Ornithology.

Hippie years

By the mid-sixties, the times they were a-changin', and Gary found himself caught up in the hippie movement. Saskatchewan was a long way from Haight-Ashbury, but it was an important focal point for the Canadian scene. During or shortly after his time at U of SK, Gary met Dr. Duncan Blewett, a pioneering psychologist and early researcher in psychedelics. Dr. Blewett was a bit of a guru to young people, and he became an important mentor and lifelong friend to Gary. Among other adventures of the body and mind, Gary tells of a party one night in Regina, where he spent the evening tripping on LSD with Leonard Cohen.

In the mid-sixties (the details are fuzzy) Gary set off with a friend on a "trip around the world". They drove an old truck from SK to Vancouver; the plan was to sell the truck and get passage on a freighter to travel cheaply to Asia. That didn't quite work out as planned. They couldn't arrange passage on a freighter there, so they headed south, getting as far as San Francisco, where they joined the Haight-Ashbury hippies. From "San Fran", they eventually headed to Tijuana, and spent some time on the beach in Baja California.

In 1971, with the spirit of the 60s still in his veins, Gary decided to head for the West Coast to join the hippies there. When he arrived at Long Beach on Vancouver Island, a band of young people were living wild and free on the beach; he realized that if he wanted to be accepted, he needed to make himself useful. He saw that they were living in shelters among the driftwood logs, and trying to keep warm at night with driftwood fires, but nobody had a saw. Gary spent some of his precious dollars on a swede saw, and he and his saw were warmly embraced by the hippies. His friend Mike Gollop joined him there later, in the fall:

"I can still see his face in the light of the big bonfires that formed the centerpiece of each evening with its revolving door of odd and wonderful people dropping by to talk and partake of whatever might be partaken of!"

Throughout the 1970s, Gary continued doing contract birding work, in between travels. In 1975, Gary again headed for Mexico, with Mike Gollop. They drove south from Regina, camping along the way until they reached Tucson, and then Nogales, Mexico. As Mike tells it:

"The trip, as with most things Anweiler and I undertook together, was not without incident though this trip exceeded even our usual quota... Our entrance into Mexico was less

than auspicious. Again we found ourselves in a bar in Tucson and after some imbibing we decided that it was certainly time to introduce ourselves to the good people of Mexico. Arriving in Nogales we were 'courted' by numerous ladies and then, while walking from one bar to another, we were picked up by the police for being out beyond curfew... we spent the night in the Nogales jail. We were the only gringos in this large cell with about 15 others and one 5 gallon pail – no bunks, people just sat around leaning against the wall. I have a clear recollection that Gary, ever the gregarious one of us, was chatting with everyone and would occasionally break into a popular country song we had just heard for the first time that day back in Tucson. At one point one of our fellow cellmates looked at him and said 'greeengo, pleeeze shut up!'... At one point in the night a guard came in to drop off a few more folks into our already overcrowded cell when Gary took it into his head to walk out and visit with people in the neighbouring cells. And so it was that when morning finally came and I was allowed to pay our fines they had to search all over to find him. Once released we had to use more of our rather dear cash supply to take a taxi up and down all the streets in order to find our truck!... We got out of Nogales as quickly as we could and found a quiet place to just pass out. I remember vividly when I woke up that Gary had chosen his resting spot on the railway tracks – like right between the rails – and Mexico has a lot of train traffic."

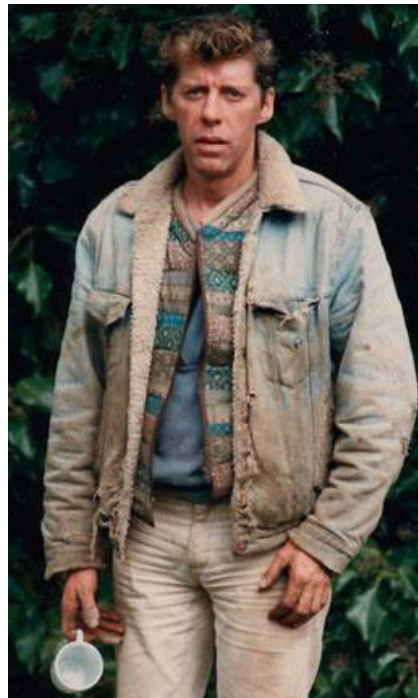
In Gary's version of events, when he came to and was finished puking over a fence, he looked up and there, perched in a tree, was the avain quarry that had brought them to Mexico in the first place - a majestic Phainopepla.

Gary and Mike hung out for a time on the beaches of Baja California, where they camped on the sand and lived mostly on fish. Gary had a makeshift fishing rod, made out of a stick with a beer can for a reel, that was highly effective at bringing in dinner.

"No matter how remote a village we came upon Anweiler never failed to find the essentials – beer and tortillas. During this time Gary also made a collection of pressed plants for the Regina museum. Of course we never gave this a moment's thought but on hindsight how crazy was it for two long-hairs to cross back into the States with a pressed plant collection?! Aside from running completely out of money and having to pawn my lucky silver dollar in Cheyenne we made it back intact and filled with memories for a lifetime."

Upon his return from the Mexico trip, Gary continued to do contract birding work for Bob Nero, and the Canadian Wildlife Service.

Gary met his first wife Sandy through his birding work at the museum, in the late 1970s. Gary and Sandy got married, and they had a daughter, Lani, born in 1981, joining Sandy's twins from a previous relationship. They moved to Nanaimo, BC around the time Lani was born, but they struggled in their marriage and the relationship was over by 1986.



Gary at "Haven by the Sea", about 1986.

After his first marriage ended, Gary found himself somewhat at loose ends with his life. He had attended a retreat at "Haven By The Sea", a facility on Gabriola Island in southwestern BC that specialized in psychology and personal growth. Gary had found some personal solace there, and had stayed on at "The Haven", employed as the groundskeeper. It was there that he

met his second wife, Judy Weisgarber, a Psychologist who was attending a workshop at The Haven.

Life in Edmonton

Gary and Judy began a long-distance relationship; he stopped by in Edmonton on the way to visit relatives in SK, and before long she was spending partial summers on Gabriola and he was spending winters with her in Edmonton. By the winter of 1990, Gary moved permanently to Edmonton to be with Judy. Gary found work in Edmonton as a building manager, and worked there until he retired in 2003.

Many years later, after Gary's divorce papers finally went through, he and Judy were sitting at home one night when Gary said casually, "I wouldn't mind getting married, as long as it's not a big fuss..."

"Is that a proposal, Gary?", Judy exclaimed.

"Um,... yeah, I guess it is, why not?" And so they were officially married in 2003. After a small family service in their back yard, they had a big potluck dinner with friends and family at a local hall. The first song of the reception was "At Last", by Etta James. Gary's sister made a special wedding night outfit for Judy - basically a combination wedding dress and moth costume that was sure to attract Gary's attention.

While in BC, Gary had rekindled his childhood interest in butterflies, and of course he was collecting moths off the lights at Haven By The Sea. Once in Edmonton with Judy, he dove into moths in a huge way. At the U of A, he was warmly welcomed by Dr. George Ball, curator

and legendary ground beetle expert. Though the U of A's Strickland Collection was mostly beetles, they'd acquired the Bowman Lepidoptera collection, basis for the most recent Alberta Lepidoptera checklist in the 1950s. Over the next few years, Gary became heavily involved in the Strickland Museum and later the Sperling lab. Among many other things, Gary re-organized the collection and began adding his own new material, helped establish the online Virtual Museum, and was a regular part of weekly lab meetings with students.

Gary also reached out to other local lepidopterists. In those pre-internet days, this was largely done by perusing the Lepidopterists' Society membership list, and cold-calling anyone within driving distance. There were several other people active in Lepidoptera in Edmonton, but Gary was the enthusiastic 'spiritual leader' who pulled us all in with his infectious energy. By the mid-1990s, a critical mass of Lepidoptera enthusiasts were meeting regularly and exchanging ideas. Gary was the main gravitational attraction that held us all together, and was a source of so much wisdom and encouragement. The core members of this group eventually created "The Alberta Lepidopterists' Guild" (ALG) as a formal society in 1999, with Gary as the founding president.

Having a formal society gave us a certain amount of credibility, and from 2000 to 2004 the ALG was invited on a series of bio-inventory expeditions to remote parks in northern AB. ALG members were flown in to the most remote locations, provided with a camp, food, cooks, and local transportation (quads or boats, plus some chopper/float plane time), and were basically turned loose to chase bugs to our hearts' content. Many important records came

out of these expeditions. Gary went on several of these trips, and regaled us all with his wild stories around those evening campfires.

"Bewitched" - by Gary Anweiler (as told in the ALG News, Fall 2008)

In the late summer of 1991 I was at the peak of my "Catocala madness", lured down to southern Alberta by the possibility of finding those exotics (for someone from CENTRAL Alberta) like C. meskei, hermia, parta, et al. Years of having Holland's magical essay on "sugaring" for moths cooking away in my psyche had finally erupted into full bloom and I was out there in the dusk whenever I had time and weather permitted; can of sugar bait, knapsack full of rattling glass jars and extra flash-light batteries, paint brush and most importantly a casual demeanor, surreptitiously painting bait on local golfcourse and city park trees. A sticky business and, as one soon discovers this far north, a late night adventure as for much of the season it is approaching 11 PM before darkness finally arrives. So there was I, August 27, in a little plantation along a prairie stream in the grasslands west of Claresholm, AB (near Willow Creek Provincial Park), in the blackness, checking baits. It can get a bit spooky out there when one is alone, especially if there is a bit of wind as there was this night. As I tired, my mind wandered off like a child. There were a number of "cats" at the baits, a few other noctuids, but nothing very EXCITING. A voice in my head was babbling away and I heard it say "wouldn't it be neat to find a...a a.. Black Witch [a huge tropical moth that occasionally strays north from Central America] at my bait! ... Two trees later, so help me Buddha, there it was - a great big Black Witch sucking bait!! Too big for any of the jars I had with

me!!! And then she was..... gone!!! Back to the van for the BIG jar I had there, still not 100% certain I had not been hallucinating (always a possibility for those of us who survived the 60's!). But when I returned to the tree there it was, back on the bait, and then in my jar. No doubt about it....it was real! So, what does one do with a Black Witch??? What bit of science could be served by another specimen of a moth that is unmistakable?? I thought about the amazingly long flight it had made up from the tropics in the darkness, night after night, to a cottonwood along a creek in southern Alberta, Canada, perfectly timed to coincide with the one in my head! I took it back to the van, woke up my



Gary and some ALGers at Waterton Bioblitz, 2005 (L-R Lawrie, Schmidt, Djernaes, Anweiler, Lumley, Roe, Weisgarber, Nazari and son, Simonsen (photo by Felix Sperling).

wife Judy to show her, took a photo, and turned it loose. Last I saw of it was heading towards Alaska.

Gary spent the next couple of decades out surveying moths all over Alberta, often with Judy, and sometimes joined by other moth enthusiasts. Throughout these years, Gary and the other ALGers compiled massive numbers of species distribution records. It was summarized in a comprehensive checklist, published by several ALGers in 2010. Gary also wrote up hundreds of synopses of Alberta Lepidoptera species; these "species pages" are still hosted on the U of A's Strickland Museum website.

Later years

As Gary got into his 70s, his active field work slowed down, but he continued his moth research. He and Chris Schmidt wrote a massive monograph on the noctuid moth subfamily Acronictinae, which was published in 2020. He also took up insect photography, and took incredible photos that he shared online. Around this time, he met a young neighbor, a 4-year-old girl who was entranced with Gary's miniature world of wonders - the two of them often met to go exploring in the meadows along the ravine near their homes.

One of the most amazing things about Gary was his utter joy at simply being wherever he was, so totally "in the moment", and amazed at his luck - that the random forces of the universe had brought this particular moment into existence. It might be up on a mountaintop surrounded by grandeur, but it might also be some anonymous roadside stop, or poring over specimens, or a conversation at someone's kitchen table. Gary lived every moment to the fullest. His personal and oft-repeated motto (possibly from a Zen Master in California) was "If Not Fun, Best Left Undone".

"Some days, when I get a really good picture of a really good butterfly, I just get so high, I get... it's like I just get so stoned I can hardly talk, and my eyes will just overflow. It's just a wonderful experience. It's almost a semi-religious experience for me and it's such fun." - Gary

Gary loved to tell people about his favourite thing to do on the weekend. Before bed, he would put a few moth "tails" in a solution of KOH, to clear away the soft tissue and make it easier to examine the hard, chitinous parts of the genitalia. Then, in the morning, he would rinse the specimens, and sit down to examine them with the microscope. Some time later, he would realize three things: first, he was very hungry; second, it was three in the afternoon; and third, he was naked. Cognitive scientists call this "flow," and Gary was a capable of very impressive flow. - John Acorn

Gary was involved in many Lepidoptera research projects over the years; key among them were his revision of the genus *Panthea* (published in 2009), co-authorship of the AB Lepidoptera checklist (2010), and co-authoring a major

monograph on Acronictinae and related moth groups with Chris Schmidt (2020). He also served on the COSEWIC Arthropod conservation subcommittee from 2002 to 2009. He was honored with the Criddle Award in 2005 by the Entomological Society of Canada, and the Carr Award in 2006 by the Entomological Society of Alberta, both of which recognized his work as a dedicated amateur. He has also won the ALG's Wolley Dod Discovery Award three times, for the most exciting Alberta Lepidoptera discovery of the year.

In his last few years, Gary descended into dementia, and in his final year his needs become so great that he had to make the move to an assisted living home, where Judy visited him every day. He passed on October 12, 2023. He is survived by his wife Judy Weisgarber, his daughter Lani, grandsons Liam and Elliott, sisters Jill, Jane, Patricia (Trish), and Sally. He is also remembered by nieces and nephews, and by Judy's family that he had adopted as his own.

- by Greg Pohl, with help from Judy Weisgarber, Ross Lein, Mike Gollop, John Acorn, Chris Schmidt, Doug Macaulay, and Felix Sperling.

Key publications by Gary Anweiler:

Anweiler, G.G. 2009. Revision of the New World *Panthea* Hubner (Lepidoptera, Noctuidae) with descriptions of 5 new species and 2 new subspecies. *ZooKeys* 9: 97-134.

Pohl, G. R., Anweiler, G. G., Schmidt, B. C. & Kondla, N. G. 2010. An annotated list of the Lepidoptera of Alberta, Canada. *ZooKeys* 38: 1-549.

Schmidt, B. C. & Anweiler, G. G. 2020. The Moths of North America north of Mexico, Fascicle 25.4. Noctuoidea: Noctuidae (part): Pantheinae, Raphiinae, Balsinae, Acronictinae. Wedge Entomological Research Foundation, Washington, D.C. 469pp.

Greg Pohl



Gary at Halloween



Upper Left: Gary at 17, with a Northern Harrier; Wisconsin, 1961 (photo by Ross Lein). **Above:** Gary at a nature fair at Elk Island National Park, 2019. **Left:** Gary and friend, 2013.



Left: Greg Pohl and Gary both dressed up as historical Lepidopterist “Ken Bowman”, Feralia 2016. at Halloween. **Right:** ALG founding, 1999 (L-R back: Schmidt, Pohl; middle: Bird, Shepley, Lawrie, Pike, Sperling, Macaulay, Morneau, Spence, Volney; front: Anweiler, Mengersen, Ball, Godwin).

A history of the Ely collection and Lepidopterists' Society networking: part 1

Caitlin LaBar

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Each lepidopterist has a story of how they first became interested in butterflies or moths, who their early mentors were, and who or what inspired them along the way. Everything we know about Lepidoptera is built on the work of those who have gone before us. New information is added almost every day in the form of location records, genetics research, and behavioral and life history studies; it is part of what keeps it interesting and exciting. However, we are sometimes so engrossed in the present that we forget to remember the legacy of our past. In my attempt to learn more about a collection of insects, mostly Lepidoptera, that was given to me over 20 years ago, I was awarded a glimpse into the early history of the Lepidopterists' Society and a shared passion in Natural History that has shaped the lives of many people. The result is this four-part account of the Ely family (part 1) and their connections to other lepidopterists in Wisconsin, Maine, New Hampshire, and Latin America (part 2), the western United States (part 3), and Europe, Asia, Australia, New Zealand, and the eastern United States (part 4).

When I was around 12 years old, my life-long passion for insects began turning into a dedicated study with a focus on butterflies and the start of a collection. My first mentor was Terry Ely, a friend from church and the local USDA plant quarantine officer. Terry was primarily interested in moths but had a collection of many insects from all over the world and gave me tips on how to preserve what I was starting to collect. He gave me my first Banded Alder Borer (*Rosalia funebris*), California Tortoiseshell (*Nymphalis californica*), and a giant grasshopper (*Tropidacris cristata*) he collected in Guayaquil, Ecuador. After I found a dying female Poplar Sphinx (*Pachysphinx occidentalis*) in my backyard that was tattered but so exciting to a budding lepidopterist, Terry brought me a perfect specimen he found while working in eastern Washington. Throughout these few years, Terry mentioned bits of his childhood: that his family would take trips across the country, that his mother had corresponded and traded butterflies and artifacts with people all over the world, and that Terry had collected a lot in New Hampshire. I loved hearing the stories, but as a teenager I didn't think to ask questions and learn more details about the collection of which he spoke, and I've forgotten many of the details over the years.

One day in the summer of 2001, Terry told me that he was retiring and moving to Arizona, that his mother's collection had already been moved long distances several times and was in rough shape, that he couldn't see doing that again, and that he knew I would treasure and care for it,

if I was willing. Shaking with excitement, and with permission from my parents, I accepted his generous offer. We met at his office in Ellensburg and I was blown away as we pulled drawer after drawer full of butterflies and moths from a large, green-painted steel cabinet (Fig. 1). Fifteen drawers, 18x22 inches each of solid oak with glass lids. I was told that the cabinet and drawers were surplus from a university back east, obtained a few decades prior. Terry showed me some other displays of large tropical butterflies and moths that he was keeping, but with a characteristic twinkle in his eye, said that there were still some very special specimens in the collection he was giving me, so to take very good care of it.



Fig. 1. Original cabinet that housed the Ely Collection.

Once home, I began the painstaking task of evaluating the specimens and repairing everything as best I could. Many specimens were damaged from the original cross-country moves, along with some pest damage, and several rusty pins and moldy specimens from exposure to humidity at some time in the past. I replaced as many pins as I could, carefully cleaned off dried mold with a soft paintbrush, and became an expert at gluing broken wings and bodies. Well, not quite expert: I later discovered while trying to identify an unusual South American swallowtail that I had mistakenly reversed the forewings and glued them on upside-down! Most of the specimens didn't have any name labels, only general locations and dates at best, thus I had to comb through books to identify the hundreds of butterflies, organizing them into taxonomic groups, rapidly honing my ability to recognize key features helpful to secur-



Fig. 2. Specimens with Rachel's name and handwriting, collected in Colorado, and one from Wisconsin labeled as "home brooded" in Endeavor.

ing an identification. A couple years went by and then I received news that Terry had passed away suddenly at his home in Arizona. Although I lost a mentor, a new chapter began when in the same year I met Jonathan Pelham, Dave Nunnallee, and other Washington lepidopterists. However, without Terry to ask questions of, I had to piece together the history of my collection from his few stories and the tidbits I could gather from the specimen labels.

Early on, internet searches came up empty for Terry Ely, his mother Rachel, and a few of the names on the specimen labels. Eventually I was able to recognize Rachel's handwriting on many of the labels: she only wrote her name on a few labels of Colorado specimens (Fig. 2), but these matched the style of the majority of labels in the collection.

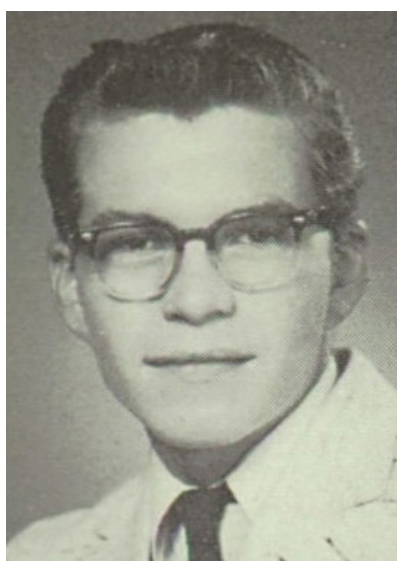


Fig. 3. (left and center) Rachel Smith (Ely) yearbook photos from the National Louis University in Chicago.

Fig. 4. (right) Terry F. Ely at age 18, 1957 Portage High School yearbook photo.

Other labels could be grouped by style, handwriting, location, date, and other similarities, allowing me to piece together little vignettes of history since one label might include a person's name with a date and location that matched other labels with the same data but no collector. However, one piece of the puzzle continued to confuse me: Terry had talked about New Hampshire and many of his moths had New Hampshire locations, so I had assumed that was where he grew up, yet many of the labels with Rachel's handwriting were from Wisconsin (Fig. 2). In early 2019, my curiosity rose again and I started searching the internet for any trace of Rachel's history or information on some of the other names on the labels. I was able to find a few tidbits on two of the names, both associated with the University of New Hampshire, but it was my mom who had the brilliant idea to search for Rachel Ely along with the keyword "Lepidoptera" instead of the "butterflies" or "New Hampshire" that I had been

trying. Up popped a link to The Lepidopterists' Society archive! Early on, The Lepidopterists' Society member directory was published at the end of each year, and most are available online through the Journal archives (List of members 1947, 1948, 1949, 1951, 1952, 1953, 1954, 1955). Through these records, I determined that Rachel had been a member of The Lepidopterists' Society and that she was from Endeavor, Wisconsin. Finally armed with the correct information, the floodgates were opened and the story of the Ely Collection was brought to life.

Rachel Isabell Smith (12 March 1911–12 Sep 1959) (Fig. 3) was born in Withee, Clark County, WI to Sylvester and Ella (Field) Smith. She graduated in 1933 from the National Louis University in Chicago, IL with a teaching

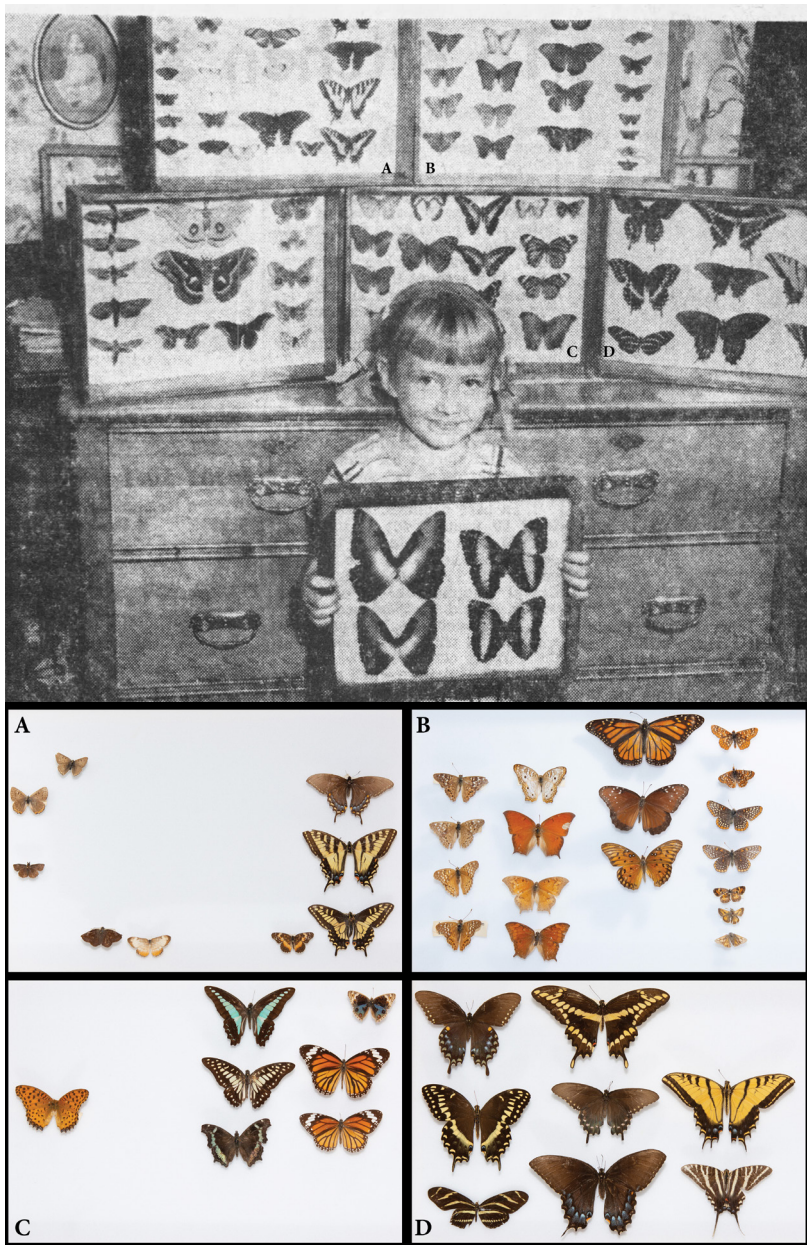


Fig. 5. (above) Cindy Ely with part of the Ely Collection, Wisconsin State Journal photo (Prindle 1952). Letters correspond to reproduced displays of Ely specimens in Fig. 6. **Fig. 6.** (below) Specimens from the Ely Collection believed to be those shown in Fig. 5.

degree. Rachel married **Frank Henry Ely (29 Nov 1887–18 Aug 1951)** in 1938 and their son, **Terrance Frank “Terry” Ely (21 Aug 1939–28 Dec 2004)**, was born a year later (Fig. 4). They lived on a farm near the Fox River a few miles southeast of Endeavor in Marquette County, WI. Terry’s sister Cindy was born in 1948. Rachel and Frank became widely known for their love of natural history and large collection of insects and other items, effectively turning their house into a small museum, of which they often gave tours to school children (Prindle 1952, Many exhibits 1953, Hume 1955). Sadly, Frank died suddenly on 18 Aug 1951 at the age of 63 (Obituary 1951). Rachel joined the Lepidopterists’ Society some time prior to this in 1951, initially giving her name as “Ely, Frank (Mrs.)” but in later directories is listed as “Ely, Rachel (Mrs.)” (List of members 1951, 1952,

1953, 1954, 1955). A newspaper article about the family and their hobbies confirmed the stories I remembered from Terry, stating that they “filled their home with butterflies, Indian relics, nature curios, postage stamps, and other odds and ends from all parts of the globe” (Prindle 1952). The article states that Rachel had collected Indian relics and bird eggs as a child, but these interests grew after marrying Frank who was also an ardent collector, and after his death she intensified her collecting activities and maintenance of their home museum to fill the time. At the time of the article, Rachel stated she had around 600 butterfly and moth specimens, some of which were pictured. I easily recognized 40 specimens, plus several others that resemble specimens in my collection but are too small to positively identify to a particular specimen (Figs. 5-8).

Other newspaper tidbits shed light on Ely activities and connections: Rachel drove Terry and his friend Bobby Robicheau to Madison where they visited the geology and entomology departments at the University of Wisconsin and visited the William Sieker home (Hume 1953a), the Ely family collected several butterflies and fossils during a trip to Colorado and up through South Dakota (Moundville 1953) and later spent a day in Milwaukee visiting the zoo and calling on some butterfly collectors (Hume 1953b). In 1954, Rachel published a short article on her observations of *Hemileuca maia* near her home (Ely 1954), in which she mentions another collecting trip to Colorado, and that William E. Sieker of Madison came up to Endeavor to net some of the moths. In 1956, 17-year-old Terry won three firsts on his insects at the county fair (Mueller 1956a) and spoke about his insect collection at a meeting of the Kiwanis club in Portage (Mueller 1956b). He was becoming widely known in Wisconsin for his entomology interests and was interviewed for an article where he stated his goal was to become an agricultural entomologist (Terry Ely 1956). He reared and collected specimens to sell to help pay for college and the article stated that “University of Wisconsin entomologists say the collections of Terry and his mother are far better than those in any museum in the state and more varied than that at the university. ‘That lad could teach us some things,’ confessed one well known professor.” (Terry Ely 1956). Terry’s passion was very evident throughout the article and it illustrated why he had been so encouraging to me: he had seen much of the same passion, excitement, and drive in me at the same age. My favorite anecdote from the article is this: “Recently he showed up at the agricultural extension office at Montello and shouted to Kenneth M. Frost, the



Fig. 7. (above) Terry and Rachel Ely with part of the Ely Collection, Wisconsin State Journal photo (Prindle 1952). The case above Terry's head contains at least four recognizable specimens in the Ely Collection. **Fig. 8.** (below) Specimens from the Ely Collection believed to be those shown in Fig. 7.

Marquette county junior club agent, 'Get me a bottle, quick.' On the screen door of the courthouse he had caught a moth and exclaimed, 'Here's a *Catocala*, just what I've been looking for.' (Terry Ely 1956). This reminded me of several similar encounters in my own life, including scrounging for containers as a teenager at summer camp to bring home my first *Hyalophora euryalus* and several prized longhorn beetles.

Terry attended the University of Wisconsin for one year, Fall 1957 to Spring 1958, where he had the help of a scholarship awarded for his 4-H club Entomology work (Personals 1958a). Rachel, Terry, Cindy and Rachel's mother went on a two-week road trip in late June 1958, traveling 3,434 miles visiting parts of Maine and southeast Canada (Mueller 1958a). This trip was probably in part to arrange for a move to Maine because a few months later the newspaper advertised an auction of various belongings and announced that Rachel, Terry and Cindy would be moving to Bryant Pond, ME on 10 Nov 1958 (Personals 1958b, Mueller 1958b). Rachel married Billy Symmes of Bryant Pond on 17 Jun 1959 and both were stated to be "engaged in Biological and Botanical work" (Mueller 1959a). Rachel's life was tragically cut short on 12 Sep 1959, when she and Billy were riding a motorcycle through Laconia, NH and hit a dip or hole in the road, lost control and crashed (Mueller 1959b). Rachel died instantly from head trauma while Billy suffered minor injuries. Terry was stated to be working on aphid research at the University of Maine and Cindy went to live with a relative of Billy Symmes (Mueller 1959b). Terry married Eleanor "Ellie" Starbird on 27 Feb 1960 and began attending the University of Maine in the fall of 1960 (Announce 1959, Miss Eleanor 1960). Terry seems to have graduated in 1962 because he moved to Rochester, NH around that time and began working for the Maine Forest Service assisting inspector-in-charge Vincent LaFleur with trapping and monitoring insect pests (Hawkins 1962). Specimens in the Ely Collection stop in August 1964, except for one specimen from Maine in 1970. Terry and Ellie moved to Ellensburg, WA around 1982, where I knew them from around 1997 until Terry retired and they moved to Arizona in 2001. The Ely Collection contains 484 butterflies, 843 moths and over 450 other insects (nearly all Coleoptera and Hymenoptera collected by Terry in New Hampshire and Maine) from 29 countries, including 20 states in the US, with dates ranging from 1885 to 1970. Around 8% of the Lepidoptera are from Wisconsin and 51% from New Hampshire.

Rachel's article on *H. maia* (Ely, 1954) mentioned her contact with William E. "Bill" Sieker, whom she and Terry also visited regularly. Newspaper records also state that Rachel and Terry visited lepidopterists in Milwaukee (Hume 1953a), and based on the 1955 LepSoc membership directory, these could have included James A. "Jim" Ebner, Arthur H. Moeck, George F. Schirmer, Alvin L. Throne and Howard E. Was. Jim Ebner wrote about these and other members of the Milwaukee Entomological Society, which later evolved into the Wisconsin Entomological Society (Ebner 2014). Significant portions of the Milwaukee Public Museum (MPM) Lepidoptera collection are from the James R. Neidhoefer, Bill Sieker, Arthur Moeck, Jim Ebner and Les Ferge collections (Milwaukee Public Museum 2023). A search for "Rachel Ely" on the Symbiota Collections of Arthropods Network (SCAN) found five specimens in MPM: *Catocala whitneyi*, *Dolba hyloeus*, *Hemileuca maia* (x2), and *Smerinthus jamaicensis*. The *D. hyloeus* and *S. jamaicensis* each have a note that they were photographed for "Sphingidae of Wis." After requesting images of these specimens in December 2019 from the collection manager, Julia Colby, I continued researching the Sieker connection and was eventually put in contact with Les Ferge through Michael Collins. Les informed me that Bill Sieker mentored him



Fig. 9. Two specimens in the Ely Collection believed to have been collected by Bill Sieker.

from 1971 until Bill's death and that "Bill spoke of Rachel occasionally and lamented her tragic early death." According to Les, the *Sphingidae of Wisconsin* was a manuscript Bill was working on until his death, but it was never published. Les also suggested that my sphinx moth specimens from Door County, WI were also likely collected by Bill, who owned a vacation cottage in Baileys Harbor. He said that Bill would run lights and collect moths there and was generous in giving many specimens to people, so it is more likely that he and Rachel traded specimens rather than Rachel collecting the Door County specimens herself. This assumption is backed up by the sharp angle of the wings (Fig. 9), as if they were papered specimens and not fully rehydrated when Rachel pinned them, as well as the fact that she tended to only write "Wis." for specimens she collected in Endeavor but usually included the county or other details for anything obtained from other people. Within a few days, I received images from MPM of the five Ely specimens with labels verifying they were from the Sieker Collection. Searches on SCAN for specimens with the same dates or locations as other Ely specimens from around the world almost always produced results from MPM, either exclusively or with only a few other hits from other collections. These matching records at MPM are predominantly from the Moeck, Sieker, and Neidhoefer collections. This evidence points towards the extensive trading that Rachel, Terry, and other Wisconsin lepidopterists did in the 1950s with each other and collectors around the world, which will be summarized in the next three parts of this story.

Acknowledgements

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(Continued on page 37)

A moss-mimic caterpillar of *Moduza* Moore [1881] (Lepidoptera: Nymphalidae) from Mindanao, Philippines

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Abstract: A moss-mimic caterpillar of *Moduza* Moore, [1881] (Nymphalidae: Nymphalinae) is reported and illustrated from Mindanao, Philippines.

Key words: larva, mimicry, Mindanao, *Moduza*, *Neonau-clea*

The genus *Moduza* (common name Commander) was described by Moore in [1881] and the species under this genus are distributed from India towards Sulawesi and the western Lesser Sunda Islands. Tsukada (1991) listed and illustrated 11 species of *Moduza* for Southeast Asia, while Wu *et al.* (2019) cited 9 species. However, Treadaway and Schroeder's checklist (2012) listed 26 species of *Moduza* occurring in the Philippines with 19 endemic species. Future taxonomic and phylogenetic studies should include species from the Philippines to determine their relationships with other *Moduza* species, and with members of its closely related genus *Athyma* Westwood, [1850]. Based on current literature, only *Moduza procris* (Cramer, [1777]), *M. urdaneta*, (C. & R. Felder, 1863), and *M. mata* (Moore, 1858) have documented life histories (complete or incomplete) (Robinson *et al.* 2023; Igarashi & Fukuda 2000; Tan *et al.* 2011; Saji *et al.* 2023; Kunte *et al.* 2023), which means that most of the species under this genus have unknown life histories.

This paper reports a moss-mimic caterpillar of *Moduza* sp. from Mindanao, Philippines.

Moss-mimic larva

The caterpillar looks similar to other species of *Moduza* but this one mimics the moss that blankets the trunk of its hostplant. The head is pale brown with reddish brown short conical protrusions. The thoracic and head regions are pale brown while the rest of the body is black with green moss-looking markings.

The most conspicuous structures are the scoli that mimic the moss. The thoracic scoli are pale yellow and branched in a way that they mimic the fresh shoots of the moss, while some randomly distributed branched scoli are white, which also mimics some dead moss. The most abundant branched scoli are pale green, dark green, and black. The combination of these colors and details of scoli patterns



Moss-mimicking larva of *Moduza* sp.



The site where the larva was documented. The seedling and mature tree of *Neonauclea* can be seen on the middle and right side of the photo.

are definitely an impressive mimicry for any animals living in a mossy forest. The moss-mimic caterpillar looks similar to the illustration of *Moduza urdaneta* by Igarashi and Fukuda (2000), but *M. urdaneta* is darker to almost black, and that species does not occur on Mindanao island.



The hostplant, *Neonauclea* sp. (Rubiaceae).

Habitat

Montane Forest of Sitio Logdeck, Brgy. Kalagonoy, Gingoog City, Misamis Oriental (1000+ m elevation; 8.735603, 125.030285).

Hostplant

The hostplant is a species of *Neonauclea* Merr. (Rubiaceae). Igarashi and Fukuda (2000) listed *Terminaria catappa* L. (Combretaceae), *Chasalia curviflora* Wallich (Thwaites), *Neonauclea calycina* (Bartl. ex DC.) Merr., *Uncaria longiflora* (Poir.) Merr., and *U. lanosa* Wall. (all Rubiaceae) as hostplants of *Moduza procris*, while *M. urdaneta* feeds on *Uncaria velutina* Havil., *U. philippensis* Elmer, *Canthium* Lam. sp., and *Neonauclea orientalis* L., also all in the Rubiaceae family. *M. mata mata* (Moore, 1858) also utilizes *Neonauclea*

orientalis in the Philippines (Robinson *et al.*, 2023).

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Left: The stem, branch, and petiole of *Neonauclea* sp. **Right:** Figure 8. Fruit of *Neonauclea* sp.

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The Black Rajah (Nymphalidae, Charaxinae), *Charaxes solon sulphureus*, Chiang Dao, Chiang Mai Province, Thailand, November 2019. Images by Antonio Giudici (www.ThaiButterflies.com)

A male *Automeris phrynon* (Lepidoptera: Saturniidae: Hemileucinae) attracted to blacklights twice, and caterpillar hunting with UV light in San Ramón, Alajuela Province, Costa Rica

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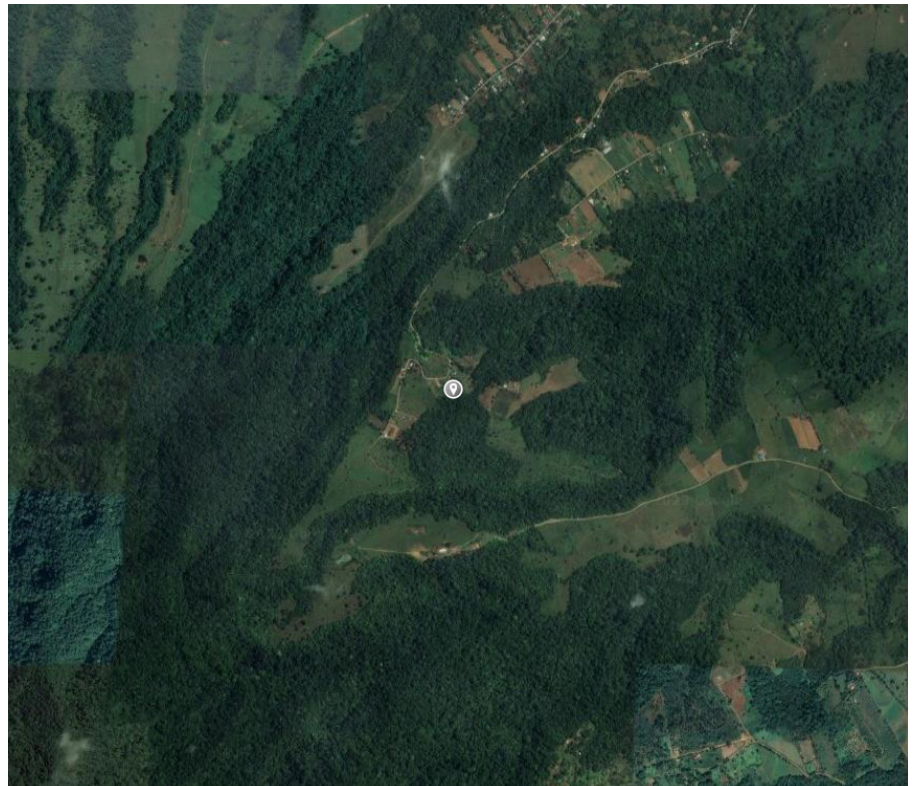


Photographs of the beautiful male *Automeris phrynon* that was attracted to blacklights twice.

On 15 December 2023, a male *Automeris phrynon* Druce 1897 (Lepidoptera: Saturniidae: Hemileucinae) was attracted to blacklights twice on the same night in San Ramón, Alajuela Province, Costa Rica (10°25'38"N 84°38'23"W). *Automeris phrynon* is one of only two diurnal Saturniidae in Costa Rica and the only species inhabiting lowland rainforests. There are two male color morphs, brown and yellow and both have only rarely been recorded at lights (Dan Janzen, pers. comm., Janzen 1984, Marquis 1984). Males fly to calling females in mid to late-morning and are reported to resemble fast-flying pierids (Marquis 1984, Miller et al. 2007). Little has been written about the life history of this beautiful moth (Janzen 1984, Lemaire 2002, Marquis 1984, Meister 2011, Miller et al. 2007).

The male was first observed on a sheet with two Entoquip entolight blacklights (365 nm and 395 nm/32 w) and one Pest-west Quantum 24" T12 blacklight (368 nm/40 w) at 01:00 on 15 December 2023. The lights were checked the evening before a number of times, last at 23:00 and the moth was not present. The moth was captured for photographs shortly after finding it but escaped 15 m from the lights a few minutes later and flew off into the forest. When the lights were checked the next morning at 06:00 the moth was on the sheet again. No females were observed at the lights or during the

day. The lights were run at the edge of rainforest at the Casa Del Mono Airbnb at an elevation of 475 m every night from 12 December to 17 December 2023. A small stream flows through the forest approximately 30 m from the lights. The surrounding landscape is a mixture of forest and agricultural land dotted with homes.



An aerial photograph showing where the *Automeris phrynon* male was found at the blacklights.



Above: My first night moth setup on the woodpile and the covered moth “camp” Esteban built for me. **Left:** The permanent mothing area at Casa Del Mono next to the house and adjacent to the rainforest.

gracious hosts and care deeply about the ecological value of their property. When I arrived at the Airbnb late in the afternoon after a very long day of travel, I simply threw my sheet and lights over a wood pile under a small overhang next to the house and ran an extension cord out the kitchen window. There were torrential downpours that night and I was soaked checking the lights.

The next day while we were exploring the area, I received a text message from Esteban that he had taken the liberty to build me a “small camp” for my moth lights “for more comfort and a drier space suitable for work!”. I was

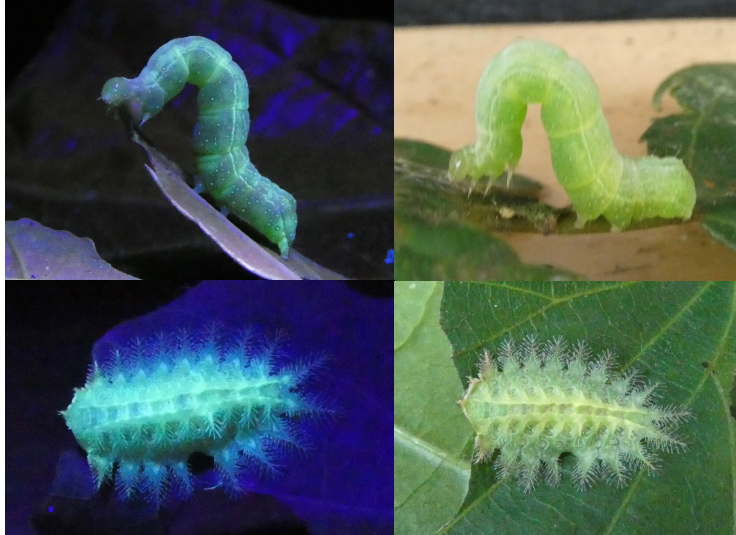
honestly a little worried about what that meant, until I got back to the Airbnb and saw what he had constructed. My lights were moved to the edge of the forest next to the house, under a tarped canopy, the sheet fully secured from the wind and two chairs for lounging while mothing. It was absolutely perfect, and I stayed dry photographing moths despite the incredible rainstorms that occurred every night. Before leaving I gifted Esteban and Jessica an Entoquip blacklight and a sheet. A few weeks after I left, Esteban sent me a message and a photo that he had built a better moth structure. It is an amazing, covered area next to the house so anyone visiting should inquire and I suspect will arrive to a moth setup ready to go.

During my stay, I also explored the property and nearby areas for caterpillars using a UV Beast V3 flashlight with light at 385-395 nm (uvbeast.com). I had no knowledge of Costa Rican caterpillars but searching with the ultraviolet light was still productive. Despite dodging intense rain showers, private properties limiting access to the edge of a road, and a low seasonal period for caterpillars (Dan Janzen, pers. comm.), during a little more than an hour spread over three nights, caterpillars were easily found, representing eight species in at least five families: Sphingidae, Limacodidae, Notodontidae, Noctuoidea and Danainae (including a parasitized sphingid caterpillar and an unidentified caterpillar). Six of the caterpillars were photographed under ultraviolet and natural light (Plate 1). Ultraviolet light is highly effective for locating caterpillars at night in both the new and old world and for a broad suite of families and species (Meyer and McElveen 2021, Morningred et al. 2022, Moskowicz 2020, Moskowicz 2021, Moskowicz 2023a and b, Tilley et al. 2023, Tilley

The Casa Del Mono Airbnb is wonderful for moths, butterflies, insects, and birds and as a base camp for exploring the Arenal and La Fortuna areas. The small home is at the end of a 1.6 km road (a small SUV will navigate the rough patches easily), about 6 km from downtown La Fortuna, a small bustling town. The house is very modern with one bedroom, one bathroom, a kitchen and sitting area, air conditioning, a wood burning stove and most importantly abuts dense rainforest. There is an outside outlet for running lights and a 15 m extension cord and power strip. The Airbnb is owned by Esteban and Jessica Castro-Rodriguez, who are exceptionally friendly and



Plate 1. Caterpillars located with ultraviolet light photographed with ultraviolet light and in normal light (top to bottom): *Rhuda* sp. (Notodontidae), *Erinnyis ello* (Sphingidae), *Manduca* sp. (Sphingidae), probably *Tithorea pinthias* (Danainae), unidentified Noctuoidea sp., *Isa* sp. (Limacodidae).



and Stewart 2023) but to my knowledge has not been tested in the tropics. Many caterpillars fluoresce brightly or are more visible when exposed to ultraviolet light (Moskowitz 2017, 2018) and it could be a useful method for locating caterpillars amidst the dense tropical rainforest vegetation. Given the abundance of Saturniidae, Sphingidae and Limacodidae moths at my blacklights, and how brightly many species in these and other families fluoresce, at least in North America and Europe, caterpillar surveys earlier in the year with ultraviolet light might be very effective and should be explored for tropical habitats.

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Above: Two views of the forest and forest edge near the blacklights. **Left:** The Casa del Mono Airbnb. The blacklights were set up to the left of the house in the adjacent rainforest.

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Adult feeding behavior of the Colorado Hairstreak (*Hypaurotis chrysalus*) in southeastern Arizona

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Figure 1. Location of the Santa Catalina Mountains study area in southeastern Arizona.

(All photos by the author except where noted)

ABSTRACT

In 2023, I studied the feeding behavior of the Colorado hairstreak (*Hypaurotis chrysalus*) in the Santa Catalina Mountains near Tucson, Arizona. Adults were observed and photographed feeding at two non-floral sugar resources: cynipid wasp galls (*Disholcaspis*, apparently *rubens*) on netleaf oak (*Quercus rugosa*) and new acorns on silverleaf oak (*Q. hypoleucoides*). Some cynipid galls are known to be visited by hairstreaks (in addition to *chrysalus*) because they secrete a sugary nectar as an ant attractant. However, routine acorn-feeding by hairstreaks is, to the best of my knowledge, undescribed in the literature and novel for butterflies in general. The precise source of acorn exudates in the study area was not determined, but disease, insect damage, and naturally-secreted phloem sap are considered.

INTRODUCTION

I first observed adult Colorado hairstreaks (*Hypaurotis chrysalus*) feeding at cynipid wasp galls on netleaf oaks (*Quercus rugosa*) in the Santa Catalina Mountains north-east of Tucson, Arizona in 2010 (Figure 1). The site, which is located along Incinerator Ridge immediately downslope



Figure 2 (above). Colorado hairstreaks taking turns at a *Disholcaspis* gall cluster on a netleaf oak. Figure 3 (below). Female Colorado hairstreak basking adjacent to *Disholcaspis* galls on a netleaf oak.

from a stand of the larval host Gambel oak (*Q. gambelii*), burned in the 2003 Aspen Fire and in 2010 the netleaf oaks were approximately 4-m tall, shrubby, and multi-stemmed. On 30 June, I flushed several adults from these oaks, and many returned to perch. Initially I thought they were seeking shade among the netleaf oak leaves for thermoregulation, but I discovered a more compelling reason for their presence when one entered the interior of a netleaf oak and approached a pair of large (~12 mm diameter) reddish galls where it joined a second adult already feeding (Figure 2). Later that day, I photographed a female basking near galls prior to a feeding bout (Figure



Figure 4. *Disholcaspis* galls attended by ants on a netleaf oak.

3). These galls, which secrete a sugary nectar¹ as an ant attractant (Figure 4) (Aranda-Rickert 2017, Pierce 2019), were induced by a *Disholcaspis* wasp species, apparently *rubens* (BugGuide 2023, iNaturalist 2023, Russo 2021). I observed additional feeding bouts at *Disholcaspis* galls on netleaf oaks at this location in 2011, and in the Pinaleno Mountains in 2020.

Scott (1974) reported on the behavior of adult *crysalis* in Colorado but did not mention gall feeding. The only documentation of gall feeding by hairstreaks is a study of the oak hairstreak (*Satyrium favonius ontario*) in Massachusetts by David Wagner and Benedict Gagliardi (Wagner and Gagliardi 2015, Gagliardi and Wagner 2016); they conclude that galls, and other “non-floral sugar resources” like honeydew from aphids and scale insects, are likely more important than flower nectar as a source of carbohydrates for a variety of hairstreaks and other insects.

Hoping to contribute another piece to this puzzle, I returned to the Santa Catalina Mountains in 2023 to document in greater detail the feeding behavior of the Colorado hairstreak. I suspected that the abundance of cynipid wasp galls might influence its local distribution and reproductive success, but I had no idea that oak acorns would factor into the relationship. The 2010 site described above had burned again in the 2020 Bighorn Fire and the netleaf oaks, which had re-sprouted, were small and not attracting hairstreaks. Nearby, however, I found adults in unburned habitat convenient for repeated visits and established a study area.

STUDY AREA AND METHODS

¹ Pierce (2019) and Ivey and Gilberti (2022) refer to gall secretion as ‘nectar’ because it originates from plant tissue, as opposed to ‘honeydew’ (sometimes used to describe gall secretions), which refers to secretions that emerge directly from an insect.



Figure 5 (above). Santa Catalina Mountains study area (looking west toward Mt. Bigelow from east end). Figure 6 (below). Interior of the Santa Catalina Mountains study area.

The study area is a 240-m-long transect following an existing trail below Mount Bigelow (Figures 5 and 6) at an elevation of 2550 m. The vegetation community is Madrean pine-oak forest, the most widespread montane plant community in southeastern Arizona (Griffith et al. 2014). Netleaf oak is the dominant tree, providing over 90% of plant cover. Silverleaf oak is uncommon and scattered. Although there are no Gambel oaks in the study area, they are common nearby. Buckbrush (*Ceanothus fendleri*), a perennial shrub and popular native nectar source, is abundant along the transect and was in luxuriant bloom throughout the study period. The area did not burn in the 2020 Bighorn Fire but may have burned in the 2003 Aspen Fire.

A total of 14 hours was spent during 8 visits from 5 July to 9 August. All visits were in the morning except for one afternoon visit that was quickly ended due to heavy rain and lightning. Adults were located by agitating oak stems with a walking stick or brushing the stick over leaves; roughly 30% of flushed individuals were successfully followed to a perch. Important foraging events were documented photographically when possible, and specific foraging locations were marked with survey tape. Hairstreaks were not individually marked.

RESULTS AND DISCUSSION

Flower Feeding

Colorado hairstreaks were not observed feeding at buckbrush flowers, despite the blooms often attracting up to 10 Arizona hairstreaks (*Erora quaderna*) and a variety of other insects. Scott (1974) states that the Colorado hairstreak has “lost the ability to feed on flower nectar” and that the proboscis is “shorter than in flower-feeding Theclini”. Despite Scott’s claims, I am aware of at least two photographs by Bill Beck showing adults probing flowers, one in northern New Mexico and one on buckbrush in the Santa Catalina Mountains (Figure 7), both prior to 2023. Flower feeding is therefore periodically engaged in by *crysalus* but may be energetically unprofitable because the proboscis has atrophied over time in response to the adult preference for non-floral exudates.

Wagner and Gagliardi (2016) conclude that, despite the secondary importance of flower nectar to two eastern *Satyrrium* species, flower visitation would be expected to increase on hot days “when liquid may be even more important than a source of sugar.” Scott (1974) described Colorado hairstreaks sipping water from wet sand, which would serve the same function on hot days. I did not observe this behavior.

Gall Feeding

From 6-9 adults were counted during each morning visit to the study area. On 14 July, three adults were observed visiting two *Disholcaspis* galls on different netleaf oaks (Figures 8 and 9). I located both galls by successfully following the flushed adult. Even situated at eye level in these relatively low-growing oaks, galls are challenging to find. Wagner and Gagliardi (2015) characterized galls (and other non-floral sugar resources) as “typically dispersed” and “more cryptic than flowers”, making it “difficult to know their importance”. I suspect that gall importance in the study area, in addition to being unknowable, is variable because, according to Russo (2021), gall-inducing insect populations are subject to potentially dramatic annual changes due to drought, high summer temperatures, and fire. No further activity was observed at either of these two galls on subsequent visits, which followed the onset of heavy monsoon rains that likely washed away nectar.

Of the eight described oak species occurring in the Santa Catalina Mountains (Verrier 2018), Colorado hairstreaks have been documented photographically visiting galls at three: netleaf oak, Gambel oak, and silverleaf oak. I have observed *crysalus* far more regularly on the netleaf oak and conclude that in southeastern Arizona it may serve as the “cornerstone” oak in terms of sugar resource availability because of 1) its abundance in comparison to other high-elevation oak species, and 2) the reliable presence on netleaf oaks of *Disholcaspis* wasp galls. This is not to suggest that the Colorado hairstreak is more abundant today in southeastern Arizona than it was, say, 50 years ago. In fact, the opposite may well be true.

Netleaf Oak Abundance. In southeastern Arizona, the netleaf oak has apparently benefited from a changing fire regime over the last several centuries. These changes have been conveniently divided into three phases: 1) historically

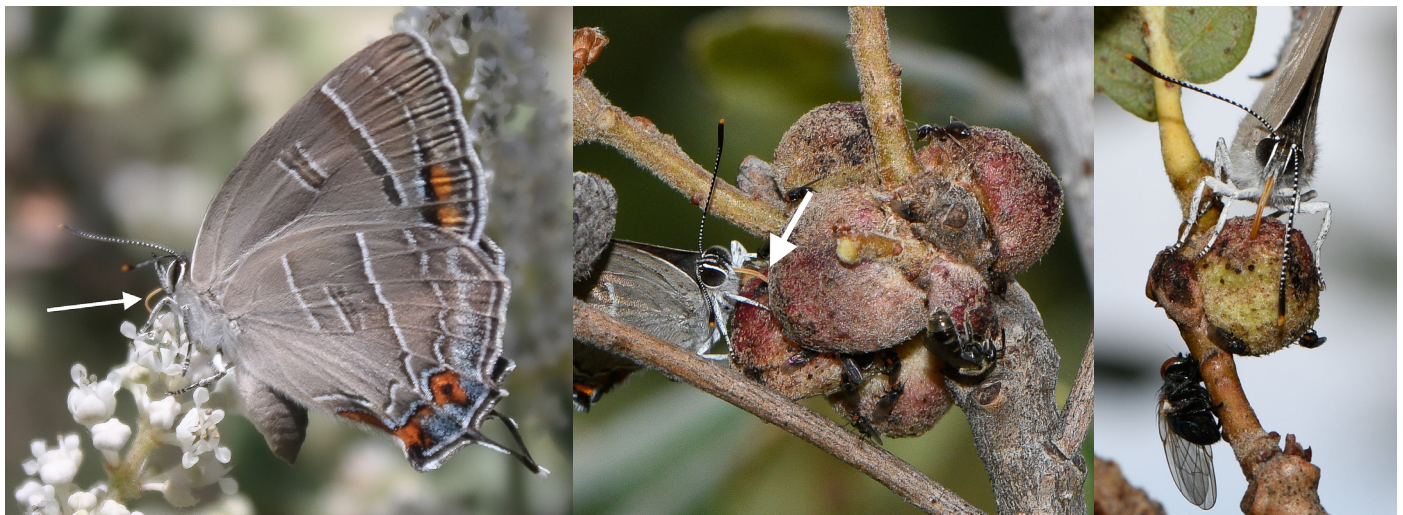


Figure 7 (left). Colorado hairstreak nectaring at *Ceanothus fendleri* in the Santa Catalina Mountains (photo courtesy of Bill Beck). Figure 8 (center). Colorado hairstreak feeding alongside bee, ants, and flies at a *Disholcaspis* gall cluster on a netleaf oak. Figure 9 (right). Colorado hairstreak feeding with flies at a *Disholcaspis* gall on a netleaf oak.

frequent surface fires before Euro-American settlement that favored an open forest with a mix of pines and oaks; 2) a 20th century period with widespread livestock grazing and few fires because of active suppression, resulting in fuel accumulation; and 3) a contemporary era of intense mega-fires (Bahre 1998, Barton and Poulos 2018). According to Barton and Poulos (2018) and Reyna et al. (2019), recent high severity wildfires in pine-oak forest have caused a shift from a diverse suite of species, including pines, alligator juniper (*Juniperus deppeana*), and low- to mid-elevation oaks (*Q. emoryi* and *Q. arizonica*) to a species-poor, shrubby community mainly of upper elevation oaks (*Q. hypoleucoides* and *Q. rugosa*) and buckbrush. Furthermore, in the Chiricahua Mountains the transition from pre- to post-fire at pine-oak forest sites has resulted in significant declines in silverleaf oaks and increases in netleaf oaks, especially at sites that burned with high fire intensity (Poulos et al. 2021). Netleaf oak is also considered the dominant oak species in pine-oak forests of northern Mexico (Gallina and Ffolliott 1983), presumably for the same reasons related to fire.

Gall Community. Different oak species support different cynipid gall communities. With very few exceptions, cynipid gall wasps do not use oak hosts from more than one subgeneric group (Russo 2021). In other words, the *Disholcaspis* wasps that induce galls on netleaf oak, in the white oak group, would not be expected to induce galls on silverleaf oaks, in the red oak group; although there are many cynipid wasp species that visit only red oaks. No detailed studies of cynipid wasp communities on different oak species have been conducted in Arizona, to my knowledge, but in Mexico netleaf oaks support the highest number of gall wasps among oaks in the white oak group with 52 species (Serrano-Muñoz et al. 2022).

The appeal of netleaf oak galls is further demonstrated by the following observation. Two of the three North American members of the hairstreak tribe Theclini, the Colorado hairstreak and the golden hairstreak (*Hypaurotis grunus*), occur in the Pinaleno Mountains in southeastern Arizona; for the golden hairstreak this is the eastern limit of its range (Bailowitz and Brock 2022). In 2021 and 2023, I flushed both species from adjacent netleaf oaks at 2600 m near Ladybug Saddle. While the Colorado hairstreak larval host (Gambel oak) is abundant nearby, the nearest “known” record of the suspected golden hairstreak host, canyon live oak (*Q. chrysolepis*), is several km away at approximately 1890 m (SEINet 2023).² Even assuming that canyon live oaks are present much closer, which seems likely given the limited vehicular access to these rugged mountains, the fact remains that some golden hairstreaks are flying several hundred meters upslope apparently to feed at *Disholcaspis* galls on netleaf oaks.

² SEINet lists only one recent (1988) record: Marijilda Canyon (32.6792, -109.828) approximately 6.5 km N of Ladybug Saddle.

Acorn Feeding

On 9 July, I flushed a Colorado hairstreak from a silverleaf oak and followed it until it eventually approached a cluster of two acorns, where it perched (Figure 10). I did not observe feeding but suspected it. On 12 July, I returned to this silverleaf oak and immediately photographed an adult *feeding* at a new (i.e., developing) acorn (Figure 11). Two days later, on 14 July, I found an adult feeding at the *same* acorn! The feeding bout on 14 July lasted from 08:50, when I arrived, to 10:25. At 10:25 a second individual landed nearby, basked briefly (revealing itself as a male), displaced the “original” individual (sex unknown), and took a turn feeding. Five minutes later the “original” hairstreak returned and displaced the male. It fed at the acorn until I left at 11:15. The length of the feeding bout (>2 hrs.), and the competition for access to the acorn, convince me that these hairstreaks were being “rewarded” at a sugar source rather than engaging in either 1) the collection of dew or 2) the cleaning of their proboscises, two explanations for this behavior offered by others early in the study.



Figure 10 (above). Colorado hairstreak perched on a silverleaf oak acorn. Figure 11 (below). Colorado hairstreak feeding at a new silverleaf oak acorn.

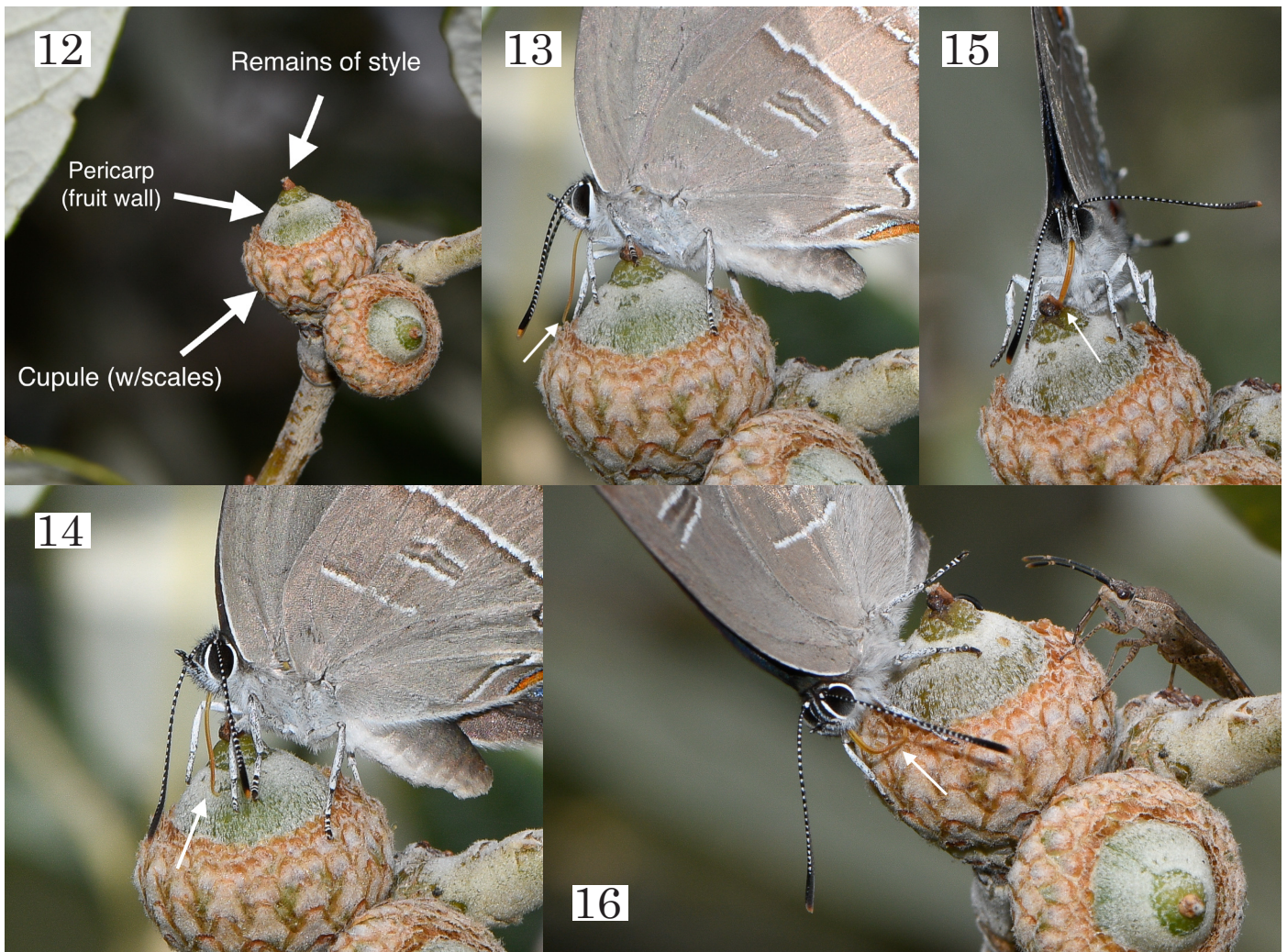


Figure 12. Parts of a silverleaf oak acorn. Figure 13. Colorado hairstreak feeding at the top of the cupule of a new silverleaf oak acorn. Figure 14. Colorado hairstreak feeding at the pericarp of a new silverleaf oak acorn. Figure 15. Colorado hairstreak feeding at the remains of the style of a new silverleaf oak acorn. Figure 16. Colorado hairstreak feeding at the cupule of a new silverleaf oak acorn with approaching hemipteran.

During the feeding bout, all parts of the new acorn (labeled in Figure 12) were “licked”, including the topmost scales on the cupule (Figure 13), the pericarp (Figure 14), and the remains of the style (Figure 15). The acorn was attracting a variety of other insects as well, including a large hemipteran (Figure 16), flies, and several small beetles. Although no visits to this acorn by Colorado hairstreaks were observed after 14 July, adults were seen at two different acorns on the same silverleaf oak on 27 July, the last day adults were observed feeding in the study area.

I believe that acorn-feeding is unreported because it is both unexpected and difficult to document, especially in areas where adult hairstreaks dwell primarily in the canopies of tall oaks. In southeastern Arizona, in addition to the silverleaf oak, Colorado hairstreaks have been photographed visiting the acorns of two other oak species, Gambel oak and Arizona white oak (*Q. arizonica*) (B. Beck, pers. comm. 2023). There is also an online photograph of *crysalus* feed-

ing at a new Gambel oak acorn in Colorado (Eaton 2014). I am not aware of hairstreaks feeding at netleaf oak acorns.

Acorn Exudates

Regretfully, I did not remove and dissect acorns or otherwise analyze acorn exudates (e.g., swab the surface for lab analysis) when they were being fed upon. I speculate, however, that these exudates were the result of one or more of the following: disease, insect damage, and phloem sap (secreted in the absence of disease or insect damage). Each is discussed and evaluated briefly considering the following observations made during the study: 1) acorn exudates were present in minute amounts, undetectable during field observations and in photographs (i.e., there was no obvious oozing); 2) only new acorns were visited by Colorado hairstreaks (supported by photographs from others); and 3) filbertworm and/or filbert weevil were active in the study area.

Disease. Two studies of oak acorn exudates were recently conducted in Europe in response to the growing popularity of commercial oak honey production there. In Spain, holm oak (*Q. ilex*) and Pyrenean oak (*Q. pyrenaica*) apparently both exude copious amounts of sap during acorn formation, which is collected by bees and used to make honey (Terrab et al. 2018, Seijo et al. 2019). Both Terrab et al. (2018) and Seijo et al. (2019) include images of oozing and/or frothy acorns, which Terrab et al. (2018) attributes to “high phloem pressure” claiming the condition is typical in Spanish oak forests during the summer, especially in mountain areas with moderate humidity.

Neither study cites earlier research in Spain by Biosca et al. (2003) that reports on the presence of *Lonsdalea quercina*, the bacterium that causes drippy nut disease, in the same two Spanish oaks, holm oak and Pyrenean oak, used in commercial honey production. The bacterium apparently enters the maturing acorn through insect oviposition punctures (Swiecki and Bernhardt 2006, CODA 2016). The most obvious symptom is copious oozing of frothy, sticky, honey-like sap from affected acorns (see images in Biosca et al. 2003, Swiecki and Bernhardt 2006), the same symptoms described and pictured in Terrab et al. (2018) and Seijo et al. (2019) and attributed to high phloem pressure. In the Santa Catalina Mountains, acorns did not ooze copious sap and therefore drippy nut disease, which is currently unreported in Arizona, is ruled out (for now) as a source of acorn exudates.

Insect Damage. Both filbert weevil (*Curculio occidentis*) and filbertworm (*Cydia latiferreana*) drill similar pinhead-sized oviposition wounds in new acorns. In filbert weevil, wounds are commonly surrounded by a discolored and/or raised area and “may exude small amounts of sap” (Swiecki and Bernhardt 2006). Another possible source of acorn secretions is scale insects (Order Hemiptera, suborder Sternorrhyncha), which could conceivably establish in new acorns under the scales of the cupule and pierce plant tissues to feed on sap, secreting the excess as honeydew that attracts hairstreaks (T. Swiecki, pers. comm. 2023). I saw no evidence in the field (or in the literature) that insect acorn feeders (e.g., filbertworm and filbert weevil) engage in ant-mutualism like some *Disholcaspis* wasps. Although new acorns in this study attracted a variety of insects, ants were not observed.

On 9 August, I collected and examined the two acorns shown in Figure 11. The results were counterintuitive; the upper acorn (previously visited by hairstreaks) was desiccated and rock hard, while the lower acorn (unvisited by hairstreaks), was green and soft with evident insect damage, i.e., an exit hole of either filbertworm or filbert weevil (Swiecki and Bernhardt 2006). Apparently both acorn feeders also create similar exit holes. I dissected the insect-damaged acorn but found no larvae inside to assist with identification.

Phloem Sap. Is it possible that oak phloem sap is being secreted in minute amounts at the surface of new acorns (or at other areas of new growth) in the absence of insect damage or disease? That is, as acorns develop, and sugars are delivered to them via the phloem, might some of this sugary fluid “leak” onto the surface where it attracts hairstreaks? Hairstreaks would not be expected, and indeed none were observed during this study, at old (i.e., mature) acorns where phloem sap presumably is no longer being delivered.

In Colorado, according to Scott (1974) male and female *crysalus* “sucked sap oozing from [Gambel] oak twigs”, apparently locating the sap by odor “since the sources were almost indistinguishable (my ital.) from other twigs”; dendrologists define “twig” as the “current or most recent growth increment on the apical end of a shoot”. Scott further suggests that a diet of this highly viscous sap is at least partly responsible for behaviors evolved by adults to prevent dehydration (e.g., males patrolling in late afternoon and evening to avoid direct sun).

I am not aware of any other studies that portray hairstreaks, including other Theclini, as sap-feeders. I suggest that two additional sources should be considered for the “sap” described by Scott (1974): 1) *Lonsdalea quercina*, which has been found in naturally-occurring Gambel oaks in Colorado (Kozhar et al. 2023); and 2) cynipid stem galls. Although my experience with oak galls is limited, some oak stem galls could easily be mistaken for “twigs”; see for example the gall in Figure 17 induced by a wasp (possibly a *Neuroterus* species) on a silverleaf oak in the Santa Catalina Mountains, and Figure 1 in Pierce (2019).



Figure 17. Colorado hairstreak feeding at a cynipid wasp gall (possibly *Neuroterus* species) on a silverleaf oak stem (photo courtesy of Bill Beck). Note the presence of up to four hymenopterans.

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Schinia fulleri (Noctuidae). Townsend (North) Wildlife Management Area, southeast of Ludowici, Long County, Georgia (U.S.A.), Sept. 12, 2019. Image by James Adams

Membership Updates

Chris Grinter

Includes ALL CHANGES received by February 13, 2024. Direct corrections and additions to Chris Grinter, cgrinter@gmail.com.

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First report of *Apamea* (= *Abromias*) *lithoxylaea* ([Denis & Schiffermüller], 1775) (Noctuidae: Apameini) from North America

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On the evening of July 7, 2023 in the Federal Hill area of Delhi, Delaware County, New York, USA, I deployed wine and sugar bait ropes on tree branches along a forest-pastureland edge. Shortly after dark, 3 specimens (2 ♂; 1 ♀) of an unusual noctuid were collected on the ropes. These moths were pale beige in color with wood grain patterning (Figure 1) and while at rest superficially resembled *Lithophane* spp., though these moths were much larger, and the season was inconsistent with that genus. A closer examination of the wing characters, including the overall appearance of the basal dash and subterminal line, led me to believe this was a species in the genus *Apamea* Ochsenheimer. However, a search the next day in Moths of North America fascicle 26.9 on the genus *Apamea* and relatives did not present a match for this moth. Internet searches

eventually led me to the Eurasian species *Apamea lithoxylaea*, otherwise known as the Light Arches, which was the closest visual match I could find for the moth.

I dissected the genitalia of one of the males (Figure 2) and compared the valves to those illustrated for *Abromias lithoxylaea* in volume 8 of Noctuidae Europaeae (Zilli et al. 2005). Zilli et al. transferred this species (along with others found in Europe) to the genus *Abromias* Billberg, pending a revision of *Apamea* on the global scale, and noted genitalic differences from *Apamea*. I also compared the genitalia with those illustrated on the Moth Dissection UK website (mothdissection.co.uk). The genitalia from the New York specimen are an exact match for *A. lithoxylaea*, with broad saccular bases, asymmetrical lobes on the dorsal edge of the saccular bases, and a large, triangular cucullus with a well-developed corona and spines along the



Figure 1. *Apamea lithoxylaea* adults, male (above) and female: USA, New York, Delaware County, Delhi, Federal Hill, July 7, 2023, at bait, A. E. McBride, collector.



Figure 2. *Apamea lithoxylaea* male genitalia: valves (above) and aedeagus with everted vesica. Note the asymmetrical lobes on the dorsal edge of the saccular bases (New York, USA specimen).



Figure 3. *Apamea lithoxyloea* capture location in east-central New York.

antero-ventral edge, paralleled by a long, sinuous digitus. The vesica is also a match, with its two tiny basal cornuti and small diverticulum. The abdomen has well-developed lateral coremata on the first segment.

A. lithoxyloea is widespread in Europe and western Asia where it is found in a variety of habitats including pastureland, prairies, and moderately forested areas at middle elevations in mountainous areas (Zilli et al. 2005). The habitat at the Delhi, New York site is a mosaic of pastureland, mesic prairie, and maple-ash forest at an altitude of 580 meters (1,902 feet). This locality is in the western section of the Catskill Mountains in east-central New York, a part of the Appalachian Mountain system (Figure 3). In Eurasia this species flies from June through August, and its larvae, which overwinter in the soil when partially grown, feed on the lower stems and roots of grasses.

While it is unknown how or when this species arrived in North America, the fact that three individuals representing both sexes were caught on one evening at one locality lends to the probability that it is established in the wild at least at the local level. It is noteworthy that both a sheet with a 175w mercury vapor bulb and a trap with a 15w fluorescent black light bulb running within 100 meters of the bait ropes on the same evening failed to attract this species. Many apameine moths are known for responding strongly to sugar bait but not to light, and moth enthusiasts generally employ lights more frequently than bait to search for moths, so the possibility that this species is established over a much wider geographic area cannot be discounted. The UK Moths website reports that this species is fairly common in Great Britain, and that it responds to light to a certain extent, but is more frequent at sugar (ukmoths.org.uk). In Eurasia, this species is not known to be of economic importance, and it has not been reported to cause large-scale losses to native or pastureland grasses, so its presence in North America is not expected to produce adverse environmental or agricultural effects.

Special thanks to Danny Shurey for access to the site where the moths were collected and to Eric Quinter for his review of this article. Photographs in this article were taken by the author. The map was created using SimpleMappr (<http://www.simplemappr.net/>).

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Metamorphosis (again)

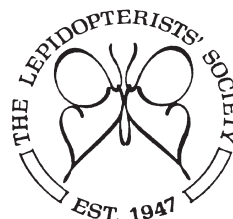
Keith Wolfe (1950-2023)



Keith Wolfe was born in San Francisco, CA and was dedicated to providing and caring for his family. They all loved spending time together and took many trips where you were guaranteed to find them laughing or being silly with each other. Aside from his family, he also found great joy in his other loves: butterflies and caterpillars — he loved the science and research, rearing and data collecting, teaching and knowledge sharing of it all, and, moreover, publishing journal articles on life histories of the Lepidoptera. Keith was a longtime member of the Lepidopterists' Society since 1981. He always believed in the power of a hug, that laughter is the best medicine, and in looking on the bright side of

things. He is survived by his wife and daughter who miss him immensely and love him dearly!"

Heather Wolfe



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Life history notes on the Southern Broken Dash, *Polites* (subgenus *Wallengrenia*) *otho* (Hesperiidae: Hesperinae), in the lower Rio Grande Valley of Texas

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Polites otho is represented in the LRGV by the subspecies *clavus* (= *curassivica*), Type Locality: Guyana (Pelham, 2008) in which the ventral hindwing coloration varies from yellow-orange to red-brown (Figs. 1-4). In recent years there has been an apparent increase in the frequency of the red-brown phenotype in the LRGV (C. W. Bordelon, pers. comm.). Burns (1994) declined to speculate on the taxonomic status of *clavus* with respect to *otho*.

Neonates make folded-leaf shelters. Later instars cut and roll grass blades into tube-like shelters, open at both ends, in which the larva remains while feeding by extending its head from the shelter (Figs. 5-7). The apical end of the shelter is sometimes silked to, and suspended from, the substrate, where it remains when the larva is at rest. The senior author has observed similar behavior when rearing the southeastern *P. otho otho* and the northern *P. egeremet*. Zhang et al. (2021) changed the former genus *Wallengrenia* to a subgenus of *Polites* based on DNA

evidence; this status was accepted by Pelham (2023).

A confined female collected by the senior author near Relampago, Hidalgo Co. 20 October 2022 oviposited on *Panicum maximum* (Poaceae). The junior author reared the majority of the resulting larvae on potted *Panicum* in a netted pop-up container. Several late-instars chewed through the netting, using it to form taco-shaped shelters instead of grass shelters (Fig. 8). These larvae were then placed in a jar lined with filter paper; they made similar shelters from the paper. When a nest was opened or a caterpillar was other-



Figures 1-4: *Polites otho clavus* adults. 1-2 Red-brown phenotype female ex ova, emerged 26-1-23; 3 yellow-orange phenotype male ex ova, ventrum, emerged 8-1-23; 4 male dorsum, Estero Llano Grande State Park, 6-11-13, photo Bryan E. Reynolds. **Figures 5-8.** Larval shelters of *P. otho*. 5 second instar; 6 another second instar, feeding; 7 fifth instar; 8 shelter formed from cage netting.

wise disturbed, it tucked its head up underneath the body and remained in that position for quite some time (Fig. 15).

DESCRIPTION OF IMMATURE STAGES

Ova (Fig. 9). Semi-hemispherical, cream-colored.

Neonate (Fig. 10). Body cream; head black.

First instar (Fig. 11). Body greenish-brown, freckled with tiny dark setal bumps.

Second instar (Fig. 12). Body brown with hints of green. Prothoracic shield black banded by yellow; also yellow lines around spiracle on T1.

Third-fifth instars (Figs. 13-16). Body darkens slightly but otherwise little change.

Pupa (Fig. 17). Medium brown, covered in white powder. Formed inside shelter.

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Figures 9-17: Immature stages of *P. otho*. **9** ovum; **10** neonate; **11** first instar; **12** second instar; **13** third instar; **14** fourth instar; **15** fifth instar in defensive position; **16** fifth instar; **17** pupa.

Life history notes on the Zilpa Longtail, *Chioides zilpa* (Hesperiidae: Eudaminae), in the lower Rio Grande Valley of Texas

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A regular if uncommon stray from Mexico, *Chioides zilpa* (Figs. 1-2) apparently does not breed in the LRGV. J. P. Brock (pers. comm.) observed and photographed larvae on *Nissolia* (Leguminosae: Papilionoideae), a climbing vetch-like vine, in the Mexican states of Sonora and Nuevo Leon, and illustrated the larva in Allen et al (2005). Bailowitz and Brock (2022) report the use of *Nissolia gentryi* in Sonora. *Nissolia* is not known to occur in the LRGV.

Confined females refuse oviposition on, and neonates will not eat, *Rhynchosia minima*, *Galactia texana*, and *Vigna luteola* (Leguminosae: Papilionoideae). *R. minima* and *G. texana* are hosts for *Chioides albofasciatus* and *V. luteola* for *Urbanus proteus*. Ultimate instars will eat the foliage of *Sesbania herbacea* (Leguminosae: Papilionoideae), a host for *Erynnis funeralis*, but neonates refuse it. The senior author found that caged females will oviposit on Crown Vetch *Coronilla varia* (Leguminosae: Papilionoideae), an introduced European perennial. Larvae readily accept it and can be reared to phenotypically normal adults. Eggs are placed on leaflets and larvae live in leaf shelters. Shapiro (1979) noted that *C. varia*, following extensive plantings along highways, is now a naturalized and common plant in Pennsylvania, where it has become the preferred host of *Erynnis baptisiae*.

The junior author obtained 3 eggs from a captive female in November, 2022. Two larvae were successfully reared

to adulthood on a potted *Nissolia schottii*. The plant was subsequently placed outdoors. In June, 2023, three larvae were found on it, showing that *C. zilpa* will breed in the LRGV if a suitable host is available. Two of these caterpillars were collected and successfully reared.

DESCRIPTION OF IMMATURE STAGES

Ova (Fig. 3). White, spherical with approximately 15 vertical ribs. Chorion surface often with imperfections that have the appearance of bubbles.

First instar (Fig. 4). Body yellow-green; collar black; head black with short white setae. T1 brown with black prothoracic plate.

Second instar (Fig. 5). Body green with numerous paler setal bumps. Head and T1 as previous instar.

Third instar (Fig. 6). As before, but with weak yellow to orange supraspiracular stripe extending the length of the body, and anal plate edged with similar color.

Fourth instar (Fig. 7). This and final instar quite colorful. Body blue-green to blue-white. Supraspiracular stripe stronger, accompanied by black freckles. T1 now crimson, as are prolegs on that segment. Coloration of prolegs on other segments matches stripe. Head black or very dark reddish-brown, with orange eyespots.

Fifth instar (Fig. 8). Body pale bluish-white in summer cohort; in winter dorsal area, especially, infused with a pinkish-purplish shade. Freckling more extensive than L4.

Head reddish-brown; each eyespot accompanied by black splotch behind eyes.

Pupa (Figs. 9-10). Mottled dark-brown when formed, covered with white powder by second day.

Literature Cited

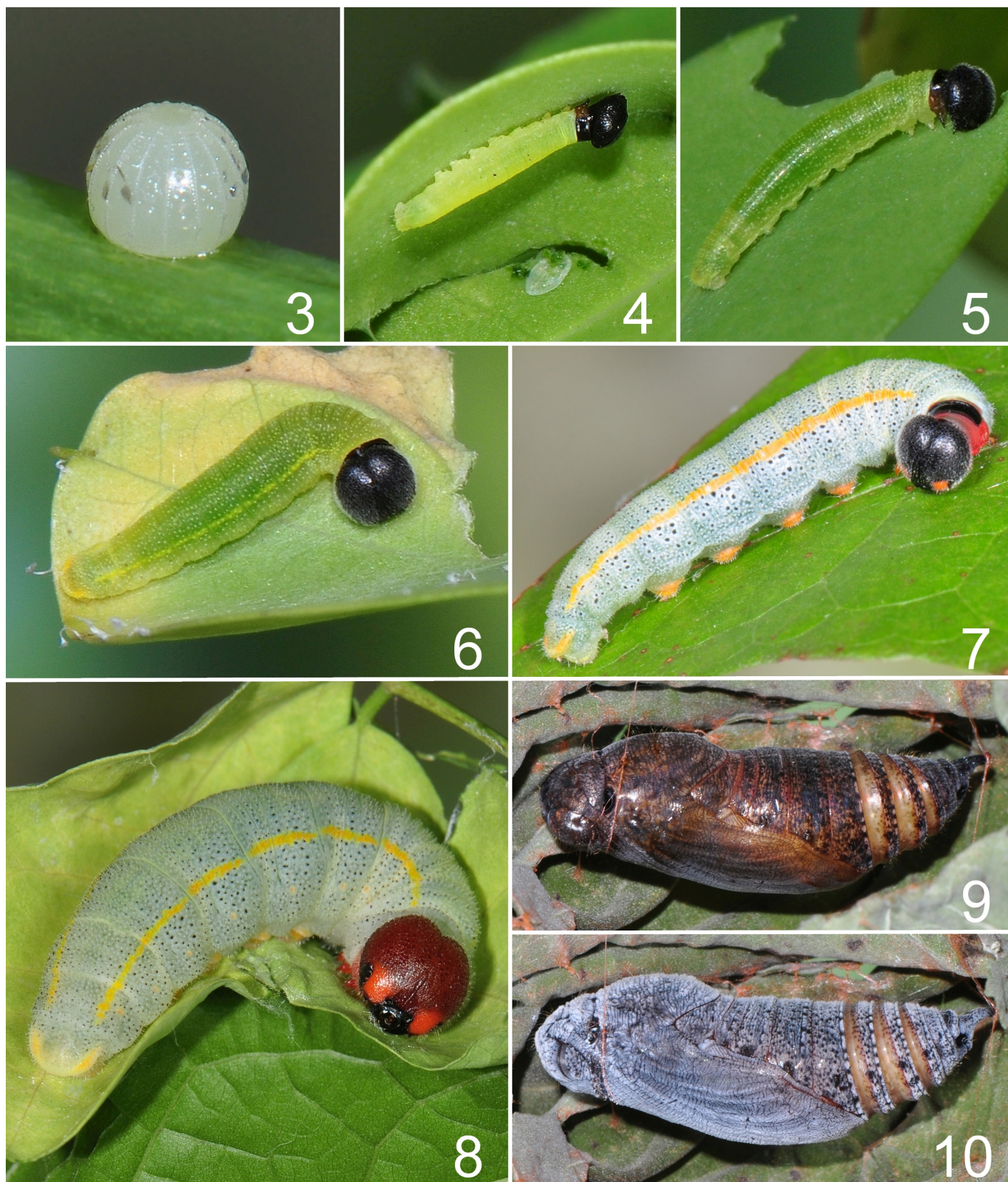
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Figures 1-2: *Chioides zilpa* adults. 1 Ventrum, fresh adult, ex ova, emerged 23-2-23; 2 dorsum, 15-11-09, Falcon Heights, TX.

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Shapiro, A. M. 1979. *Erynnis baptisiae* (Hesperiidae) on crown vetch (Leguminosae). Journal of the Lepid. Soc. 33(4): 258.



Figures 3-10: Immature stages of *C. zilpa*. 3 Ovum; 4 first instar; 5 second instar; 6 third instar; 7 fourth instar; 8 fifth instar; 9 fresh pupa; 10 pupa on day 2.

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654

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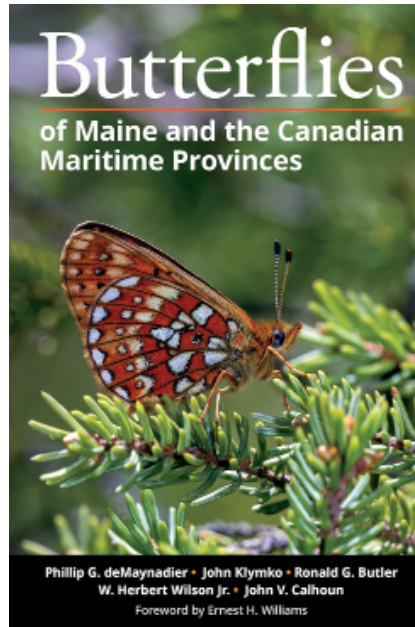
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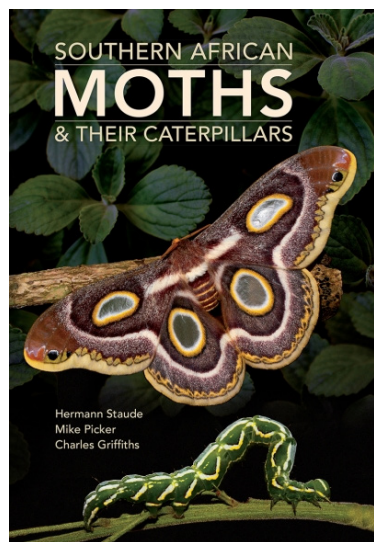
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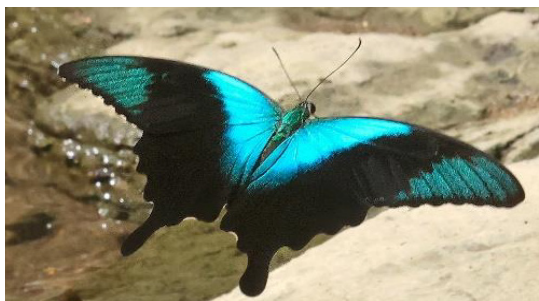
Taxonomy, Ecology, and Evolutionary Theory of the Genus *Colias* (Lepidoptera: Pieridae: Coliadinae). Second Edition, 2020 by Paul C. Hammond and David V. McCorkle.

This book has an 8 1/2 inch X 11 inch format with a hard cover, and is 319 pages in length. It includes 10 figures and 16 color plates that illustrate nearly all of the North American taxa including the extensive geographic variation in the *Colias* species of western mountain regions, plus closely related Eurasian taxa. A detailed discussion is presented of the distribution, habitat, and larval foodplants for each taxon in North America. The book also explores the broader theory of evolution and adaptive radiation using *Colias* butterflies as the model. Price: USD \$110 including postage. Available from Paul C. Hammond, 2435 E. Applegate St., Philomath, OR 97370. email copablepharon@gmail.com. 661

Tropical Trips

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. 661



Papilio peranthus

2024 Lepidoptera Expeditions to Vietnam, Guatemala and Paraguay

Lepidoptera Expeditions is offering several trips with collecting possible to the following locations this year: Vietnam, June 2-16, 2024; Guatemala, September 1-15, 2024; and Paraguay (2 parts, can be combined into one long trip), October 19-31 and November 1-15, 2024. Please contact Lepidoptera Expeditions (Scientific Publishers), P.O. Box 15718, Gainesville, FL 32604. You can also call the following number and leave a voice mail (352-373-5630) or email at tropolep@aol.com. 661



Ashinaga sp. (Ashinagidae). This apparently is an undescribed species. The named species are in China/Taiwan. This specimen is from MCM Nature Discovery Villa, Fraser's Hill, Malaysia. Sept. 2023. Image by David Fischer.

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

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Submission Guidelines for the News

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

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

Submission Deadlines

Material for upcoming volumes must reach the Editor by the dates below:

	Issue	Date Due
66	2 Summer	May 12, 2024
	3 Fall	August 15, 2024
	4 Winter	November 15, 2024
67	1 Spring	February 15, 2025

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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Nathalis iole -- a new record for Barbados

Rick Rozycki

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ABSTRACT: *Nathalis iole* (Pieridae) is recorded for the first time in the Lesser Antilles from the island of Barbados.

Recently, while on vacation in Barbados, I encountered several specimens of *Nathalis iole*, previously unrecorded from there or anywhere else in the Lesser Antilles. It was in March 2023, at Carlisle Bay Beach near Bridgetown, where there is a small area of disturbed beach ridge, with secondary vegetation adjacent to it. At this location there were a few other common butterfly species -- *Eurema daira*, *Danaus plexippus*, *Hylephila phyleus*, *Ascia monuste*, *Hemiargus hanno* and *Strymon bubastus* flying along with the *N. iole*. *N. iole* was not seen anywhere else by me on Barbados, of the many locations I visited that day on the island.

Nathalis iole is found in the southern United States (with strays ranging northward into Canada). It is also found in Mexico, Central America at least to Honduras, Cuba, Hispaniola, Jamaica, the northern Bahamas, and at least one specimen is recorded from both Grand Cayman and Little Cayman Island. There is an isolated population in the Colombian Andes (Sierra Nevada de Santa Marta and Sierra de Perija), found above 3000 m in the Paramo, which has been described as *N. iole natalia* (Pulido 2010). *N. iole* has been found in Venezuela, high in the Sierra de Perija on the Colombian border. Also one (single) specimen has been reported from above Caracas (dubious record). (A. Neild, pers. comm.) So far *N. iole*, has not been recorded from the Netherland Antilles, Trinidad or Tobago.

In 1969, E.J. Pearce recorded seventeen butterfly species from Barbados. In 1986, J. Scott had the number at twenty-four. This recent addition of *N. iole* should bring the number of species from Barbados to at least twenty-five.

ACKNOWLEDGEMENTS

I would like to thank Andrew Neild for all the distribution records and information he supplied pertaining to Venezuela. I would also like to thank my wife Pat for taking the photo.

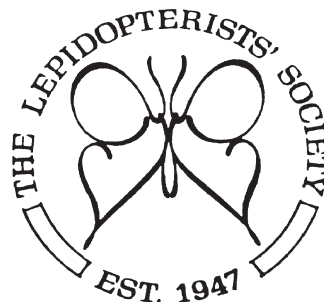
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Nathalis iole. Top - male; bottom - female. March 10, 2023. Carlisle Bay Beach, near Bridgetown, Barbados. Image by Pat Rozycki.



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