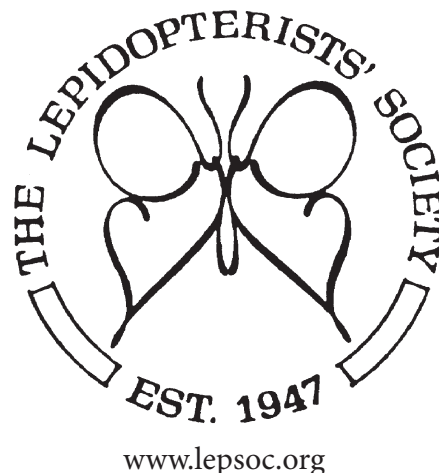


NEWS OF THE LEPIDOPTERISTS' SOCIETY

Volume 57, Number 1

Spring 2015



Inside:

**Geographic variation in
Hyalophora larvae**

***Nacoleia charesalis*
spreading in Florida**

**The enigmatic oakworm
*Anisota consularis***

**eButterfly site/Unified
Butterfly Recorder app**

**Conservation for the
St. Francis Satyr**

**Finkelstein collection
to the McGuire Center**

2014 Election results

**Membership Updates,
Marketplace, Mailbag,
Formative Experiences,
Metamorphosis, Book
Review, Lep Soc 2015,
Announcements ...**

... and more!

BILATERAL MOSAIC GYNANDROMORPH

Speyeria diana GYNANDROMORPH
Ex. ov6 COOPER CREEK Wildlife Mgt. Area,
CHATTAHOOCHEE NATIONAL FOREST,
UNION / FANNIN Co., GEORGIA
Em. Oct. 27, 1993 leg. L. L. Finkelstein



THE DIANA FRITILLARY (*Speyeria diana*)
APPALACHIAN MOUNTAINS, UNITED STATES

NEWS OF THE LEPIDOPTERISTS' SOCIETY

Volume 57, Number 1
Spring 2015

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

The **News of The Lepidopterists' Society** (ISSN 0091-1348) is published quarterly by The Lepidopterists' Society, c/o Chris Grinter, Illinois Natural History Survey, 1816 South Oak St. Champaign, IL 61820-0904, and includes one or two supplements each year. The **Season Summary** is published every year as Supplement S1 and is mailed with issue 1 of the News. In even numbered years a complete **Membership Directory** is published as Supplement S2 and is mailed with issue 4 of that volume of the News. Please see the inside back cover for instructions regarding subscriptions, submissions to, and deadline dates for, the News.

Periodicals Postage paid at Champaign, IL, and at additional mailing office (Lawrence, KS).

POSTMASTER: Please send address changes to **News of The Lepidopterists' Society**, c/o Chris Grinter, Illinois Natural History Survey, 1816 South Oak St., Champaign, IL 61820-0904.

Copyright © 2015 by The Lepidopterists' Society. All rights reserved. The statements of contributors do not necessarily represent the views of the Society or the editor and the Society does not warrant or endorse products or services of advertisers.



www.lepsoc.org

Contents

Geographic variation in fifth instar <i>Hyalophora</i> (Saturniidae): a piece of the phylogeographic puzzle	
<i>Michael M. Collins.</i>	3
<i>Nacoleia charesalis</i> (Walker) spreading in Florida	
<i>James Hayden and James Troubridge.</i>	8
The ever-enigmatic oakworm called <i>Anisota consularis</i>	
<i>Ric Peigler.</i>	11
Richard W. Holland: Bibliography and described taxa	
<i>Paul Opler.</i>	14
The rediscovery of <i>Eupithecia tricolorata</i> Cassino (Geometridae: Larentiinae)	
<i>Cliff Ferris.</i>	15
Unified Butterfly Recorder: new technology for a traditional practice	
<i>Nathan Brockman.</i>	16
Election results for the 2014 elections.	18
eButterfly takes flight	
<i>Kent McFarland, Max Larivée, and Kathleen Prudic.</i>	19
Announcements:	22
Special student research issue of the Journal (Vol 69:3, Fall 2015);	
Colorado Digital Libraries publications; National Moth Week; Pay Pal;	
Awards: Nominations for Karl Jordan Medal, Bryant Mather Award;	
Lep Courses/Meetings: Pacific Slope, Maine, Arizona; Brochures;	
Society of Kentucky Lepidopterists	
The Mailbag.	24
Membership Updates/Metamorphosis.	
<i>Chris Grinter.</i>	25
The Marketplace.	26
A trio of Sierra Nevada stories	
<i>Ken Davenport.</i>	28
Conservation Matters: Conservation and restoration for the endangered St. Francis Satyr	
<i>Nick Haddad.</i>	33
Announcement: 64th annual meeting of The Lepidopterists' Society	
Purdue University, West Lafayette, IN.	36
Book Review.	41
Irving Finkelstein's collection finds a new home at the McGuire Center	
<i>Andrei Sourakov and Andy Warren.</i>	42
A sample of butterflies of the Rockies, some common, some not so common	
<i>George Krizek.</i>	44
Formative Experiences: Richard L. Hardesty.	49
From the Editor's Desk.	49
Membership Information, Dues Rates, Journal of the Lepidopterists'	
Society, Change of Address, Our Mailing List, Missed or Defective	
Issues, Submission Guidelines and Deadlines for the News.	50
Executive Council/Season Summary Zone Coordinators.	51

Issue Date: Feb. 26, 2015

ISSN 0091-1348

Editor: James K. Adams

Front Cover:

Diana Fritillary (*Speyeria diana*) gynandromorph, reared, from collection of Irving Finkelstein (see page 42); photo by Andrei Sourakov.

Geographic variation in fifth instar *Hyalophora* (Saturniidae): a piece of the phylogeographic puzzle

Michael M. Collins

Associate, Carnegie Mus. Nat. History, Invertebrate Zoology, Pittsburgh, PA; 215 Prospect St., Nevada City, CA 95959
 michaelmerlecollins@comcast.net

The larvae of Lepidoptera are rich in taxonomic characters, exhibit a wealth of adaptations to the biotic and physical environment, and typically occupy a longer time span within the life cycle than the adult. Geographic variation in larval characters may not be congruent with that seen in adult traits, yet – in this era of DNA-based phylogenetics – data from immatures are not often a part of taxonomic and phylogeographic research. This note is an outline of newly discovered geographic variation in larval scoli color patterns in *Hyalophora*. These results will be incorporated into phylogeographic studies now underway at CMNH (Collins and Rawlins 2013).

At the time of the publication of *Wild Silk Moths of North America* (Tuskes et al. 1996) the named taxa of *Hyalophora* were thought to have distinct larval phenotypes concordant with species-specific adult characters. The form “*kasloensis*” in the Bitterroot Range of the Pacific Northwest, currently believed to be a hybrid intergrade between *H. euryalus* and *H. columbia gloveri*, appeared unique in possessing red or orange-red dorsal scoli, both thoracic and abdominal, in the last (5th) instar larva (Collins 1997, Moorewood 1991). It has long been known that the 5th instar larva of the taxon in the Great Lakes region, *H. columbia columbia*, has deep red dorsal thoracic and first abdominal scoli, with the remaining dorsal scoli of a unique yellow-pink hue. This larval phenotype intergrades with that seen in *H. c. gloveri* in the Prairie Provinces (Kohalmi & Moens 1988); the prairie populations have all yellow dorsal scoli. All other populations of *euryalus* and *gloveri* were thought to have yellow dorsal scoli in the last larval instar (Figs 1, 3).

Recently, the last larval instar in certain populations of both *euryalus* (in the Pacific Northwest; Fig 2) and *gloveri* (southern Sierra Nevada east slope and southern Nevada; Fig 4) have been shown to possess red or reddish dorsal scoli in various patterns (unpub. obs., Boyd 2012). The phylogenetic interpretation and adaptive significance of this newly discovered variation in scoli color is intriguing and open to investigation. With regard to developmental genetics, is there a causal relationship between hybridization and the expression of red pigmentation in last instar larvae in certain populations?¹ The penultimate

larva of *gloveri* often has red dorsal scoli (Fig 7). Could a hybrid dysgenesis effect have caused the expression of red pigment in the 5th instar *kasloensis* (Fig 6) by altering the timing of expression of genes normally active only in the penultimate instar? Could past introgression from the Bitterroot region have introduced the red larval coloration now seen in coastal *euryalus* in the Pacific Northwest? (Lab hybrids between widely disjunct populations of *euryalus* and *gloveri* do not have red scoli in the last instar.)

The widely disjunct geographic location of the red scoli phenotype in *gloveri*, in southern Nevada and the southern Sierra Nevada, would suggest that this larval form arose independently from the similar Pacific Northwest larval forms in *euryalus*. The size and structure of the red scoli in these southwest populations are typical of *gloveri* throughout its main distribution.

Scoli in certain saturniids are known to secrete instar- and color-specific toxins when spines are broken off the scoli (Deml & Dettner 1990, 1993, 1997, 2003; Collins 2013). These researchers speculate that, based on the nature of the secreted toxins, early instars of *H. cecropia* are protected against invertebrate predators, while later instars have a defensive chemistry directed primarily at vertebrate enemies. The true adaptive significance of scoli color variation among all *Hyalophora* taxa remains to be studied.



Figure 1. *Hyalophora euryalus*. California, Nevada Co. Reared on ornamental birch. Typical California and Baja California phenotype (both coastal and montane) with cylindrical dorsal thoracic/1st abdominal scoli; dorsal scoli on all segments yellow; reduced dorsal and lateral scoli overall, spines on scoli reduced in number and size relative to scoli and to that seen in other *Hyalophora*. The base of dorsal thoracic/1st abdominal scoli ringed entirely with black ridge of even width. (Courtesy of CMNH)

¹Such an effect is seen in “hybridzymes”, unusual enzyme variants unique to hybrid zones (Woodruff 1989, Collins et al. 1993). Disrupted gene regulation has also been found in hybrid fish (Parker et al. 1985; Phillip et al. 1983).



Figure 2. *Hyalophora euryalus*. ex cross: ♀ California, Nevada Co. X ♂ Oregon, Lane Co, Blue Pool Campground, 14 km e Oakridge, Willamette Pass hwy 58. The Willamette Pass population probably has red to orange dorsal thoracic scoli and pale yellow dorsal abdominal scoli, based on the colors of this offspring. Scolus structure as in California populations of *euryalus*. A similar larval phenotype occurs north along Pacific Coast to British Columbia. Note: scolus size enlarged due to effect of Douglas fir host (Fig. 5).



Figure 3. *H. c. gloveri*. California, Mono Co US 395 s Bridgeport, at Bodie turnoff. Typical larval phenotype for entire Rocky Mt. chain, Great Basin, SE Arizona, and east slope of the California Sierra Nevada from Mono Lake north. Note uniform yellow color of dorsal scoli, dorsal thoracic scoli bulbous; dorsal 1st abdominal scoli less so. Black ring at base of dorsal thoracic scoli broken into separate irregular spots, usually touching. Scolus larger relative to body than in *euryalus*.



Figure 4. *H. c. gloveri*. Nevada, Nye Co, Tonopah Test Site, vic. Yucca Mt. A similar phenotype with red dorsal scoli is found in the Spring Mts. of Clark Co. Nevada (Boyd & Boyd 2012). Crosses between a Mono Lake female with a male from Big Pine, Inyo Co Calif. produced larvae with similar red-orange dorsal scoli, indicating that the latter population also has the red scoli phenotype. (Courtesy of Phillip Medica USGS)



Figure 5. Host-induced polyphenism in *H. euryalus*. All larvae sibs, Nevada Co California stock. TOP: reared on *Arctostaphylos patula*. Dorsal thoracic and dorsal A-1 scoli normal size; all other dorsal and all lateral scoli much reduced or absent. MIDDLE: Intermediate phenotype, reared on *Prunus*, which – like *Ceanothus* spp. – is neutral in inducing a larval morph. Note unusual variation in size of dorsal abdominal scoli (arrows). BOTTOM: reared on Douglas fir (*Pseudotsuga menziesii*), which induces expression of exaggerated dorsal and abdominal scoli. Cryptic among dense needles (Collins 1999).

Synopsis of geographic variation in larval phenotypes. The following discussion of larval phenotypes is summarized in Table 1.

Table 1. Dorsal Scoli Color Polymorphism in 5th Instar *Hyalophora* Larvae

Population	Thoracic 2,3	Abdom. 1	Abdom. 2-8	Host / Notes ¹
<i>euryalus</i>				
California Baja Calif.	yellow	yellow	yellow	coastal, Sierra Nevada, Warner Mts. many hosts (Tuskes et al. 1996)
Oregon, Baker Co. Blue Mts., Willamette Pass, Josephine Co.	red/orange	yellow	yellow	<i>Ceanothus integerrimus</i> , <i>Pseudotsuga menziesii</i>
British Columbia Victoria, coastal	red/orange	yellow	yellow	Many hosts (Dean Moorewood, pers. comm.)
<i>gloveri</i>				
Colorado, Montana Arizona, Gila Co. to Sta. Cruz Co.	yellow	yellow	yellow	widely documented, many hosts
Nevada, north, central Ruby Mts, Toiyabe Range Sta. Rosa Mts.	yellow	yellow	yellow	reared on <i>Salix exigua</i> , <i>Prunus emarginata</i>
southern Nevada, Nye Co. Yucca Mt., Spring Mts. Clark Co.	red	red	dark orange	natural host: <i>Purshia glandulosa</i>
East slope Sierra Nevada Mono Co. s to Mono Lake	yellow	yellow	yellow	<i>Rosa woodsia</i> , <i>Salix exigua</i> , <i>Purshia tridentata</i> , <i>Prunus demissa</i>
Inyo Co., Big Pine	red	red	orange	inferred ex hybrids w/ Mono L. ♀♀. <i>Salix hindsiana</i> , <i>P. emarginata</i> See results below ²
Mono Co. ♀ X Inyo Co. Big Pine ♂	yellow red/org-red	yellow red/org-red	yellow orange	50% <i>P. serotina</i> (13) total 50% W. Reynolds, N. Carolina
Same lot	red/org-red yellow faint orange	red/org-red yellow faint orange	orange yellow yellow	(2) <i>Salix</i> sp. (glaucus leaf) (4) “ “ (1) “ “ 2500 ft. Nevada Co. CA
Same lot	yellow orange	yellow orange	yellow orange	(8) <i>Salix hindsiana</i> (7) “ “ 2500 ft. Nevada Co. CA
Same lot	brick red	brick red	pale orange	(11) <i>P. serotina</i> Carnegie Museum Pittsburgh PA (See Footnote)
Lab. F ₁ <i>euryalus</i> X <i>gloveri</i>	yellow	yellow	yellow	Collins 1984, Collins & Rawlins 2013; many crosses
Alpine & Mono Co. Monitor Pass Hybrid zone	yellow	yellow	yellow	many hosts in lab and in nature; as above
<i>kasloensis</i>				
Bitterroot Range MT, ID Okanogan Valley Brit. Col.	red/org-red	red/org-red	orange-red	many hosts (Collins 1997) (Moorewood 1991)

1. Authors unpublished research unless otherwise cited.

2. The dorsal thoracic scoli color in *H. columbia columbia* appears to be controlled by a simple co-dominant locus (Kohalmi and Moens 1988). If the genetics of western taxa are the same, the Inyo Co. California *gloveri* ♂ would have been Y/R and the Mono Co. California ♀ would have had a genotype of YY, yielding a 50/50 ratio of R/Y red-orange and Y/Y yellow offspring. This result holds for the broods reared by the author and by W. Reynolds in North Carolina, on various hosts. The 100% red-orange larvae reared at the CMNH suggests an environmental effect yet to be determined through controlled rearing.



Figure 6. *Hyalophora* "kasloensis". Montana, Flathead Co, Rogers Lake. Note deep red dorsal thoracic / 1st abdominal scoli, reddish-orange dorsal abdominal scoli. All scoli, especially dorsal scoli, possess more prominent spines compared to *euryalus*. Dorsal thoracic scoli bulbous as in *gloveri*, but smaller, close in length to abdominal dorsal scoli. Black ring irregular, not entire. The red coloration and small, spiny scoli give the mature *kasloensis* larva the appearance of a larger version of the 4th instar *gloveri* larva (Fig 7).



Figure 7. *H. c. gloveri* 4th Instar. TOP, LEFT California, Mono Co s Bridgeport at Bodie turn-off on US 395. RIGHT. Colorado, Boulder Co. (premolt-yellow pigment of 5th instar dorsal scoli visible through cuticle). The red color of dorsal scoli in penultimate larvae is typical for the entire range of *gloveri*, although all scoli, especially lateral, may be obscured by black pigment. This melanic polymorphism is especially common in eastern Montana, but also seen as far south as SE Arizona populations. All dorsal scoli nearly the same size. The phenotype with yellow dorsal scoli (BOTTOM, LEFT) is similar to that seen in *euryalus*, suggesting introgression, as this population of *gloveri* is just south of a hybrid zone between the two species.

Comparative measurements of scoli shape and size

Live specimens representative of all the various taxa were not available during the preparation of this article. Consequently, measurements of scoli size and shape were mostly taken from digital images. The shape of the dorsal

metathoracic scoli was calculated as the ratio of the greatest width with respect to the length of the scoli bulb, exclusive of the spines. Available images rarely included a size scale. To depict scoli size relative to larval size a fixed, non-growing, reference is required. The head capsule would be an obvious choice, but *Hyalophora* larvae typically retract the head into the thoracic region when disturbed. Therefore, the length of the first abdominal spiracle was used instead, in a ratio to scoli length. These data are presented in Table 2.

Data in Table 1 for scoli width/length confirm what is apparent to the eye. The dorsal thoracic scoli in *euryalus* are elongated, while those in *gloveri* and *cecropia* are nearly round. As expected for its putative hybrid origin, the corresponding scoli in *kasloensis* are intermediate in shape.

The size of the dorsal thoracic scoli in *kasloensis* is smaller in relation to spiracle length in comparison to both *euryalus* and *gloveri*. This result supports the hypothesis that the scoli in fifth instar *kasloensis* are somehow

an expression of those genes that normally regulate scoli development in the fourth instar of other *Hyalophora* taxa.

In side-by-side comparisons it is obvious that the absolute and relative size of dorsal thoracic scoli are larger in *cecropia* compared to other taxa (Fig. 8). A preliminary study gives a range of 1.75 mm to 2.25 mm for metathoracic

Table 2. Comparative measurements of dorsal metathoracic scoli size and shape among *Hyalophora*.

Species	Scolus width/ length	Scolus size related to spiracle
<i>euryalus</i> (7)	0.62	1.85
<i>gloveri</i> (8)	0.94	2.08
<i>kasloensis</i> (3)	0.70	1.61
<i>cecropia</i> (6)	0.94	1.45



Figure 8. *H. cecropia*. Wood Co Texas. Early 5th instar. Note large, globular, nearly round dorsal thoracic and 1st abdominal scoli. No black basal ring. Spiracle size in this species is larger relative to body size compared to congeners. Dorsal thoracic scoli vary from dull red to orange to yellow. (Courtesy of Ric Peigler)

dorsal scoli length in *gloveri* vs. about 2.0 mm to 2.5 mm in *cecropia*. Yet the value for scoli size relative to spiracle length for *cecropia* is the smallest of all taxa represented in Table 2. This seems to be due to a larger spiracle, relative to body size, in *cecropia*.

Molecular Studies

In her study of insect metamorphosis Judith Willis has used *Hyalophora cecropia* as a model system to reveal changes in cuticular proteins through developmental stages (Cox 1987; Cox and Willis 1985, 1987ab). Genetic markers for specific proteins have been identified (Lampe and Willis 1994), and more recently *euryalus*, *cecropia*, and *gloveri* have been shown to possess allozyme markers for specific cuticular proteins; the latter species exhibited geographic variation for certain allozymes (Willis pers. comm). Potentially these methods and markers might be used to look for a possible link between variation in genes coding for cuticular proteins and geographic and species-specific variation in scoli coloration. Such markers might also be used to detect the effects of interspecific hybrid introgression. The developmental model could also be used to study the ontogeny of scoli development in *kasloensis*.

Summary

Within *Hyalophora*, larval phenotypes were formerly considered to be taxon-specific and rather uniform over species' ranges. Red coloration of dorsal scoli on all

segments in the 5th instar was thought to be confined to the intergrade "*kasloensis*" in the Bitterroot Range. Newly discovered geographical variation revises this view, revealing two apparently independent examples of red pigmentation in dorsal scoli in Southwestern *H. c. gloveri* and in *H. euryalus* in the Pacific Northwest. This finding is intriguing in light of: (a) its possible basis in hybrid dysgenesis in scoli formation, (b) the likely origin of certain larval characters through introgression from hybrid populations, and (c) the proposed correlation between scoli color and defensive chemistry. The genetic expression of and adaptive basis of variation in scoli color in *Hyalophora* merits further research.

Acknowledgements

Don Adams, John Ashley, Bruce Boyd, Todd Esque, Chuck Harp, Les Kohalmi, Dean Moorewood, Ric Peigler, Bill Reynolds, Steve Spomer and Mike VanBuskirk generously shared information, livestock, and photos of *Hyalophora*. I am very grateful to Judith Willis (University of Georgia) for sharing the results of her research with *H. cecropia*. I thank John Rawlins for a rewarding discussion on the need for more research into the evolution of larval structure and phenotypic patterns. Special thanks to Vanessa Verdiccia for her efforts in rearing various *Hyalophora* cultures in the Carnegie Museum "bug rooms".

Literature Cited

- Boyd, B. M. and B. Boyd. 2012. *Hyalophora columbia gloveri* (Lepidoptera, Saturniidae) in the Spring Mountains, Clark County, Nevada, and description of a unique larval phenotype. *News Lepid. Soc.* 54:41, 56.
- Collins, M. M. 2013. On the finding of dead ants attached to saturniid caterpillars: Evidence of successful deterrent chemistry? *J. Lepid. Soc.* 67:62-63.
- Collins, M. M. 1997. Hybridization and speciation in *Hyalophora* (Insecta: Lepidoptera: Saturniidae): A Reappraisal of W.R. Sweadner's classic study of a hybrid zone. *Ann. Carnegie Mus.* 66:411-456.
- Collins, M. M. 1999. A hostplant-induced larval polyphenism in *Hyalophora euryalus* (Saturniidae). *J. Lepid. Soc.* 53:22-28.
- Collins, M.M., H.B. Britten, and V. Rivers. 1993(1996). Allozyme analysis of a known hybrid zone between *Hyalophora euryalus* and *H. columbia gloveri* (Lepidoptera: Saturniidae) in the California Sierra Nevada. *J. Res. Lepid.* 32:79-88.
- Collins, M.M. and J.E. Rawlins. 2013. A transect for reproductive compatibility and evidence for a "hybrid sink" in a hybrid zone of *Hyalophora* (Insecta: Lepidoptera: Saturniidae). *Ann. Carnegie Mus.* 82:193-223.
- Cox, D.L. 1987. Analysis of the cuticular proteins of *Hyalophora cecropia* with polyclonal antibodies. *Insect Biochem.* 17:485-492.
- Cox, D.L. and J.H. Willis. 1985. The cuticular proteins of *Hyalophora cecropia* from different anatomical regions and metamorphic states. *Insect Biochem.* 15:349-362.
- Cox, D.L. and J.H. Willis. 1987a. Post-translational modifications of the cuticular proteins of *Hyalophora cecropia* from different anatomical regions and metamorphic states. *Insect Biochem.* 17:469-484.

Continued on p. 13

Nacoleia charesalis (Walker) spreading in Florida

James Hayden¹ and James Troubridge^{2, 3}

¹Florida Dept. of Agriculture and Consumer Services, Division of Plant Industry, 1911 SW 34th St. Gainesville, Florida 32608 James.Hayden@FreshFromFlorida.com

^{2,3}23396 Mullins Ave., Port Charlotte, Florida, 33954; Research Associate, FL State Collection of Arthropods seth.incarnate@gmail.com

Nacoleia charesalis (Walker, 1859) (Pyraloidea: Crambidae: Spilomelinae) is a medium-sized brown moth with a native range from the Southeast Asian tropics to northern Australia. It was first detected in southern Florida, USA, in 2012 and is spreading rapidly northward. As it resembles some native North American species, we summarize its current distribution, diagnostic characters and known behavior.

The first known specimen was a female collected on 12 June 2012 in a palm grove in Homestead, Florida. It was sampled in a CAPS (Cooperative Agricultural Pest Survey) red palm weevil bucket trap baited with weevil pheromone, propylene glycol, molasses and baker's yeast, and inspected by CAPS Pest Survey Specialist Andrew Derksen. Despite immersion in the mixture and shipment in alcohol, the wing pattern was clear enough to tell that the moth was not a native species, which subsequent dissection confirmed.

Suspecting that it was a Neotropical species, JH contacted Vitor Becker (Serra Bonita, Bahia, Brazil), who identified it as *Nacoleia charesalis* (pers. comm. 22 June 2012). Alma Solis (USDA-ARS) subsequently determined it as "*Nacoleia* sp. near *charesalis*," noting that *N. charesalis* could comprise a species complex across its wide distribution; Paine (1964) noted some morphological variation. The male genitalia of Florida specimens are identical to those of the lectotype of *Botys charesalis* Walker, 1859, slide-mounted in the Oxford Museum of Natural History. The type is a male rather than a female, *contra* Walker.

To date, the moth has been collected in twelve Florida counties: Alachua, Broward, Charlotte, Collier, Levy, Marion, Martin, Miami-Dade, Monroe, Orange, Palm Beach, and Sarasota (Fig. 11). JT provided several of these county records, and many other samples came from traps inspected by the Florida Department of Agriculture, Division of Plant Industry (FDACS-DPI). Nearly two years after detection in southern Florida, a specimen was caught in a tephritid fruit fly trap in Winter Park (Orange Co.) on April 2, 2014. On July 19, JH caught a specimen at ultraviolet light in Goethe State Forest (Levy Co.; Fig. 3), about 88 miles to the northwest. Terhune Dickel caught specimens at mercury vapor light in Anthony (Marion Co.) on August 15 and September 14 (T.S. Dickel, pers. comm.). JH collected a specimen in Gainesville (Alachua Co.) on December 5 at a residential porch light.

An undoubtedly incomplete summary of the moth's native distribution (west to east) includes the Seychelles, India, Sri

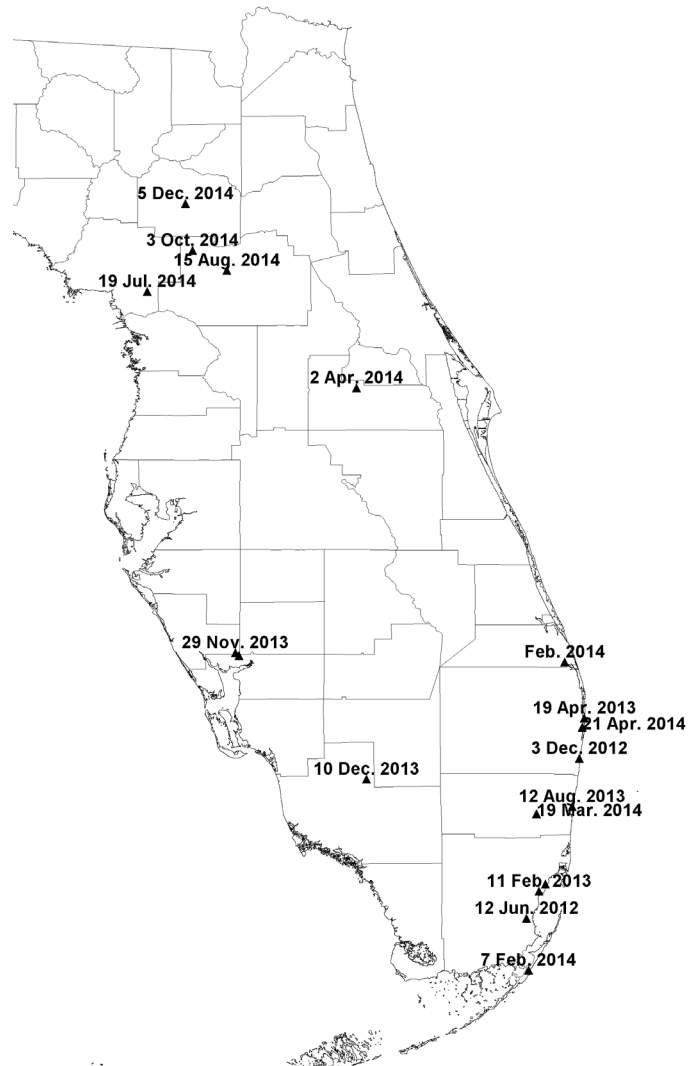
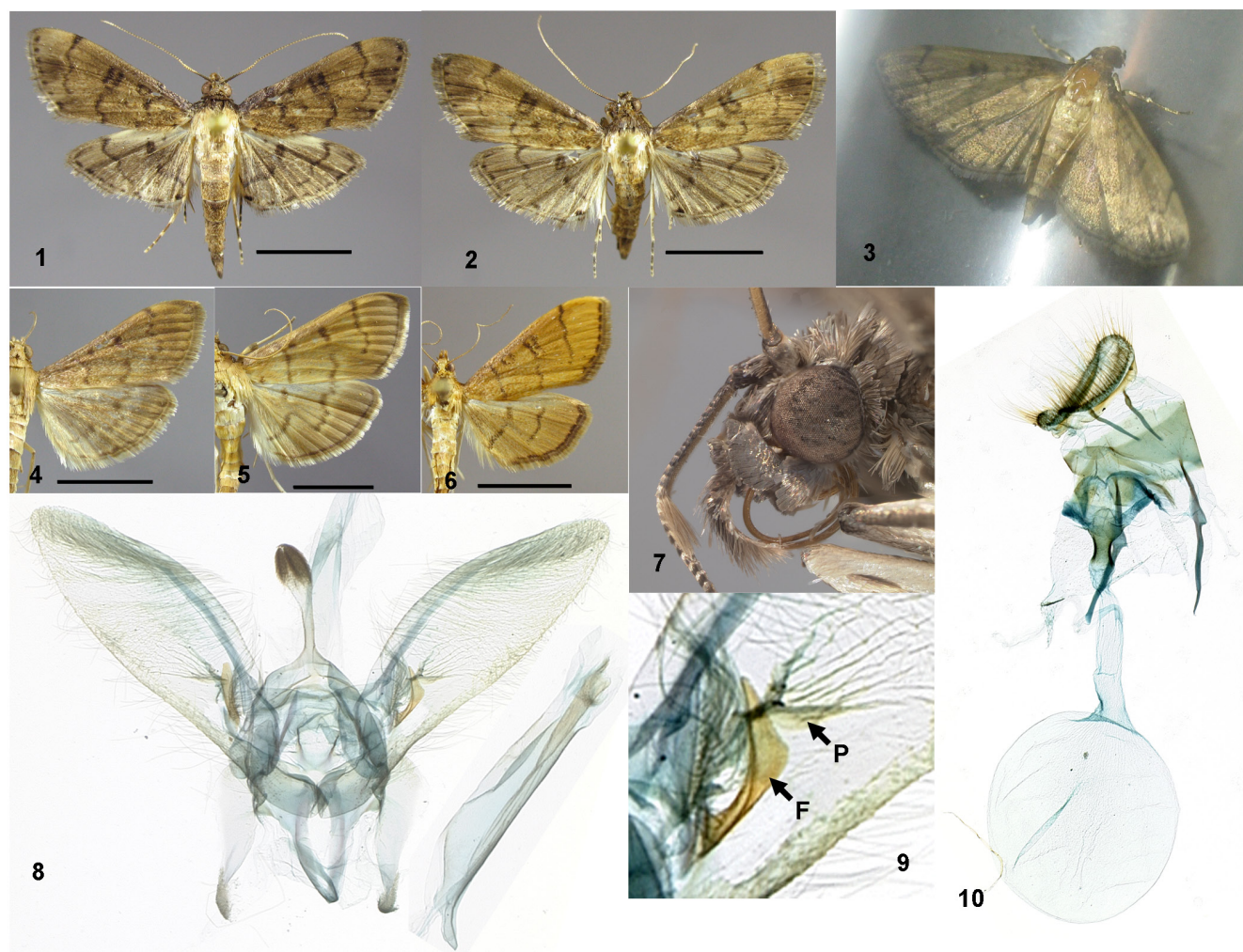


Fig. 11. Distribution of *N. charesalis* in peninsular Florida to date.

Lanka, Vietnam, China (Guangdong), Taiwan, Malaysia, Indonesia (Borneo), Japan (Okinawa and Amami Islands), and New Guinea (Caradja 1925, Paine 1964, Robinson et al. 1994, Tominaga 2002, McGuire Center Collection).

The forewing length of Florida specimens is 9.0–11.5 mm (Figs. 1, 2). The color is brown with dark, grayish brown lines; as Robinson et al. (1994: 184) aptly state, "Not all Pyraustinae are colorful! This species is distinctive only by dint of its extreme dullness [...]." The labial palpi are upturned and uniformly colored (Fig. 7). On the forewing, the lines are sharply defined and fairly smooth. The postmedial



Nacoleia charesalis unless indicated (scale bars = 5 mm): Fig. 1: Male habitus, dorsal aspect (FL, Sarasota Co., North Port, 29-XI-2013, J. Troubridge); Fig. 2: Female habitus, dorsal aspect (same data as Fig. 1); Fig. 3: Live female (FL, Levy Co. Goethe State Forest, July 2014); Fig. 4: *Herpetogramma phaeopteralis* (LA, St. Tammany Parish, V.A. Brou); Fig. 5: *Herpetogramma theseusalis* (FL, Liberty Co., Apalachicola NF, D. Matthews Lott); Fig. 6: *Blepharomastix ranalis* (FL, Marion Co., T.S. Dickel); Fig. 7: Head of male, lateral aspect (FL, Sarasota Co.); Fig. 8: Male genital capsule and phallus (FL, Sarasota Co., MGCL slide 2135); Fig. 9: Detail of valva: F, fibula; P, rounded process; Fig. 10: Female genitalia (FL, Miami-Dade Co., Homestead, 12-VI-2012 A. Derksen, MGCL slide 571).

line is B-shaped (the curve on the radial veins being nearly as large as the curve on the medials), the discal spot is circular and hollow, and the hind wing lines are like those of the forewing. The androconia are a minute tuft of yellowish scales on the male antenna one fourth distance from the antennal base and two rings of dark, flocculent scales on the membranous anterior margins of male abdominal segments 6 and 7 (not shown). The male genitalia (Fig. 8) are distinguished by one long, curved fibula situated near the base of the valve and directed toward the costa (Fig. 9: F), and distad of that, a rounded, basad-pointed, flange-like process without setae (Fig. 9: P). In the female genitalia, the ductus bursae has a small colliculum near the ostium, and the corpus bursae is spherical without signa (Fig. 10).

The species resembles several native Spilomelinae. *Herpetogramma phaeopteralis* (Guenée) (tropical sod webworm; Fig. 4) is smaller, has transverse lines that are less crisply

defined, and has androconia on the male mesothoracic femora. Small, dark-colored individuals of *Herpetogramma theseusalis* (Walker) (Fig. 5) are distinguished by the slight basad curvature of the forewing PM line over the R veins. Species of *Herpetogramma* Lederer in general have correct, ventrally white palpi. Specimens of *Blepharomastix ranalis* (Guenée) (Fig. 6) in peninsular Florida are orange, and the smaller size and nearly straight forewing PM line distinguish them. Species in other genera have lines that are differently shaped, zigzagged on the veins, or with a solid discal spot. The genitalia resemble those of species of *Penestola* Möschler and *Duponchelia fovealis* Zeller (European pepper moth, another adventive crambid in Florida) in the shape of the uncus, presence of fibulae at the base of the valve, and absence of signa, but these smaller-bodied species have three slender fibulae near the base of the valve and a more extensively sclerotized ductus bursae.

Most of the interceptions have been with molasses-fruit bait or tephritid attractant redolent of proteinaceous decay products. Males and females seem to be attracted equally. JT has also collected it regularly at light. The female that JH collected at ultraviolet light in Goethe State Forest was worn, and no individuals were found at bait that night. The longevity of adult *N. charesalis* is unknown, but adult *N. octasema* live up to 10 days (Paine 1964). The collection of one in a 23-foot-tall suction trap in Miami indicates that individuals may fly at such heights.

In their native range, the larvae are cryptic general feeders on decaying vegetation. Tominaga (2002) raised adults from caterpillars found on rich soil underneath rotting leaves. The caterpillars have a relatively colorless integument with a brown head and pinacula and dark gut contents visible. The only report of economic significance is of boring in stems of turmeric (*Curcuma longa* L.) (Kumar et al. 1996). Other recorded hosts include *Saraca* L. (flowers), mango (*Mangifera* L. spp.), *Shorea* Roxb. ex Gaertner f. spp. (in fruits), *Averrhoa carambola* L., *Elaeis guineensis* Jacq., and sweet potato (Robinson et al. 1994, Robinson et al. 2001, Tominaga 2002). Paine (1964) raised adults from hosts that were probably either banana (*Musa x paradisiaca* L.) or *Pandanus* Parkinson. In turmeric, the larvae bore into the base of the plant, tunnel the pseudostem, pack it with frass, and pupate in the tunnel. Symptoms appear as dead heart (dead central leaves), with infestation up to 65% (Hiremath et al. 1990, Kumar et al. 1996).

This species is closely related to a more important pest, *N. octasema* (Meyrick), the banana scab moth. It ranges from peninsular Malaysia through Indonesia to Melanesia and northern Australia. Its wings are more uniformly pale brownish orange, and the dorsal abdomen has a silver band. It feeds primarily on inflorescences of banana, *Pandanus*, and related plants, but it often attacks the skin of fruit (Paine 1964).

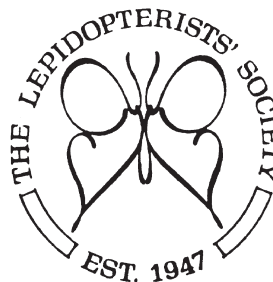
According to records, the USDA Systematic Entomology Laboratory has been sent species of *Nacoleia* for identification from ports only three times (M.A. Solis, pers. comm. 12 Aug. 2014). The preference for smelly bait agrees with Tominaga's association with rotten vegetation. The population's northward advance might slow, since North-Central Florida exceeds the northern limit of its natural distribution (Okinawa Islands, Japan). The population's spread recalls the sudden appearance of another moth with similar habits, *Simplicia cornicalis* (Fabricius), in Florida in 2006 and Louisiana in 2008 (Dickel et al. 2010). That species also feeds on decaying plant material. Interestingly, Tominaga (2002) found larvae of another species of *Simplicia* Guenée in the same location as *N. charesalis*. Feeding on decaying organic matter is also characteristic of *D. fovealis* and *Penestola*, to which *N. charesalis* may be related, but those species are semiaquatic or inhabit wet areas of plant nurseries.

Acknowledgments

We appreciatively thank Andrew Derksen for fishing moths out of bucket traps and commenting on the manuscript. Vitor Becker and Alma Solis provided determinations, comments, and records. James Hogan (Oxford Museum of Natural History, Oxford, UK) kindly loaned the type slide of *B. charesalis*. We thank Shin-ichi Nakahara (University of Florida) for translating Tominaga (2002). Bobby Cahal (FDACS Division of Forestry) provided the permit for Goethe State Forest. Several other inspectors with FDACS-DPI, USDA, and UF-IFAS collected samples: L. Buss, M. DaCosta, A. Demien, H. Escobar, J. Garcia, J. Gillett-Kaufman, W. McDonald, J. Ochoa, J. Rincon, E. Solis, and R. Tordi. The Gainesville record came from the residence of Akito Kawahara and Lisa Taylor. Andrew Warren (University of Florida), Louis Somma (FDACS-DPI), Paul Skelley (FDACS-DPI), Greg Hodges (FDACS-DPI) and Wayne Dixon (FDACS-DPI) constructively improved the manuscript. This is FDACS-DPI Entomology Contribution Number 1273.

Literature Cited

- Caradja, A. 1925. Ueber Chinas Pyraliden, Tortriciden, Tineiden nebst kurze Betrachtungen, zu denen das Studium dieser Fauna Veranlassung gibt. *Memorie Sectionii Stiintifice. Academia Romana* (Ser. 3), Bucuresti 3(7): 257–383, pls 1–2.
- Dickel, T.S., V.A. Brou Jr. and J.B. Heppner. 2010. New North American records of the Asian species, *Simplicia cornicalis*, in Florida and Louisiana. *Lepidoptera Novae* 3(1): 53–56.
- Hiremath, I.G., S. Vastard, and S.J. Patil. 1990. *Lamprosema charesalis* (Walker) (Lepidoptera: Pyraustidae), a new pest of turmeric, *Curcuma domestica* Val. in India. *Tropical Pest Management* 36(1): 74.
- Kumar, P., V.R. Joshi, S.M. Mutnal, and H.G. Hegde. 1996. Nature of damage, seasonal incidence and chemical control of Turmeric Shoot Borer, *Lamprosema charesalis* (Walker) (Lepidoptera Pyraustidae). *Advances in Agricultural Research in India* 5: 5–8.
- Paine, R.W. 1964. The banana scab moth, *Nacoleia octasema* (Meyrick): its distribution, ecology, and control. *South Pacific Commission Technical Paper* 145: i–vi, 1–70.
- Robinson, G.S., P.R. Ackery, I.J. Kitching, G.W. Beccaloni and L.M. Hernández. 2001. Hostplants of the moth and butterfly caterpillars of the Oriental Region. London: The Natural History Museum, and Kuala Lumpur: Southdene Sdn Bhd. 744 pp.
- Robinson, G.S., K.R. Tuck, and M. Shaffer. 1994. *A Field Guide to the Smaller Moths of South-East Asia*. London: The Natural History Museum and Kuala Lumpur: Malaysian Nature Society, 309 pp.
- Tominaga, S. 2002. Biological notes on five species of the Pyraloidea from Okinawa Island. *Yugato* 167: 9–12.



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

The ever-enigmatic oakworm called *Anisota consularis*

Ric Peigler

Department of Biology, University of the Incarnate Word, 4301 Broadway, San Antonio, Texas 78209-6397
 peigler@uiwtx.edu

Anisota consularis was described by Harrison Dyar (1896), who worked at the Smithsonian Institution a century ago. The original material was reared from larvae on live oak (*Quercus virginiana*) collected by Dyar at West Palm Beach. Long known only from Florida, it has been found up through coastal Georgia (Riotte & Peigler 1981) and across the Gulf Coast to Tangipahoa Parish, Louisiana, where Don Henne collected larvae several years ago. Its range is mainly in Florida, but it is recorded from all regions of that state.

I collected larvae in Georgia and Florida in the mid 1970s on southern red oak (*Q. falcata*) and water oak (*Q. nigra*), and again in July 2014 in two places in Florida on laurel oak (*Q. laurifolia*) and turkey oak (*Q. laevis*). Back in San Antonio, I finished rearing the 2014 ones on Shumard oak (*Q. shumardii*). They are not common and easy to find, unlike larvae of *Anisota pellucida*, which I find commonly in Florida and all over the Southeast. On my recent trip to Florida, I searched a full day (30 July) along many rural roads in northern, central, and western Florida, without finding any. However, early the next morning I found over 200 second-instar larvae (siblings) on the first tree I checked. They were on a 5-meter tall turkey oak on Highway 41 in Hernando County, just 15 meters south of the Citrus County line. I continued to search on foot in that area, but no more were found. It was a sandy area with towering long-leaf pines. Later that afternoon, after parking my car and searching in several more sites, I found a large brood (siblings) of fourth-instar ones near Bronson in Levy County, also on Highway 41. They had nearly defoliated a small laurel oak in a sandy field. Again, I searched that area on foot, but found no more. On 19 July 2014, Jeffrey R. Sloten (pers. comm.) collected larvae of *A. consularis* near Williston, Levy County, on bluejack oak (*Q. incana*). I believe these hostplant records of laurel oak and bluejack oak are previously unpublished. The larvae are rarely found on live oak, which has tough leaves, but in the southernmost parts of Florida where most other oaks are absent, live oak may be their only choice.

Although Kimball (1965) listed July through October as the flight times, based on females collected at lights all over Florida, I have always assumed the species was univoltine with an extended flight period. Therefore, I was surprised when adults began to emerge in early September from larvae I had collected near Bronson at the end of July. Moreover, the same unexpected results came with *Anisota peigleri*. I collected over 250 larvae of that species, most molting into the final instar, near Aucilla, Jefferson

County, Florida, on 31 July 2014, on Shumard oaks. The exact locality was the westbound I-10 rest area. Many adults emerged in early September, although *A. peigleri* is strictly univoltine in South Carolina, and David Serrano (2001: p. 4) stated categorically that it is univoltine in Gainesville, Florida. It is possible that the larvae or pupae of both species of the 2014 material were kept under a condition in captivity in San Antonio that prevented some of them from diapausing. Since they were from humid Florida, I had to rear them indoors under air-conditioning, due to the very dry and very hot weather during August. However, most pupae of both species have apparently now entered diapause and are now in my refrigerator for the winter. The smaller larvae of *A. consularis* collected in Hernando County did not pupate until September, and will spend the winter in diapause.

The larvae of *Anisota consularis* have brownish red heads. The middle stages are usually olive colored. Variation in color and markings exists for this species in the last instar. They can be grayish brown or cream colored with dark longitudinal stripes, or a pinkish orange color, as shown in the images here, but in all cases, there is a broad white lateral band alongside of a black band. The variation in overall color and markings led Packard (1905: p. 107) to write that Dyar's original larvae of *A. consularis* were found "in company with those of *A. stigma*" at West Palm Beach, but we now know that *A. stigma* only ranges across the northernmost sections of Florida. Dyar simply had larvae of two color forms.

The females that emerged in captivity in San Antonio usually emitted pheromone in the morning and midday, so I can now correct the report by Riotte and Peigler (1981) that mating behavior of this species probably occurs in late afternoon. However, some were observed to "call" late in the day, because they were unmated earlier in the day. Emergence from the pupae is early morning for both sexes. The rust-colored males are diurnal and do not come to light, so most males in collections were reared. They have translucent patches on their forewings, so in flight they mimic wasps, like most males in the genus *Anisota*.

There has been confusion pertaining to color forms and correct identification of females in collections. Although variable in color and pattern, the species is actually easy to recognize by the mauve shades that we see in *Anisota osleri* from the Southwest but not in any of the other eastern species. Two sibling females from Bronson are



Explanation of Plate:

Fig. 1: A pair of *Anisota consularis*; Fig. 2: The two color forms of females; these two are sisters; Fig. 3: Third-instar larva; Fig. 4: Mature larva, orange form; Fig. 5: Mature larva, olive form; Fig. 6: Mature larva, blackish form.

shown here representing a dark and pale color form. Kimball (1965) was quite aware of this variation, so he illustrated pale and dark females in color in his book on Florida Lepidoptera. Unfortunately, their identification was questioned by Ferguson (1971), but the two specimens figured by Kimball were verified by genitalia dissection by

Riotte and Peigler (1981). The treatments of the genus *Anisota* by Lemaire (1988) and d'Abrera (1995) contain no misidentifications nor taxonomic errors, as far as I am aware, except for treating *A. fuscata* as a subspecies of *A. stigma*. Data tabulated by Burke and Peigler (2009) indicate that *A. fuscata* is possibly more closely related to *A. consularis* than to *A. stigma*. A female figured as *A. stigma* by Ferguson (1971: plate 5, fig. 5) is obviously *A. consularis* from the figure (plus I examined the specimen itself in the Smithsonian), but he referred to it as "Floridian form resembling subspecies *fuscata*." Ferguson thus saw the close relationship between *A. fuscata* and *A. consularis*.

Voucher specimens of larvae in alcohol and the exact adults shown here in the images have been deposited in the Texas A&M University Arthropod Collection.

Literature Cited

- d'Abrera, B. 1995. Saturniidae Mundi: saturniid moths of the world, part 1. Automeris Press, Keltern, Germany, and Hill House, Melbourne & London. 177 pp., 76 col. pls.
- Burke, J. T. & R. S. Peigler. 2009. Phylogenetic analysis of *Anisota* (Insecta: Lepidoptera: Saturniidae) based on scoli size and structure of mature larvae. Southeastern Naturalist 8(4): 739-745.
- Dyar, H. G. 1896. A new *Anisota*. Journal of the New York Entomological Society 4: 166.
- Ferguson, D. C. 1971. Bombycoidea, Saturniidae (part 1), in R. B. Dominick et al., eds., The moths of America north of Mexico, fasc. 20.2A: 1-154, col. pls. 1-11. E. W. Classey, London.
- Kimball, C. P. 1965. Lepidoptera of Florida. Florida Department of Agriculture, Gainesville, 363 pp., 24 pls. (6 col.).
- Lemaire, C. 1988. Les Saturniidae américains...The Saturniidae of America...Los Saturniidae americanos (=Attacidae), Cera-tocampinae. Museo Nacional de Costa Rica, San José. 480 pp., 64 pls. (62 col.).
- Packard, A. S. 1905. Monograph of the bombycine moths of North America, including their transformations and origin of the larval markings and armature, part 2: Family Ceratocampidae, subfamily Ceratocampinae. Memoirs of the National Academy of Sciences (Washington) 9(2): 1-273 (incl. 61 pls., 23 col.).
- Riotte, J. C. E. & R. S. Peigler. 1981. A revision of the American genus *Anisota* (Saturniidae). The Journal of Research on the Lepidoptera 19(3): 101-180.
- Serrano, D. 2001. Biology, ecology, behavior, and natural history of the yellow-striped oakworm, *Anisota peigleri* (Lepidoptera: Saturniidae). M.S. thesis, University of Florida, Gainesville. 48 pp.
- Cox, D.L. and J.H. Willis. 1987b. Analysis of the cuticular proteins of *Hyalophora cecropia* with two dimensional electrophoresis.
- Deml, R. and K. Dettner. 1990. Chemical defense of *Eudia* (Saturniidae) caterpillars. Naturwissenschaften 77:588-590.
- Deml, R. and K. Dettner. 1993. Biogenic amines and phenolics characterize the defensive secretion of saturniid caterpillars (Lepidoptera: Saturniidae): a comparative study. J. Comp. Physiol. 163:123-132.
- Deml, R. and K. Dettner. 1997. Chemical defense of emperor moths and tussock moths (Lepidoptera: Saturniidae, Lymantriidae). Entomol. Gen. 21:225-251.
- Deml, R. and K. Dettner. 2003. Comparative morphology and secretion chemistry of the scoli in caterpillars of *Hyalophora cecropia*. Naturwissenschaften 90:460-463.
- Kohalmi, L. and P. Moens. 1988. Patterns of inheritance of larval tubercle-colour polymorphism of *Hyalophora columbia* of northwestern Ontario (Lepidoptera: Saturniidae). Genome 30:307-312.
- Lampe, D.J. and J.H. Willis. 1994. Characterization of a cDNA and Gene encoding a cuticular protein from rigid cuticles of the giant silkworm, *Hyalophora cecropia*. Insect Biochem. Molec. Biol. 24:419-435.
- Moorewood, W.D. 1991. Larvae of *Hyalophora euryalus kasloensis* (Lepidoptera: Saturniidae). J. Entomol. Soc. British Columbia 88:31-33.
- Parker, H.R., D.P. Philipp, G.S. Whitt. 1985. Gene regulatory divergence among species estimated by altered development patterns in interspecific hybrids. Mol. Biol. Evol. 2:217-250.
- Philipp, D.P., H.R. Parker, G.S. Whitt. 1983. Evolution of Gene Regulation: Isozymic analysis of patterns of gene expression during hybrid fish development. Isozymes: Current Topics in Biological and Medical Research 10:193-237.
- Tuskes, P. M., J. P. Tuttle, M. M. Collins. 1996. The Wild Silk Moths of North America. Cornell University Press. Ithaca. 250 pp.
- Woodruff, D.S. 1989. Genetic anomalies associated with *Cerion* hybrid zones: the origin and maintenance of new electrophoretic variants called hybridzymes. Biol. J. Linnean Soc. 36:281-294.

Variation in fifth instar *Hyalophora* larvae

Continued from p. 7

- Cox, D.L. and J.H. Willis. 1987b. Analysis of the cuticular proteins of *Hyalophora cecropia* with two dimensional electrophoresis.
- Deml, R. and K. Dettner. 1990. Chemical defense of *Eudia* (Saturniidae) caterpillars. Naturwissenschaften 77:588-590.
- Deml, R. and K. Dettner. 1993. Biogenic amines and phenolics characterize the defensive secretion of saturniid caterpillars (Lepidoptera: Saturniidae): a comparative study. J. Comp. Physiol. 163:123-132.
- Deml, R. and K. Dettner. 1997. Chemical defense of emperor moths and tussock moths (Lepidoptera: Saturniidae, Lymantriidae). Entomol. Gen. 21:225-251.
- Deml, R. and K. Dettner. 2003. Comparative morphology and secretion chemistry of the scoli in caterpillars of *Hyalophora cecropia*. Naturwissenschaften 90:460-463.
- Kohalmi, L. and P. Moens. 1988. Patterns of inheritance of larval tubercle-colour polymorphism of *Hyalophora columbia* of northwestern Ontario (Lepidoptera: Saturniidae). Genome 30:307-312.
- Lampe, D.J. and J.H. Willis. 1994. Characterization of a cDNA and Gene encoding a cuticular protein from rigid cuticles of the giant silkworm, *Hyalophora cecropia*. Insect Biochem. Molec. Biol. 24:419-435.
- Moorewood, W.D. 1991. Larvae of *Hyalophora euryalus kasloensis* (Lepidoptera: Saturniidae). J. Entomol. Soc. British Columbia 88:31-33.
- Parker, H.R., D.P. Philipp, G.S. Whitt. 1985. Gene regulatory divergence among species estimated by altered development patterns in interspecific hybrids. Mol. Biol. Evol. 2:217-250.
- Philipp, D.P., H.R. Parker, G.S. Whitt. 1983. Evolution of Gene Regulation: Isozymic analysis of patterns of gene expression during hybrid fish development. Isozymes: Current Topics in Biological and Medical Research 10:193-237.
- Tuskes, P. M., J. P. Tuttle, M. M. Collins. 1996. The Wild Silk Moths of North America. Cornell University Press. Ithaca. 250 pp.
- Woodruff, D.S. 1989. Genetic anomalies associated with *Cerion* hybrid zones: the origin and maintenance of new electrophoretic variants called hybridzymes. Biol. J. Linnean Soc. 36:281-294.

Davenport Sierra Nevada stories

Continued from p. 32

- Davenport, Kenneth E. 2007. Yosemite Butterflies. The Taxonomic Report. (5:2) 1-80
- Davenport, Ken 2012 Observations of butterfly recovery and faunal change following the 2002 McNally Fire within Sequoia National Forest. Ten years after the fire-2012. Report submitted to Sequoia National Forest (Steve Anderson) November 20, 2012.
- Davenport, Kenneth E. 2014. Butterflies of North America. Butterflies of Kern and Tulare Counties, California Contributions of the C. P. Gillette Museum of Arthropod Diversity, Colorado State University. (3.4) 1-121.

Holland material described taxa

Continued from p. 14

Taxa described from material collected by Richard Holland

- Euchloe guaymasensis* Opler, 1987. Journal of the Lepidopterist's Society 40: 188-190.
- Neominois ridingsii neomexicana* Austin, 1986. Bulletin of the Allyn Museum 107, 27 pp., 6 figs.

Richard W. Holland: Bibliography and described taxa

Paul A. Opler

C.P. Gillette Museum of Arthropod Diversity, Department of Bioagricultural Science and Pest Management,
Colorado State University, Fort Collins, Colo 80523-1177 paulopler@comcast.net

Richard W. Holland passed away October 5, 2013 and a remembrance article was published in the News (Vol. 56: 43) "A Remarkable Mind." by Steve Cary. Richard's extensive library, personal papers, and collection of Lepidoptera was bequeathed to Colorado State University, Fort Collins, and included paratypes of species that he described. A list of his lepidopterological publications is given here as well as names of taxa he described. In addition, some taxa named based off specimens he collected is also presented.

Publications authored by Richard Holland

- Cary, Steven J. and Richard Holland. 1992. New Mexico butterflies: checklist, distribution and conservation. *Journal of Research on the Lepidoptera* 31(1-2): 57-82.
- Ferris, Clifford D. and Richard W. Holland. 1980. Two new subspecies of *Occidryas anicia* (Doubleday) from New Mexico. *Bulletin of the Allyn Museum* 57, 9 pp., 19 figs, 3 tbls.
- Holland, Richard. 1969. Notes on Newfoundland butterflies. *Journal of the Lepidopterists' Society* 23(1): 33-42.
- Holland, Richard. 1972. Butterflies of middle and southern Baja California. *Journal of Research on the Lepidoptera* 11(3): 147-160.
- Holland, Richard. 1974. Butterflies of six central New Mexico Mountains with notes on *Callophrys* (*Sandia macfarlandi* (Lycaenidae)). *Journal of the Lepidopterists' Society* 28(1): 38-52.
- Holland, Richard. 1981. Aberrant New Mexican butterflies. *Journal of Research on the Lepidoptera* 19(2): 88-95.
- Holland, Richard. 1982. Parallel albinism in two thecline butterflies. *Journal of Research on the Lepidoptera* 21(3): 158.
- Holland, Richard. 1984. Butterflies of two northwest New Mexico Mountains. *Journal of the Lepidopterists' Society* 38(3): 220-234.
- Holland Richard W. 1988. A new subspecies of *Speyeria atlantis* (Nymphalidae) from south-central New Mexico. *Bulletin of the Allyn Museum* 115, 9 pp., 4 figs, 3 tbls.
- Holland, Richard W. 1995. Distribution of selected *Anthocharis* and *Pontia* (Pieridae) in New Mexico, Chihuahua and Sonora. *Journal of the Lepidopterists' Society* 49(2): 119-135.
- Holland, Richard. 2009. *Lepidoptera of North America*. 9. Butterfly distribution and dispersion across the montane islands and drainages of the Chihuahuan desert. Contributions of the C.P. Gillette Museum of Arthropod Diversity, Colorado State University, Fort Collins, 38 pp.
- Holland, Richard. 2010. A new subspecies of *Oeneis chryxus* (Nymphalidae: Satyrinae) from south central New Mexico. *Journal of the Lepidopterists' Society* 64(3): 161-165.
- Holland, Richard. 2010. A new subspecies of *Satyrium titus* (Lycaenidae: Theclinae) from south central New Mexico. *Journal of the Lepidopterists' Society* 64(3): 166-171.
- Holland, Richard. 2010. A new subspecies of *Argynnis nokomis* from the Sacramento Mountains of New Mexico. *Journal of Research on the Lepidoptera* 42: 79-80.
- Holland, Richard. 2011. *Lepidoptera of North America*. 10. Review of *Plebejus icarioides* and *Glaucopsyche lygdamus* in New Mexico with four new subspecies (Lycaenidae, Lycaeninae, Polyommataini). Contributions of the C.P. Gillette Museum of Arthropod Diversity, Colorado State University, Fort Collins, 38 pp.
- Holland, Richard and Steven J. Cary. 1996. Butterflies of the Jemez Mountains of northern New Mexico. *Journal of the Lepidopterists' Society* 50(1): 61-79.
- Holland, Richard W. and Gregory S. Forbes. 1981. Rediscovery of *Apodemia phycioides* (Riodinidae). *Journal of the Lepidopterists' Society* 35(3): 226-232.
- Lafontaine, J. D., Walsh, J. B., Holland, R. W. 2010. A revision of the genus *Bryolymnia* Hampson in North America with descriptions of three new species (Lepidoptera, Noctuidae, Noctuinae, Elaphriini). *ZooKeys*, 39: 187-204.

Taxa described by Richard Holland

Pieridae

Pontia sisymbrii transversa R. Holland, 1995

Lycaenidae

Glaucopsyche lygdamus ruidoso R. Holland, 2011

Glaucopsyche lygdamus erico R. Holland, 2011

Plebejus icarioides nigrifem R. Holland, 2011

Plebejus icarioides sacre R. Holland, 2011

Satyrium titus carrizozo R. Holland, 2010

Nymphalidae

Euphydryas anicia cloudcrofti Ferris and R. Holland, 1980

Euphydryas anicia chuskae Ferris and R. Holland, 1980

Oeneis chryxus socorro R. Holland, 2010.

Speyeria hesperis capitaneensis R. Holland, 1988 [originally described as subspecies of *Speyeria atlantis*.]

Speyeria nokomis tularosa R. Holland, 2010

Noctuidae

Bryolymnia marti R. Holland, 2010

Continued on p. 13

Rediscovery of *Eupithecia tricolorata* Cassino (Geometridae: Larentiinae)

Clifford D. Ferris

5405 Bill Nye Avenue, R.R. #3, Laramie, WY 82070. Research Associate: McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville, FL; C. P. Gillette Museum of Arthropod Diversity, Colorado State University, Ft. Collins, CO cdferris@uwyo.edu

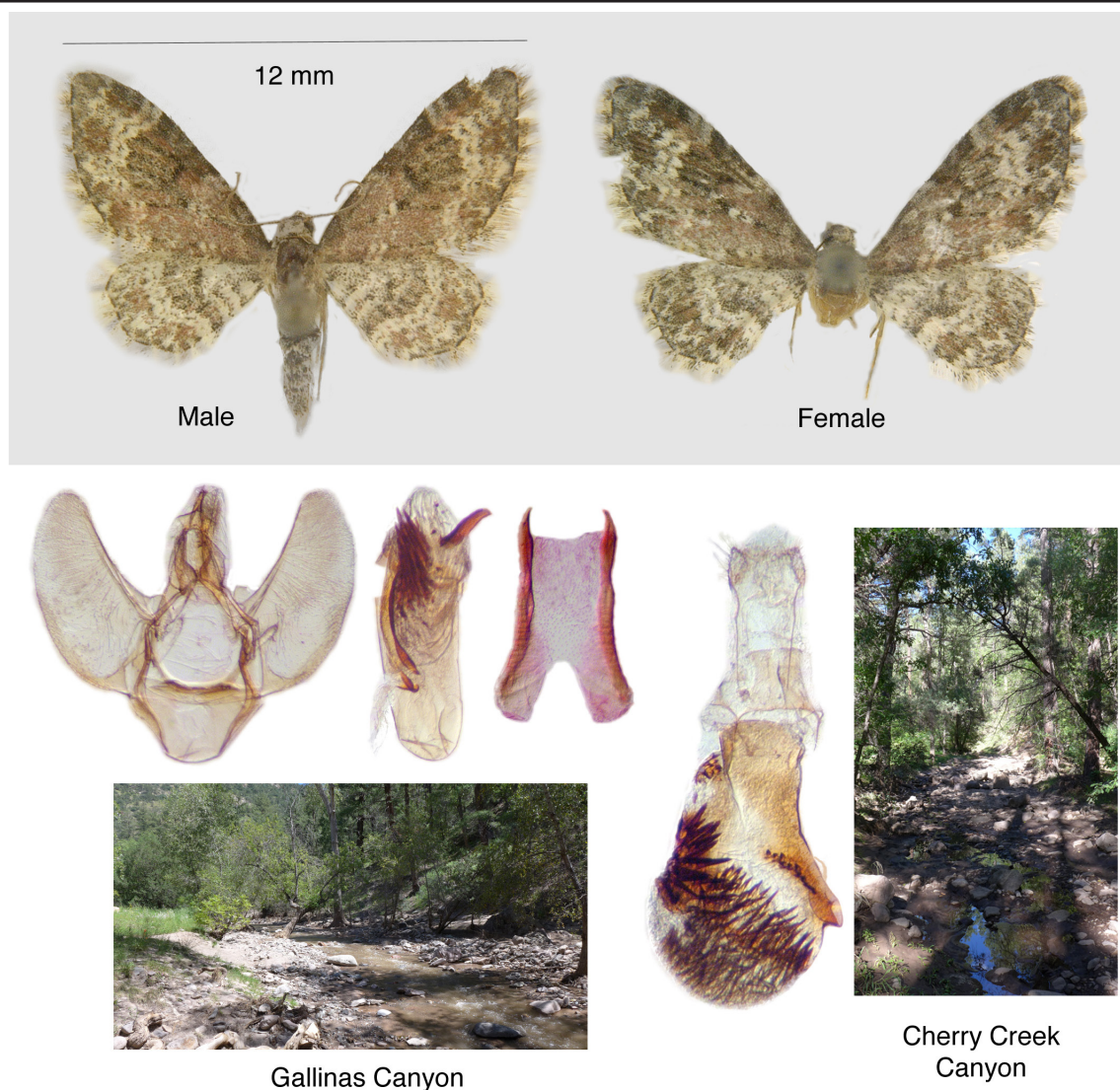
Eupithecia tricolorata was described in 1927 from a single female holotype collected in "southern Arizona," and to my knowledge is the only known specimen, unless additional examples reside in museum unidentified *pro tem* material. The type is in the Museum of Comparative Zoology (MCZ) in Cambridge, MA. On successive nights in Grant Co., New Mexico I collected a single male and a single female in UV light traps in two widely separated canyons. The female was obtained during the night of 2 September, 2014 at 6750' in Cherry Creek Canyon, Pinos Altos Mts.; the male on the following night in Lower Gallinas Canyon, Black Range at 6670'. The collection sites are both narrow mountain canyons with intermittent streams in moderately dry mixed coniferous/deciduous forest.

McDunnough (1949, fig. 17F) illustrated the genitalia of the holotype, but not the adult. Some years ago, David Lohman kindly sent me a color photo of the type. These two specimens are illustrated here with their respective genitalia. The female genitalia match the McDunnough illustration, and the adult agrees with the photograph sent to me from the MCZ. From left-to-right in the illustration, the

male genitalia shown are genital capsule minus phallus, phallus, and genital plate. The vesica was not everted because the phallus sheath is split in two places.

LITERATURE CITED

McDunnough J H. 1949. Revision of the North American species of the genus *Eupithecia* (Lepidoptera. Geometridae). Bulletin of the American Museum of Natural History, 93(8): 533–728, figs. 1–20, plates 26–32.



Unified butterfly recorder: New technology for a traditional practice

Nathan Brockman

Butterfly Wing Curator Reiman Gardens Iowa State University 1407 University Blvd. Ames, Iowa 50011

<http://www.reimangardens.com>

Opened in 2002, the 232 sq. m or 2,500 sq. ft. Christina Reiman Butterfly Wing owned by Iowa State University (ISU), delights guests, engages students and provides a base for researchers to conduct Lepidoptera based projects. For the past seven years, the Entomology staff conducted annual population studies on the Gardens' grounds and managed a citizen science program monitoring annual butterfly populations in Iowa. Through these and other related activities, it became apparent there might be a better way to conduct and record these surveys. With the increased adoption and advancements of hand held technology, a plan was created in 2012 to develop a mobile application which could be used to survey butterflies in the field.

The ISU Department of Electrical and Computer Engineerings' Senior Design program has a year-long class designed to give graduating seniors real world experience. In 2012, a project proposal to develop a mobile butterfly survey app was chosen as the class project. Students Curtis Ullerich, Ryan Scheel, Julie Tillman and Cameron Whipple accepted the proposal submitted by Reiman Gardens' Nathan Brockman and he worked closely with them on the Android version of the mobile app named the Unified Butterfly Recorder (UBR). In 2013, a second proposal for the iOS version was chosen by students Eric Larssen, CJ Mankin and Sean Shickell. Both of these groups worked with Gardens' Entomology staff, Nathan Brockman and Anita Westphal, and incorporated feedback from other professionals conducting population surveys. UBR now boasts both an Android and iOS app which allows researchers, professionals, amateurs and enthusiasts the ability to record butterfly sightings in the field on a smartphone or tablet. The UBR application makes quick and efficient data collection possible. Replacing paper and pen with a device allowing a variety of data points, across a variety of survey protocols has greatly enhanced the recording speed and the variety of data collected. Beyond the user-entered data, additional information such as weather, location, speed and time are automatically collected. Global-regional species lists are built into the app, and UBR is also capable of utilizing custom lists created by the user. Users can also take photos of specimens to include with records. By collecting a super-set of data, both user-entered and automatically-captured, UBR makes it easier to quantify the user's data, regardless of survey method, with other users.

The UBR app is essentially broken into six different data entry pages: Survey, Make Sightings, Sightings, Edit Sighting,

Map and Settings. Upon opening UBR, the user is asked to select a survey methodology. Depending on which method is chosen the features and function on the corresponding pages adjust to meet the needs of that particular protocol.

Survey

After a protocol is chosen UBR opens to the "Survey" tab where information is entered related to the location where observations will be recorded. Many of the fields in this section can be auto populated from "defaults" set in the Settings. "Survey" is also the tab that displays some of the automatically populated fields such as weather and GPS location upon survey start. The "Begin" button at the top of this tab is what activates the breadcrumb points and fills in start and stop times.

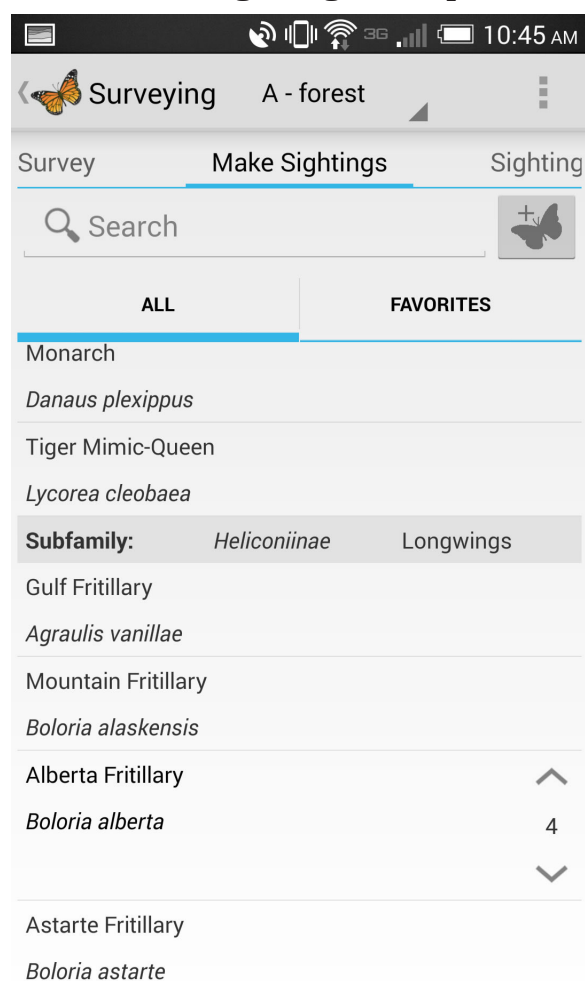
Make Sightings

Observed specimens are recorded on the "Make Sightings" tab; this page is designed for speed and ease of entry. To enter an observed individual, the user merely taps the corresponding button with the name of the individual. Each tap of the button will enter another count and a user can quickly jump from one species to another with little to no delay. The "Make Sightings" tab allows the user to see all species listed in the user selected list or they have the option to choose items from that list and add them to a Favorites list. By using the Favorites list it is possible to quickly and easily narrow down the most relevant species on a particular site during a particular season. On the All and Favorites list, the user can predetermine if they want the list sorted alphabetically, by common name, or by scientific name. If there happens to be species in extremely high abundance, the Favorites list makes it possible to pin a species to the top of the list, making entry of that particular species even easier.

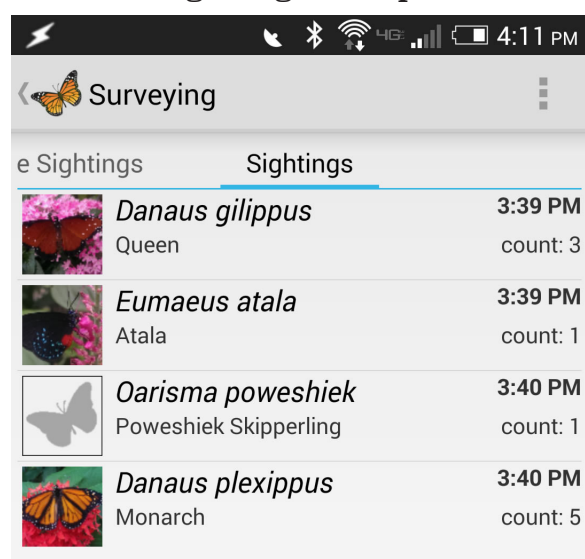
Sightings

All entered observations from "Make Sightings" show up on the "Sightings" tab. The "Sightings" tab shows the names of all recorded individuals, how many were observed at each point, and the time they were observed. By tapping one of these observation data recorders the user is taken to the "Edit Sighting" page where, automatically populated fields, such as time and GPS location are accessible. Also on this page is a variety of

Make Sighting Example



Sighting Example

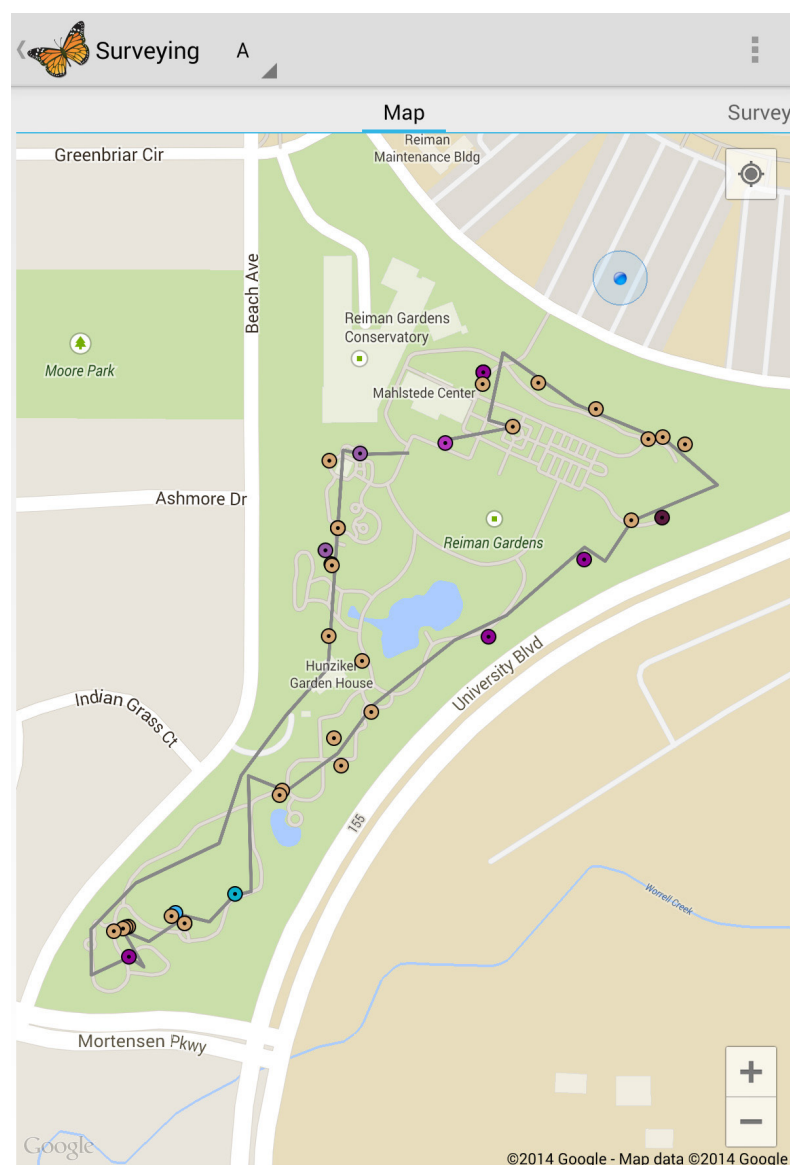


user fields such as observed behavior or individual sex. These user fields are drop downs allowing for quick data entry. Here it is also possible for the user to launch the device's camera and take a photo that will be linked to that individual observation.

Map

The "Map" tab records the data collector's route on an interactive map that can be resized and rotated. That way the user can see a colored dot on all the locations where observations were entered. From the start to the end of a data collection period, the observation dots will change color, based on a mathematical formula, utilizing the species family and subfamily to create a specific color pallet. The most related species appear in different shades of the same color. This automatically generated color pallet makes it easy to see, for example, where all the *Papilio* or *Hesperiidae* were observed on a site.

UBR Map Example



Settings

The “Settings” page offers a variety of customization options specific to a survey method as well as set defaults for many of the text fields. Examples of customizable options include temperature as either Fahrenheit or Celsius and species list by either common or scientific names. “Settings” is where the user selects species lists for the “Make Sightings” tab, including an option to select a custom list.

The UBR app was designed to be a collection tool not a data storage tool. As a collection tool, it became possible to design UBR so it could be used by any individual or group. Data collected on UBR can be stored on the device, uploaded to cloud storage services, emailed to another individual or group, or uploaded to an online database. Uploading to another group or organization’s online database can be setup, it just requires a bit of coding by the UBR programming teams, and an organization interested in linking their users UBR collected data to their databases.

The Unified Butterfly Recorder app is a powerful field tool. With the ability to record and quantify large datasets, the Unified Butterfly Recorder app can greatly aid in processing the data. Using the extra datasets that can be collected through UBR verses traditional paper methods creates great potential for outstanding visualization data representations.

Finally, with the ability to add custom lists, a UBR user can survey just about any organism: pollinators, dragonflies, trees or rocks; the possibilities are endless and it’s FREE. UBR can be found by searching for Unified Butterfly Recorder on both the Google Play Store and Apple App Store.

More information on UBR, download links, how-to instructions, and information on the development teams can be found online at <http://reimangardens.com/collections/insects/unified-butterfly-recorder-app/>.

UBR in the field



Election results for the 2014 elections

Michael E. Toliver, Secretary

President-elect	Jonathan Pelham*	269
	Paul Severns	71
	Mark Walker (write in)	1
Vice-Presidents	John Calhoun (U.S.A.)*	282
	André Freitas (Brazil)	201
	Crispin Guppy (Canada)*	247
	Niklas Wahlberg (Finland)*	220
	Kilian Roever (write in)	1
Executive Council	Christi Jaeger*	250
At-Large	Erik Runquist*	249
	Caitlin LaBar*	221

	Matthew Lehnert	213
	Harry Pavulaan (write in)	1
	Mark Walker (write in)	1
Secretary	Mike Toliver*	333
	Dave Fine (write in)	1
Treasurer	Kelly Richers*	340

*Denotes winner

A total of 348 usable ballots were tabulated for this election. There were no Constitutional Amendments or Honorary Life members on the ballot, though Ron Leuschner was nominated for Honorary Life Membership for his exceptional service to the Society. Unfortunately, he passed away before the membership could vote on his nomination.

eButterfly takes flight

Kent McFarland¹, Max Larivée², and Kathleen Prudic³

¹Vermont Center for Ecostudies, PO Box 420, Norwich, VT 05055 kmcfarland@vtecostudies.org

²Collections entomologiques et recherche, Insectarium de Montréal/Espace pour la vie 4581, rue Sherbrooke E.
Montréal, Québec, Canada H1X 2B2 maxim.larrivee@ville.montreal.qc.ca

³Oregon State University, Integrative Biology, Corvallis OR 97331 prudick@science.oregonstate.edu

For many centuries, the public has contributed significantly to our understanding of butterfly identification, distribution, phenology and abundance. eButterfly (<http://www.e-butterfly.org>) provides a place for butterfly enthusiasts to report, store, organize and view vast amounts of their personal butterfly data – collections, photographs and even sightings. Anyone, anywhere and at anytime can submit observations of North American butterflies via their computer, smartphone or tablet. Together, these records provide the community with an ever-growing shared resource of butterfly information.

eButterfly is an online storage system of the species you've seen, collected and photographed. By aggregating your sightings with those of others, it is a place that allows you to see what is on the wing in your region and beyond with customizable flight charts. It gives you the ability to plan outings and trips across North America or build species lists and albums of photographs in real time. eButterfly provides tools for custom built range maps, flight time graphs and statistics for the top contributors in any given area. It also provides you, the user, control of how your data is shared with others. Not all data has to be visible to the community. We've built these tools and more at eButterfly, and we're planning to build even more.

eButterfly's Eclousure

The eButterfly team is a modest assortment of long time butterfly enthusiasts. The idea of collecting biodiversity checklist data emerged over 60 years ago when ornithologist Jacques Larivée started the Québec bird checklist program. Now with over 6 million records, it's the longest-running bird checklist program in North America and a wealth of biodiversity and conservation information. Jacques' son Max grew up 'checklisting'. But it wasn't birds that caught his eye, rather it was butterflies. "Because of my dad, I swam in butterfly and bird checklists since I was five years old," said Max Larivée. "I first thought of building a checklist-based butterfly website in 2000 when I entered graduate school."

But it was not until Max joined the Canadian Facility for Ecoinformatics Research at the University of Ottawa as a post-doctorate researcher with Jeremy Kerr that he was able to act on his idea. "In 2010, I pitted two college computer science teams against one another to build a beta version of eButterfly," said Larivée. "And that is how I met Sambo Zhang who turned out to be a real wizard of a programmer for this sort of thing and we've been

working together ever since." The two of them launched a modest Canada eButterfly program in 2012. The site was a success, but they knew they could make it even better and expand it across the remainder of North America.

Kathleen Prudic, a research scientist at Oregon State University, a Lepidopterist Society Member-at-Large and avid eBirder, was thinking along the same lines: North America needed an online butterfly service. "Butterflies are extremely sensitive to changes in temperature, population growth, urban sprawl, changes in land and water use, and many other forces," commented Prudic. "It's time to leverage this local natural history knowledge into understanding of continental patterns of biodiversity change." Experts have the ability to interpret these changes with powerful computers, but they don't have the manpower to gather all the checklist data. She knew the butterfly community was already collecting this data but needed a centralized place to store it. In late 2012, she joined the eButterfly team and helped expand it across North America.

With eButterfly's popularity rising rapidly, the site was poised for some significant upgrades but the team needed someone with more experience in citizen science efforts. As a long-time butterfly watcher and director of the Vermont Butterfly Survey at the Vermont Center for Ecostudies, Kent MacFarland had been managing the first eBird state portal for over a decade. He started using eButterfly as soon as he discovered it through a recommendation from the Society's Past President, Andy Warren. Kent realized eButterfly had the potential to be as big and powerful as eBird had become for bird checklists. He joined the team and we all soon traveled to the home of eBird at the Cornell Laboratory of Ornithology to get technical advice from Team eBird. Armed with a better understanding of the practical underpinnings of eBird, we worked through the fall and winter to get a new and improved eButterfly ready by spring of 2014.

With its similarities to eBird and ease of use, eButterfly now allows everyone from children to senior citizens, beginners to professionals to easily share their butterfly records and track their checklists. It offers users – free of charge – automated lists, photos and real-time maps of butterflies drawn from a database expected to amass millions of records gathered from thousands of observers in the coming years. The site allows users to submit and organize their butterfly observations, collections, and photos, and to share them with others.

Data Collection

eButterfly uses data collection protocols such as checklists to standardize the way we observe butterflies, while simultaneously maximizing the scientific and conservation value of the data. The basic data gathered with each checklist are: species, date, location, and whether all species detected are included on the checklist. Most observations include counts of individuals for each species, and basic information that identifies the observers and describes how the count was conducted (start time, duration, and distance traveled). We chose this relatively simple survey design in order to engage the largest number of participants, as increasing complexity of protocols in crowd-sourced projects tends to decrease the number of participants.

A significant aspect of the data that users contribute to eButterfly is that each observation has an exact date and is linked to a point on the map. This provides the opportunity to link eButterfly observations with a variety of covariate data that potentially influence butterfly occurrence, such as weather, climate, habitat, land use and other anthropogenic factors.

eButterfly accommodates historical data, too. In the early 1980s, Peter Hall started keeping detailed field notes – butterfly species seen, where, when and how many. He had no way to share these with others, so it was word of mouth to alert a few more interested friends of what he had seen. He then began photographing butterflies - first slides then digital images. Now, with eButterfly he will be uploading about 10,000 of his records in bulk to eButterfly. “It’s a dream come true to have all my records and images in one place,” remarked Hall.

While we encourage all eButterfly contributors to conform to the protocol standards we have developed, we also allow



Rick Cavin: March 2014 eButterflyer of the Month, top eButterfly contributor, Ontario butterfly atlas data compiler and all around great guy. (Photo by Lynn Saxberg)

users to enter data in a variety of other ways, even though these observations may be of reduced analytical value. For example, while eButterfly strives to gather detailed location and temporal specificity, historic data often can be limited to information at the county or even the state level. Other counts may be entered that cover long distances, or that simply report incidental or random observations. Flexible data entry increases initial involvement, and once involved with eButterfly, users have the option of submitting richer, more useful observations.

Ensuring Data Quality

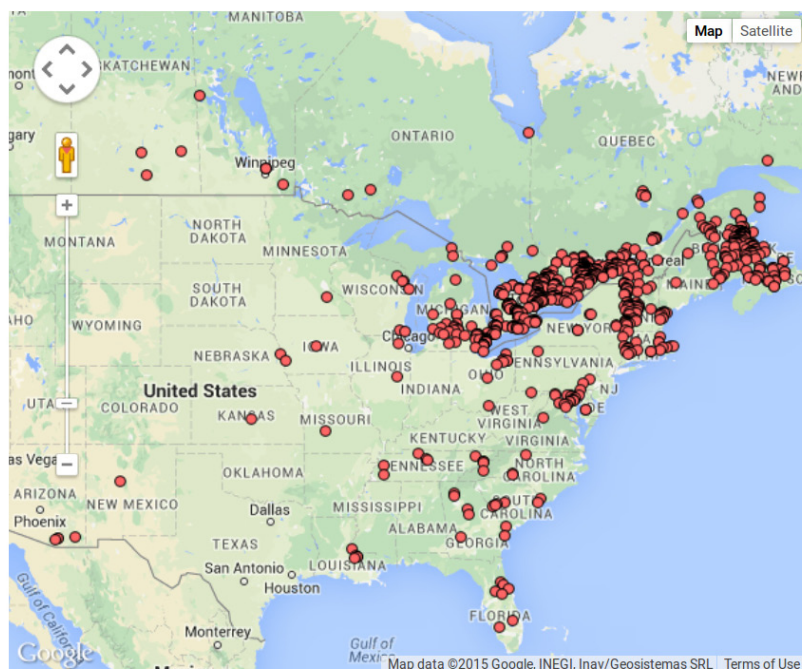
Data quality is of paramount importance to eButterfly. Typos happen, specimens are misidentified, and well-intentioned eButterfly observers can sometimes just make mistakes. Our volunteer team of over 40 butterfly experts (and growing!) works tirelessly to make eButterfly data as accurate and authoritative as possible. Some of these people work at the scale of a single state or province, while others help tackle whole regions. The regional butterfly experts can also easily work together by sharing difficult identifications with other experts and specialists in certain taxonomic groups.

Every one of these experts is a part of the eButterfly team because of their demonstrated expertise with butterfly identification and their deep knowledge of butterfly occurrence. We hope some of you might consider becoming data reviewers too.

eButterfly employs an electronic version of the traditional museum specimen determination process. Each butterfly observation is scrutinized by one of our experts. If the observation does not include a photograph of the observation in the field or from a collected specimen, it is checked against known phenology, presence likelihood, and degree of difficulty in field identification and marked as a sight record (to be used with caution). Observations with photographs are carefully vetted and determined to species, if possible. Just like a museum specimen, each observation has the determiner's as well as the observer's identification. We never change the observer's identification; that is up to each observer. However, all of the visualizations (maps, charts, etc.) use the determiner's identification. eButterfly does not police personal butterflying lists, but does vet the data available to the community.

At eButterfly, using the most accepted taxonomy and keeping it up to date is very important. eButterfly follows Jonathan Pelham's catalogue at Butterflies of America (see <http://butterfliesofamerica.com/>) which is updated regularly by Pelham. You don't have to worry about having the latest taxonomy for your data. eButterfly takes care of it for you automatically.

Location	Language	Species name
<input type="text"/>	English name	Viceroy
Start date	End date	
2005-01-01	2014-12-31	
<input type="button" value="Reset"/> <input type="button" value="Search"/>		



Map of 10 years of viceroy (*Limenitis archippus*) sightings reported on eButterfly (2005-2014). (Screenshot by Jeff Oliver)

Soaring Ahead

eButterfly is growing by leaps and bounds. Here are a few amazing statistics that are a testament to the power of joining forces to improve our knowledge of our amazing butterfly fauna. eButterfly users have shared more than 30,000 checklists from over 13,000 locations across Canada and the United States. There are over 106,000 observations accounting for more than 600 butterfly species in the eButterfly database already. eButterfly users have spent more than 15,000 hours surveying butterflies and shared nearly 34,000 photos. We are active on Facebook, Twitter and, courtesy of John Acorn, we even have our own YouTube channel to help you learn more about eButterfly and how to use it.

eButterfly is proud to be a part the new ROM Field Guide to Butterflies of Ontario.

The range maps are based on hundreds of thousands of historical records including over 20,000 records from the eButterfly database. From this, eButterfly developed what we believe is the first computer-modeled predictive species

distributions for a butterfly field guide. As a result, North American range maps based on species distribution models from eButterfly data will soon be added to our species profile pages and updated in near real-time as new data is added.

eButterfly is poised to tackle big issues with big data. Biodiversity data collected over broad geographic and temporal scales is an emerging, powerful source for exploring ecological patterns and processes related to species ranges, behavior and conservation in a changing world. Yet these data sources are often limited to a small number of taxa, mainly birds. eButterfly aims to change that. A team of scientists are beginning to use the eButterfly data with sophisticated statistical models and computational techniques that integrate, interpret, and analyze these data resources. We can't wait to report more of what they find in the future!

eButterfly is a place where anyone, anywhere, anytime, can explore, learn and share butterfly data. We're constantly improving and making eButterfly an even more amazing tool. We hope you'll join the eButterfly community.

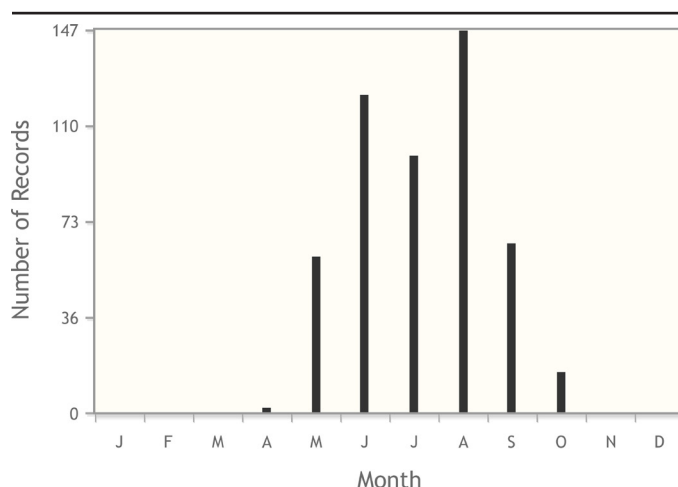
Connect with us!

Website: www.e-butterfly.org

Facebook: www.facebook.com/eButterfly.northamerica

Twitter: www.twitter.com/eButterfly_org

YouTube: www.youtube.com/channel/UCLIGhIB0dw1AQc_xQNvADFw



Flight times of the American Copper (*Lycaena phlaeas*) in eastern North America. This chart summarizes over 500 records spanning nearly 100 years of observations. (Screenshot by Jeff Oliver)

Announcements:

Call for Papers - special student research issue of the Journal (Vol 69:3, Fall 2015)

At this year's annual meeting, the Executive Committee of the Lepidopterists' Society approved using the 3rd issue of Volume 69 (2015 calendar year) to showcase peer-reviewed manuscripts that include undergraduate students as co-authors. The goals of this effort are, in part, to showcase the exceptional work that the "next generation" of Lepidopterists are performing and to expose future scholars of Lepidoptera to our Society's outlet for publication. The same instructions to authors and the same criteria used during our standard peer-review process will apply to articles that appear in the special section, tentatively titled: "Focus on the Future: Research from Emerging Lepidopterists". Should you or a colleague outside the Society that uses Lepidoptera as focal taxa in research wish to submit an article for this special issue please indicate so in the cover letter (or email) that accompanies your manuscript submission. Questions – please email me (keith.summerville@drake.edu or call 515-271-2265).

Colorado Digital Libraries publications

Papilio (New Series), edited and published by James A. Scott, is now online (ISSN 2372-9449), treating systematics and biology of butterflies. All issues #1-23 now available as FREE printable pdfs through the Colorado Digital Libraries at <http://digitoool.library.colostate.edu>; click on Colorado State University, search for Papilio (New Series). They have open access and may be downloaded, viewed, and printed at no cost. Some issues include #21, *Argynnis* (*Speyeria*) *nokomis nokomis*: geographic variation, metapopulations, and the origin of spurious specimens (Nym-phalidae), by James A. Scott & Michael S. Fisher, 32 p. #22, Systematics and life history studies of Rocky Mountains butterflies, by J. Scott (parts by Norbert G. Kondla & Richard E. Gray), 78 p. #23, Identification of *Phyciodes diminutor*, *P. cocyta*, and *P. tharos* in northeastern U.S. (Nymphalidae), by J. Scott, 26 p. (Note: various small corrections were made to #21-23, so if you downloaded them before Jan. 10, 2015 you should download them again to get those corrections). Print quality is improved over some originals, esp. larger readable type in #6, better photos in #8, and b/w photos now color in #12. Printed copies can still be obtained (at cost of printing, pos-tage, & handling) from J. Scott including the separate nice commercially-printed color plates in #12 and #18. Subjects treated are systematics related in #1, 8-9, 11-12, 18-23 on various butterflies and #5, 7, 10, 13, 23 on *Phyciodes*, about 4000 new hostplant records and life histories (mostly #2, 4, 6, 14, 22), corrections/reviews of 58 North American butterfly books in #19, biological catalogue of North American butterflies in #20, building storage drawers (#15, 16), insect conservation laws in #17, and distribution of Caribbean butterflies in #3.

These are listed under the C.P. Gillette Museum of Arthropod Diversity. Most numbers of the Contributions of the C.P. Gillette Museum of Arthropod Diversity are now also served on line as pdf's with open access. We hope to have all of the series served on-line by the end of the calendar year.

Paul A. Opler, Assistant Director, C.P. Gillette Museum, and James Scott, JameScott@juno.com, 60 Estes St., Lakewood, CO 80226-1254, USA

National Moth Week 2015: The Year of the Sphinx Moth, July 18-26, 2015



The fourth annual National Moth Week will be held on July 18-26, 2015. Last year, there were hundreds of participants in all 50 US states and in 43 countries. The goal of National Moth week is to focus

much needed attention on moths and their incredibly biodiversity and to help document their distribution. The event is free and everyone is welcome to participate. Registration forms can be found at nationalmothweek.org. Please register your location and submit your data and photographs to our diverse global partners. They can be found on the National Moth Week website at nationalmothweek.org. While National Moth Week celebrates the diversity of all moths, we like to shine a light—literally and figuratively—on a certain family of moths each year. Last year, we celebrated the year of the Silk moth (Saturniidae). This year, we are celebrating the family Sphingidae. Robust fliers with distinctive wing shapes, the sphinx moths consist of about 1,463 species world-wide and about 124 species in North America. For inquiries or information visit the National Moth week website at nationalmothweek.org or email David Moskowitz @ dmoskowitz@ecolsciences.com

PayPal is the easy way to send money to the Society

For those wishing to send/donate money to the Society; purchase Society publications, t-shirts, and back issues; or to pay late fees, PayPal is a convenient way to do so. The process is simple: sign on to www.PayPal.com, and navigate to "Send Money", and use this recipient e-mail address: kerichers@wuesd.org; follow the instructions to complete the transaction, and be sure to enter information in the box provided to explain why the money is being sent to the Society. It's as simple as that—and be sure to let us know if you have any difficulties with the process.

AWARDS:**Nominations for Karl Jordan Medal 2015**

The Karl Jordan Medal is a prestigious award that may be given biennially by the Lepidopterists' Society at the Annual Meeting in recognition of published original research on the Lepidoptera. Nominations of publications must be of exceptional quality and focus on the morphology, taxonomy, systematics, biogeography and/or "natural history" of Lepidoptera. The criteria (J. Lep. Soc., 26:207-209) emphasize that the work may be based on a single piece of research or on a series of interrelated works and must be at least three but not more than 25 years old. The latter is to assure that the awarded work(s) have been used by lepidopterological community and stood the test of time. The Jordan Medal is not intended to be a career award for service rendered to the study of Lepidoptera as the Society already has such an award, Honorary Life Member. In addition, the nominee does not have to be a member of the Society. A complete list of the lepidopterists who have received the Karl Jordan Medal is available on the Lepidopterists' Society website http://www.lepsoc.org/society_news.php.

Formal nominations for the Karl Jordan Medal will be accepted from any member of the Lepidopterists' Society or lepidopterist and is to be sent to Dr. Jacqueline Y. Miller, McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, PO Box 112710, Gainesville, FL 32611-2710 or via email (jmiller@flmnh.ufl.edu). Please send a list of the specific publications for which the candidate is nominated, a support letter outlining the significance of the work(s), and if possible, a copy of the nominee's CV, no later than 20 April 2015.

Bryant Mather [Travel] Award

During the Executive Council meeting at the 2012 Lepidopterists' Society meeting in Denver, Colorado, the idea of providing financial aid to individuals wishing to travel to, and present at, the Annual Meeting was discussed and the following motion was adopted: "The Society will provide up to \$1,000 to be divided among winning member applicants for money to travel and present (poster or talk) at the 2013 meeting in Gainesville, FL. This award shall be known as the Bryant Mather Award, and applications will be evaluated by the Awards Committee in time to notify winners as they make arrangements to travel to the Gainesville meeting." The award is named in honor of the late Bryant Mather, a long-time Society Member and financial benefactor. During the 2013 meeting, the Executive Council voted to extend this award for the next five years.

The Awards Committee is now accepting applications from Society Members for the 2015 Bryant Mather Award for travel to the Lepidopterists' Society meeting at Purdue University in West Lafayette, Indiana, July 29-August 2. **We would like to award two or three stipends to partially cover meeting-related expenses.** Applicants are

to be judged on need for the award (i.e., lack of sufficient resources to travel to the meeting without the award) and acceptance of their proposed presentations. Applicants can include any member wanting to attend and present at the meeting (the award is not limited to students).

Please submit a brief (500 words maximum) application summarizing your need for the award, together with a detailed budget and proposed title of your presentation or poster to tgilliga@gmail.com by April 30, 2015. Winners will be selected by the Awards Committee and notified by May 15, 2015. Recipients will be reimbursed by the Treasurer after the meeting.

Lepidoptera courses/meetings:**Early Announcement of the Pacific Slope Meeting, June 19 - 20**

The Pacific Slope Section of the Lepidopterists' Society will have a field meeting at the Sequoia Heights (formerly known as Camp KEEP) facility on the western slopes of the Sierra Nevada Range in California at the southern end of the Tulare County border above Glenville. The area, a mixture of forest and meadows, is optimal for butterfly and moth collecting. The meeting will be Friday, June 19 and Saturday, June 20. Accommodations are cabins with bunks and a new RV area has been added for RV parking. Cost is \$77 per person, and a registration form will be mailed to all Pacific Slope addresses. Any other persons interested in attending please contact Kelly Richers at kerichers@wuesd.org or 661-201-7357 for a registration form.

Eagle Hill, Maine seminar July 12 - 18

Hugh McGuinness and Bryan Pfeiffer will be teaching a weeklong seminar on Lepidoptera this summer at Eagle Hill in Steuben, Maine. The course, which is titled "Moths and Butterflies: Identification, Specimen Preparation and Taxonomy," will emphasize identification of macrolepidoptera; the current state of taxonomy in Lepidoptera; the techniques used for observing, studying and surveying butterflies and moths; and various aspects of Lepidopteran conservation. Each day will include a lecture topic, lab work and plenty of field time, both during the day and at night. Because we have two instructors we will have a lot of flexibility in the nature of the course and we plan to adapt the course depending on the interests of the students. Eagle Hill is a wonderful biological station with great food and ample accommodations set on hillside in coastal Maine about 1 hour from Bar Harbor. The course is scheduled to run from the 12th to the 18th of July, 2015. For more information, go to <http://www.eaglehill.us/programs/nhs/nhs-calendar.shtml>.

The Sixth Annual Lepidoptera Course, 16 – 25 August, 2015.

Held at the Southwest Research Station (SWRS) in the Chirichahua Mountains in SE Arizona (a 2 1/2 hour drive from Tucson), the focus of the Lep course is to train graduate students, post-docs, faculty, state and federal employees, and serious citizen-scientists in the classification and identification of adult Lepidoptera and their larvae. Topics to be covered include the biology and systematics of major families of Lepidoptera, an introduction to adult and larval morphology with a focus on taxonomically-important traits, extensive field work that concentrates on both collecting and photographing adults and larvae, collecting and curatorial techniques, genitalic dissection, larval classification, use (and abuse) of DNA bar coding, and general topics in Lepidoptera systematics, ecology, and evolution.

With its extensive series of Sky-Island mountain ranges, SE Arizona has the highest Lepidoptera diversity in the US. With low desert scrub, oak and mixed oak-pine woodland, lush riparian, juniper, Douglas fir, and mountain meadow habitats all within a 40 minute drive from the station, the SWRS is an ideal location from which to sample this diversity (of both habitats and species).

If you want to interact with other Lepidoptera enthusiasts, see a spectacular *Dysschema*, identify the Organ of vom Roth, sort through trap samples with hundreds of species, learn about diversity of Lepidoptera, and enjoy the vistas of SE Arizona, then this course will provide a unique experience.

Partial list of Invited instructors (subject to change):

Rich Brown (Mississippi Entomological Museum), Jennifer Bundy (RD4AG), Chris Grinter (Illinois Natural History Survey), Sangmi Lee (Arizona State University), Chris Schmidt (Canadian National Collection), Bruce Walsh (University of Arizona)

For more information, see <http://research.amnh.org/swrs/education/lepidoptera-course>, or www.lep-course.org or contact Bruce Walsh at jbwalsh@u.arizona.edu

You can also see photos and comments from students in the 2011 course at their facebook site, "2011 Lep Course, SWRS SEAZ".

Brochures

If anyone is in need of some of the new Membership Brochures to hand out at various functions, please contact Julian P. Donahue (julian@lepsoc.net) and he will be glad to help you out.

Continued on next page, p. 25

The Mailbag . . .

Is the petition to protect the Monarch Butterfly a “dishonest” document?

Lincoln P. Brower

Department of Biology, Sweet Briar College
Sweet Briar, VA, USA 24595 brower@sbc.edu

Nick Grishin (2014), in the previous issue of the News, has stated that my cosignatories and I have been involved in a “sophism” in writing the August 2014 petition to designate the monarch butterfly as a threatened species (Monarch ESA Petition, 2014). Grishin further states (p. 194): “....so I call the petition ‘scientifically dishonest’....”. For those, including myself, who may be baffled by the accusation, let us examine the Webster’s Dictionary definition: “sophism: an argument...intended to deceive”. Various synonyms of “deceive” from the Oxford American Thesaurus are *misguide, lead on, trick, swindle, entrap*. Grishin has, in effect, called me a liar. I reject this hostile and uncalled for accusation.

For those who want to understand why I reject Grishin’s accusations as unsubstantiated, I urge you to read the 162-page petition carefully. The reason I signed onto it is because it thoroughly documents several factors that almost certainly underlie the reasons why monarchs have declined so precipitously.

The US Fish and Wildlife Service (FWS) has accepted the petition and will be conducting a one-year status review on monarchs. I encourage fellow members of the Lepidopterists’ Society and others to provide thoughtful and non-malicious comments to the FWS, favoring or opposing the petition. Comments may be submitted until 2 March 2015. To submit a comment, go to: <http://www.regulations.gov/#!docketDetail;dc=FR+PR+N+O+S R;rpp=10;po=0;D=FWS-R3-ES-2014-0056>. Substantive written statements will improve the final listing package, if the USFWS finds that listing is warranted.

LITERATURE CITED

- Grishin, N. V. 2014. Why the monarch butterfly should not be listed under the Endangered Species Act. *News of the Lepidopterists’ Society* 56:193-196.
- Monarch ESA Petition. 2014. Petition to protect the monarch butterfly (*Danaus plexippus plexippus*) under the Endangered Species Act. Submitted to Secretary of the US Department of the Interior, by The Center for Biological Diversity and Center for Food Safety, joined by The Xerces Society and Dr. Lincoln Brower, on August 26th, 2014. Fish and WL Service Docket: 8 Jan 2015: <http://www.regulations.gov/#!docketDetail;D=FWS-R3-ES-2014-0056> 1-162.

Membership Updates

Chris Grinter

Includes ALL CHANGES received by 12 February 2015

New and Reinstated Members: members who have joined/renewed/been found/or rescinded their request to be omitted since publication of the 2012 Membership Directory (not included in the 2008 Membership Directory; all in U.S.A. unless noted otherwise)

Badon, Jade Aster T.: [address omitted on request]

Balaam, Kathie: 26591 Cancion, Mission Viejo CA 92691

Brock, Sanara (Mrs.): 1334 South Lauren St. Casper WY 82604

Campbell, Matthew (Mr.): 1013 NW Furnish Ave., Pendleton OR 97801

Ciminera, Marina (Ph.D.): Campus Agronomique, BP 701 97379 Kourou, FRENCH GUIANA

Cleveland, Anna: P.O. Box 641020, Pullman WA 99164

Coburn, Max: 506 North 57th Street West, Muskogee, OK 74401

Hardesty, Richard L.: P.O. Box 190855, Hungry Horse, MT 59919

Kennedy, William: 902 South Loop 499 Apt U7, Harlingen TX 78550

Klatt, Catherine (Ms.): 302 Quay Road, Delanson NY 12053

Lorenzi, David E.: 407 East Madison Street, Apt. 40, Dodgeville, WI 53533

Maring, Chelsea (Ms.): [address omitted on request]

Merren, Nevaeh: 4599 N. Avra Rd., Tucson AZ 85743

Micheels, Lucas (Mr.): [address omitted on request]

Olson, Eric: 823 Grays Peak Drive, Superior CO 80027

Pippen, Jeffrey: 204 Regiment Way, Durham, NC 27705

Sowers, Mike (Mr.): 1802 Greenspring Place #407, Frederick MD 21702

Spencer, Don (Mr.): 1354 Vinton Ave., Memphis TN 38104

Tucci, Nicholas J.: 1090 E. 8th Street, Chico, CA 95928

Walker, Holly (Mrs.): 514 South Orange Street, Apt. D, Media, PA 19063

Wells, Carrie (Ms.): 528 Hodges Gap Road, Boone NC 28607

Welsh, Gareth S.: 2 Brafferton Close, Woodham Burn, Newton Aycliffe, Durham DL5 4RQ, United Kingdom

Winters, James M.: 1216 SW 85th Terrace, Oklahoma City, OK 73139

Address Changes (all U.S.A. unless noted otherwise)

Brown, John W (Ph.D.): 5829 Cove Landing Rd. #102, Burke VA 22015

Caldwell, Jeffrey, (Dr.): 2033 Camel Lane, Apt. 23, Walnut Creek, CA 94596

Crabtree, Laurence: 2660 Prescott Ave., Placerville CA 95667

Kekkonen, Mari: 123-252 Stone Road West, Guelph ON N1G 2V7 CANADA

Klein, Michael W.: 4588 Wilson Ave, San Diego, CA 92116

Kruse, James J.: 740 Simms Street, Golden, CO 80401

Lewis, Delano S. (Ph.D.): Dept. Bio., Chem., & Environ. Sci., Northern Caribbean University, Mandeville, Jamaica.

Manderino, Rea (Ms.): 3645 Elder Oaks Boulevard, Apt. 7403, Bowie, MD 20716

Proshek, Benjamin: 402 H Street NE, Apt 1, Washington DC 20002

Radulescu, Andrei (M.D.): 6261 Craughwell Lane, Dublin, OH 43017

Rotter, Michael: 3435 North Jamison Boulevard, Flagstaff, AZ 86004

Metamorphosis

Chris Grinter

David N. Hudson of Great Missenden, Buckinghamshire, England has passed away. Mr. Hudson became a Life Member of the Society in 1986, and was particularly interested in the Lepidoptera of Peru. [information received from his widow, Mrs. Carole Hudson]

More Announcements:

Continued from previous page, pg. 24

Society of Kentucky Lepidopterists

The Society of Kentucky Lepidopterists is open to anyone with an interest in the Lepidoptera of the Great State of Kentucky. We are a very active organization. We have two or three field meetings every year. The schedule for the 2015 field meetings is as follows:

Spring Meeting: Western Kentucky, Land Between the Lake NRA: April 10, 11 & 12

Summer Meeting: Big Rivers WMA, Crittenden & Union Counties: 5, 6 & 7 June

Late Summer Meeting: Red Bird WMA Daniel Boone NF, Leslie County: 7, 8 & 9 August

The Annual Meeting will be held in November at the Insect Museum of University of Kentucky, Lexington, KY.

Annual dues are \$15.00

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



The Marketplace

IMPORTANT NOTICE to ADVERTISERS: If the number following your ad is "564" then you must renew your ad before the next issue!

New Advertising Statement: The News of The Lepidopterists' Society accepts advertising related to Lepidoptera and consistent with the purposes of the Society free of charge. Other types of advertising will not be accepted, regardless of the source. Acceptability of advertisements for publication is at the discretion of the News editor.

Books/Journals

FOR SALE: Lepidoptera books from personal library of over 600 volumes. Books are in excellent condition, mainly hardbound, some with custom bindings. All are out of print and most were published before 1999. I must sell due to lack of space to continue to store them. I do not have a current list of titles available, but am working on one that should be available soon. Available titles do include Jamaica and its butterflies by Brown and Heineman, The butterflies of North America by Howe, The generic names of the butterflies and their type species by Hemming (custom hardbound), Ithomiidae tribe Napeogenini by Fox and Real, Butterflies of Liberia by Fox, A revision of the American Papilios by Rothschild and Jordan (custom hardbound), How to know the butterflies by Ehrlich and Ehrlich, Butterflies of Britain and Europe by Higgins and Riley. In the meantime, before a more complete list of titles is available, I am making the following offer: An assortment of 50 books for \$200.00 or 20 books for \$100.00

(with a provision to ensure that you won't receive any duplicates to your present library). For more information contact John Masters, quest4tv1@aol.com. 564

FOR SALE: One copy of David Spencer Smith, Lee D. Miller, and Jacqueline Y. Miller's magnificent book "The Butterflies of the West Indies and South Florida." 1994. Oxford University Press, Oxford, UK. 264 pp. 32 color plates by Richard Lewington". This book is very hard to find. Only 800 copies were printed. This copy is in good condition and is signed by author Jacqueline Miller. It was formerly owned by the famous Everglades scientist John Ogden and bears his stamp. Contact Marc Minno (352-219-1009; marc.minno@gmail.com). 564

FOR SALE: Books and Literature (mostly Lepidoptera) worldwide coverage. I want to sell duplicates from my library. For lists send an email to metzlere@msu.edu. 571

FOR SALE: Journal of the Lep Soc, Vol. 6-49, 50 #s 1 & 3; Vol. 21 only #1. Price: \$250.00 + shipping; weight ± 60 lbs. Journal of Research on the Lepidoptera, Vol. 1-36, missing Vol. 24 #3 & Vol. 27 #s 3 & 4. Price \$300.00 + shipping; weight ± 45 lbs. If multiple bids, I prefer selling to youngest bidder for greatest use of these Journals over time. U.S. only; payment by check or money order. Peter Hubbell, 6200 N. Via Rancho, Tucson, AZ 85704; 520-229-3560, peterhubbell@q.com. 571

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

Only members in good standing may place ads (but see top of next column). **All advertisements are accepted, in writing, for two (2) issues unless a single issue is specifically requested.**

All ads contain a code in the lower right corner (eg. 562, 563) which denotes the volume and number of the **News** in which the ad first appeared. **Renew it Now!**

Note: All advertisements must be renewed before the deadline of the

third issue following initial placement to remain in place.

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

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

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

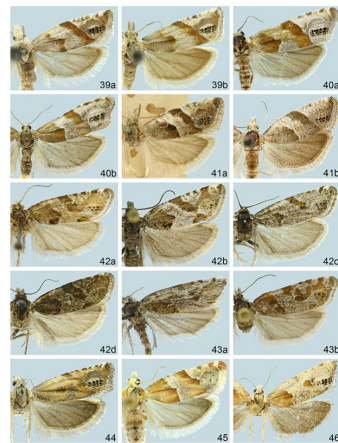
No mention may be made in any advertisement in the **News** of any species on any federal threatened or endangered species list. For species listed under CITES, advertisers must provide a copy of the export permit from the country of origin to buyers. **Buyers must beware and be aware.**

New *Eucosma* book published by the Wedge

The Wedge Entomological Research Foundation announces publication of its newest book: "*Eucosma* Hübner of the Contiguous United States and Canada (Lepidoptera: Tortricidae: Eucosmini)" by Donald J. Wright and Todd M. Gilligan. The book will be published mid-April 2015. The retail price is \$90.00, however the Wedge Entomological Research Foundation is offering an early-bird-special discounted price of \$80.00 (plus shipping and handling) for all orders received by 1 August 2015. Please go to the Foundation's website www.wedgefoundation.org or contact Eric H. Metzler, Managing Director, metzler@msu.edu for details on ordering books from the Foundation. Several of your favorite retailers of entomology books will also have copies available. Don't forget 1 Aug 2015 for the discounted price.

The book, ISBN 978-0-933003-16-3, is 256 pages, 30 colored plates, 49 monochrome plates hardbound with dust jacket, and 8.75" x 11.25" approximate dimensions. The contents include 133 species accounts. *Eucosma* Hübner is one of the largest genera in the Tortricidae, with more than 230 described species. It achieves its greatest species richness in the Nearctic, where members of the genus can be found in nearly every habitat, from the dunes of the Gulf Coast to the barren summits of the Rocky Mountains. This volume is the first comprehensive treatment of N. American *Eucosma* to be published in more than 90 years. One hundred and thirty-three species are reviewed from the contiguous United States and Canada. Nine new species are described, nine new synonymies are proposed, 21 lectotypes are designated, and several unresolved species complexes are discussed. Diagnostic morphological features useful in species identification are emphasized and illustrated with 450 color adult images and 629 detailed genitalia drawings.

"This is a meticulously researched and beautifully illustrated guide to the moths of the tortricid genus *Eucosma* that occur in the lower 48 states and Canada. Taxonomic and nomenclatural problems are resolved, and details are provided to assist in the identification of all species. It is a must-have for those interested in the tortricid fauna of North America." John Brown, Systematic Entomology Laboratory, USDA-ARS, Smithsonian Institution. 571



Equipment

FOR SALE: Light Traps: 12 VDC or 120 VAC with 18 inch vanes (15 & 32 Watt) and 24 inch (40 Watt). Rigid vanes of Stainless Steel, Aluminum, or Plexiglass. Rain Drains and beetle screens to protect specimens from damage.

Collecting Light: Fluorescent UV 15, 32 & 40 Watt. Units are designed with the ballast enclosed in a weather tight plastic enclosure. Mercury Vapor: 160 & 250 Watt self ballast mercury vapor with medium base mounts. 250 & 500 Watt self ballast mercury vapor with mogul base mounts. Light weight and ideal for trips out of the country.

Bait Traps: 15 inch diameter and 36 inches in height with a rain cloth top, green Lumite plastic woven screen, and supported with 3/16 inch steel rings. A plywood platform is suspended with eye bolts and S hooks. Flat bottom has a 3/16 inch thick plastic bottom that will not warp or crack. Bait container is held in place by a retainer.

Cornell Drawers: Leptraps now offers Cornell and California Academy Storage Drawers. Drawers are made of Douglas Fir, Hardboard Bottom and Glass Top. Finished in Clear Satin Gloss Varnish. A single Card Holder with Pull or two Card Holder with a Knob Pull. Foam pinning bottom is available.

For more information on any of the above, visit our web site at: www.leptraps.com, or contact Leroy C. Koehn, Leptraps LLC, 3000 Fairway Court, Georgetown, KY 40324-9454: Tel: 502-542-7091. 564

FOR SALE: Three ten-drawer Cornell style cabinets with drawers for sale. Drawers with glass tops and good pinning bottoms. \$75 each or all three for \$175. Contact: Richard S Smith, bport.rss@gmail.com; phone: 207-469-6234. 571

Livestock

FOR SALE: Hyalophora cecropia eggs June-July 2015. \$15/dozen, \$6/each additional dozen. Contact me (Ben McAllister) at ben.d.mcallister@gmail.com. 571

Research Request

WANTED: Observations, photos, specimens of larvae and adults of the Spotted Tussock Moth, *Lophocampa maculata*, from all areas of North America, recent or old data. Records from far northern Canada, the desert SW, southern Appalachians and Pacific Coast are especially needed to define range. Records of early or late season observations are particularly valuable. All larval photographs are useful, especially if they show unusual patterns of coloration. Specimens are desired for future genetic analysis. Contact Ken Strothkamp, Lewis & Clark College and Portland State University (kgs@lclark.edu or kstrot2@pdx.edu) for more information on the project. 571

A Trio of Sierra Nevada stories

Ken Davenport

8417 Rosewood Ave., Bakersfield, CA. 93306

kdavenport93306@yahoo.com

SONORAN BLUES FLYING IN THE SIERRA NEVADA IN JANUARY!

The Sonoran Blue (*Philotes sonorensis* (Felder & Felder)) is known not only for being perhaps the most beautiful species of blue in the family Lycaenidae, but is also known to be one of the earliest spring fliers in California, the only state where it occurs.

I live in Bakersfield, California not far from the southern Sierra Nevada where overwintering species can sometimes be found even on warm winter days. This winter (2013-14) proved to be very dry and was having a string of several unseasonal warm days. So wanting an outing to look for butterflies even in the winter, I came up with an unlikely goal. Could I find Sonoran Blues flying in January well before their usual flight in March and the first half of April north of Kernville along the upper Kern River in Tulare County, California?

There were several reasons why I thought such a quest could succeed. I had discovered many of the colony sites in that region myself so I knew where to look. I knew that Sonoran Blues had been collected even in late January south in San Diego County at the south end of the state and in early February even in the California Coast Ranges in Santa Barbara County (Santa Barbara & Dry Canyons, Santa Lucia Range). And, I actually found a single Sonoran Blue along the upper Kern River at Limestone Camp on February 1, 2005.

The day (Jan. 27, 2014) was mostly sunny in the 60's and there were some clouds. But my searches of *sonorensis* colony sites at lower elevations (2600-4300') were turning up empty. I was seeing some moth activity.

Streambeds showed signs of heavy rains along the Sherman Pass area and here many plants were in good leaf condition in contrast to lower elevational levels where plants were in obvious stress condition related to drought.

It was just after noon and I decided to try a former Sonoran Blue colony site on the Sherman Pass Rd. east of the Kern River at 4900' that had apparently been extirpated in 1997 and not seen since that year. A forest fire here in July, 2002 had also damaged this site. But I also knew that Sonoran Blues were re-colonizing the lower slopes 600 feet below and could reach this site again.

When I reached the site conditions were fairly good with high solar radiation and light soils. A search of the canyon and rock faces for several minutes yielded no butterfly



Philotes sonorensis,
Top: ♂, Sherman
Pass, Tulare Co.,
CA Jan 27, 2014;
Bottom: ♀, East of
the Kern River, S of
Limestone Camp,
Tulare Co., March
27, 2013. These
two localities are 4
miles apart. (photo
by Richard P.
Meyer)

sightings. I started to put my net and other gear into the back of my Toyota Highlander when I looked one last time at the base of the rock ledge along the road and adjacent to the unnamed canyon. There I saw a blue that had to be either a very early flying Acmon Blue (*Plebejus acmon* (Westwood)) or a Sonoran Blue. Netting confirmed it was a male Sonoran Blue and seemed to confirm my suspicion that the species was moving upslope and re-colonizing former sites destroyed by the 2002 McNally Fire.

But the story did not end with this one capture. As I again prepared to leave another Sonoran Blue showed up, then 5 more after that. I was able to collect 6 of the 7 individuals seen (some went to the Colorado State Museum collection in Fort Collins, Colorado) and in later weeks would confirm that the species was successfully recovering at many colony sites in the area, apparently by colonists in areas which survived the fire (as those on the Kern River Trail along the river at the bridge that crosses the Kern River south of Johnsondale and near the junction of Mtn. Hwy. 99 and the Sherman Pass Rd).

Later in the year, that January 27th *P. sonorensis* locality had also been colonized by the Cythera Metalmark (*Apodemia mormo* in the *cythera* (W. H. Edwards) group) which colonized several new sites where it was previously unseen, even up to 6800' at Alder Creek.

It seems that butterflies can be very resourceful in recovering from forest fires and, rather than relying too much on "baseline" data, butterflies are constantly changing their distributions based on where their habitats are in the fire or natural disaster recovery cycle.

SNOUT BUTTERFLIES IN THE SIERRA

Southwestern Snout Butterflies (*Libytheana carinenta streckeri* Austin & J. Emmel) are an uncommon butterfly in California and are best known as rare strays or emigrants in the Mojave and Colorado Deserts. Emmel & Emmel (1973) allowed for the possibility that there may be breeding populations within the state in areas where the larval host hackberry trees grow.

Some Western Hackberry Trees, now going under the name *Celtis reticulata* Torr., occur north of Banning in Riverside County (Emmel & Emmel, 1973), in Kern Canyon at Democrat Hot Springs in the southern Sierra Nevada, and in Caliente Canyon in the Tehachapi Mountains. So far, it is unknown if those trees in the Sierra Nevada or Tehachapi Mts. have been used as hosts by Snout Butterflies (there are no records of these butterflies from inside Kern Canyon below Lake Isabella and only one sighting in 2012 from Caliente Canyon by Richard P. Meyer).

Until 1984, the only known records for *Libytheana carinenta* from Kern County were from the southern San Joaquin Valley (Bakersfield, (1) "September, 1961" (Glen Broadwater) and (1) 6 Oct 1963 (KD). There was a single sighting in Bakersfield 18 Oct 1988 but neither collection or photo was possible (KD). Then four (4) individuals were collected in the Mojave Desert near Koehn Dry Lake 27 Sep 1984 (KD). Susan Steele photographed one at China Lake 5 Nov. 2001. Numbers in parentheses represent numbers collected above and in records listed below for the Sierra Nevada.

During these years I suspected the Snout Butterfly likely strayed at least occasionally into the southern Sierra Nevada but as rare as the species is in the Kern County the chances of finding even one in the Sierra was a "longshot." But I made it a goal to visit the southern Sierra in the Fall months to check blooming rabbitbrush in the hopes I would eventually find one or more. Finally, on October 28, 2003 I was able to capture an individual at Chico Flat in the upper Kern River Corridor (north of Kernville) in Tulare County (still the only record for that county) on October 28, 2003 flying with Painted Ladies (*Vanessa cardui* Linnaeus) and Monarchs (*Danaus plexippus* Linnaeus) on their yearly Fall southerly migrations. But unlike those species, Snouts must be either straying or emigrating north from their population centers in Arizona, northern Mexico or possibly originating from transient populations from California hackberry trees.

Other records, always of singletons, took place over the next ten years. I became aware of the Mariposa County record by Oakley Shields from the Annual Season Summary Report for 1990 which is the only record for the Yosemite region.

But the very dry year of 2014 in what had been an extremely poor year for desert butterflies would have a major surprise

in late October and the first half of November. Two records for Snouts had come from a single locality at Weldon in past years in 2008 and 2012. But this year (2014) at this locality on two separate days (see records below) I would observe small movements of Snouts (often in very good condition) for a relatively short time (and few or none the rest of the day) and collected three individuals in a day two separate days, with a seventh collected about a week later.

Weldon and the Kern River Valley are essentially "gateway" locations to the Sierra Nevada and other records from Koehn Dry Lake, Jawbone Canyon and Sageland (a former stage stop N of Kelso Valley) seem to suggest a flyway route for strays and some migrants which were apparently traveling in small groups on October 28th and November 4th. The nine captured adults at Weldon (including the two singletons in 2008 and 2012) were either nectaring on blooming rabbitbrush or perching on dead branches of shrubs or trees.

Few current lepidopterists seem aware Painted Ladies (*Vanessa cardui*) seem to migrate south yearly in the Sierra Nevada. But the author has observed such migrations nearly every year. Also see the comments and contributions by others: Shapiro & Manolis, 2007 and Season Summary Reports for California by Robert L. Langston under "migratory species" for the years 1978-79, 1981, 1991-92 and 1998. Such southward migrations can start in August and last into early December (with a peak in October to mid-November in the southern Sierra Nevada).

Few lepidopterists seem aware that West Coast Ladies (*Vanessa annabella*) seem to move within the Sierra upslope (as west of Sherman Pass 7600-9150') and downslope (Kern River Corridor and Kern River Valley including Weldon) in the Sierra in late season, but not in a north-south direction. Both *Vanessa* species can reach numbers of over 100+ per day at Weldon.

Monarchs, Painted Ladies and West Coast Ladies are much more numerous than Snouts in the southern Sierra Nevada. The much less common Snouts can be easily overlooked. Snouts though are moving (emigrating) north instead of south, but in much fewer numbers. Still they get to the Sierra Nevada. Where are they going? Where will they yet be found in the Sierra Nevada? Snouts are giving up their secrets very slowly. Few collectors or watchers are in the southern Sierra Nevada at the right time to see and report them. Maybe that will change in the future and we will learn more about where they occur in the Sierra Nevada!

Southwestern Snout Butterfly (*L. carinenta streckeri*) records in the Sierra Nevada:

California: (KD=Ken Davenport; other observers are named)

Mariposa County: Jerseydale 13 Oct 1990 (Oakley Shields)

Tulare County: Kern River N of Kernville, Chico Flat (1) 28 Oct 2003 (KD).

Kern County: A few miles north of the south end of Sierra Nevada in Mojave Desert influence in Jawbone Canyon (1) 6 Sep 2006 (KD); (1) Sierra Hwy. (E side Lake Isabella) 1.5 mi. NW of Hanning Flat (1) 24 Oct 2006 (KD); Grapevine Canyon, E side of the Sierra 2 Dec. 2008 (Susan Steele); Spring with mud and trees 0.7 mi. SE of Sageland (N of Kelso Valley, one seen perching on dead branches) 21 Oct 2008 Weldon, Kelso Valley Rd. off Hwy. 178 at Weldon (1) 27 Oct, 2008 (KD); (1) 6 Nov 2012 (KD); 28 Oct 2014 (8-9 seen, 3 collected) (KD); (6-7 seen, 3 collected 4 Nov 2014 (KD); (2 seen, 1 collected) 12 Nov 2014 (KD).

Summary: 13 collected individuals in the Sierra Nevada, 12 by the author; one confirmed photograph by Susan Steele. A number of additional individuals were seen but not collected, most in 2014.

References:

- Davenport, Kenneth E. 2007. Yosemite Butterflies. Text. The Taxonomic Report of the International Lepidoptera Survey. Second Edition Volume 5:1, 80 pp.
- Davenport, Ken 2014 Lepidoptera of North America. 3.4 Butterflies of Kern and Tulare Counties, California (Revised). Contributions of the C. P. Gillette Museum of Arthropod Diversity, Colorado State University. 221 pp.
- Emmel, T. C. and J. F. Emmel, 1973. Butterflies of southern California. Natural History Museum of Los Angeles County, Science Series. 26: 1-148.
- Langston, Robert L., Coordinator. 1978-1998. Annual Season Summaries of the Lepidopterists' Society for California and the Southwest.
- Shapiro, Arthur M. & Timothy D. Manolis 2007. Field Guide of the San Francisco Bay and Sacramento Valley Regions. California Natural History Guides. University of California Press. 346 pp. 31 Color Plates.



Left column: Weldon, Kern County, CA, October 28, 2014; Upper right: Chico Flat, Tulare Co., CA north of Riverkern and Kernville, Kern Co., CA, October 28, 2003; Lower right: Weldon, Kern Co., CA, November 4, 2014. All collected by Ken Davenport. (Photo by Richard P. Meyer)

Some observations of Monarchs (*Danaus plexippus* (Linnaeus)), Queens (*Danaus gilippus thersippus* (H. Bates), Painted Ladies (*Vanessa cardui* Linnaeus) and West Coast Ladies (*Vanessa annabella* (W. D. Field)) in the Kern River Drainage in the southern Sierra, Kern and Tulare Counties, CA.

Monarch Butterflies Introduction:

Since some believe that Monarch Butterfly eastern USA migrations are threatened, I felt it was time to share my unpublished observations of this migratory species in the Kern River drainage in the Sierra Nevada.

Monarchs have been observed in the southern Sierra Nevada, Tehachapi Mts. and southern San Joaquin Valley by this writer from 1960-1964 and from 1969 to the present. In the revised edition of a publication entitled "Butterflies of Kern and Tulare Counties, California" (Davenport, 2014) under Monarch Distribution I wrote: "Found throughout the region, sometimes overwintering in the San Joaquin Valley and lower foothill canyons in the Sierra Nevada and Tehachapi Mts. Large summer populations can be found in association with *Asclepias fascicularis* Decaisne in the Lake Isabella-Weldon areas of the Kern River Valley. These can remain very abundant there until at least mid-November. Other milkweed species are utilized in the region's mountains and in the San Joaquin Valley."

Numbers of Monarchs observed in the region were notably smaller in the very dry years of 2013-14 that also affected the growth and leaf condition of the host milkweed plants. Long term drought and availability of hostplants for transient populations in the region and elsewhere in the state seem to be likely contributors to reduced numbers of Monarchs being observed in this area in those years.

Sherman Pass, Monarchs and general butterfly observations.

Not mentioned in the Kern-Tulare Counties publication are observations of Monarchs in the Sherman Pass area which reaches an elevation of 9200' at the Pass summit but with nearby ridges and peaks up to over 10,000' elevation. Sherman Pass is north of Walker Pass (the southernmost Sierra Nevada Mountain Pass) accessible from the Kern River about 25 miles north of Kernville on the west end and from Hwy. 395 north of Pearsonville via Nine Mile Canyon and Kennedy Meadows at the east end.

Personal observations over 12 years of over 110 species of butterflies have taken place in the McNally Fire burn area (150,670 acres of Sequoia National Forest burned from July 21 to August 29, 2002) where I have been monitoring the recovery of butterflies. I was also very familiar with the area and its butterfly fauna prior to the fire which was helpful in evaluating changes and recovery. The study

(Davenport, 2012) has revealed an encouraging recovery of most of the butterfly species in the burn area. One hundred seventeen species are known in the survey area. Several species not recorded from the Sherman Pass area prior to the fire have since colonized the area and some of those have become abundant. Monarchs were NOT studied in detail until 2012 because their occurrence in the area was never threatened because of their migratory status and they are regularly seen from spring to late fall in that area in all years. Their occurrence in areas with milkweeds that support transient populations were observed even as soon as the month following the fire (Davenport, 2003). Many other species have moved either to higher or lower elevations in response to plant community changes and plant succession. Butterfly counts done here yearly in late June or early July are sometimes among the top five counts in the USA for numbers of species recorded.

Despite huge damage from the fire to the chaparral oak woodland plant community and to coniferous forest much of the higher forest above 7000' survived, much of it with large areas that did not seriously burn. Since the area above 8300' along the Sherman Pass Rd. had not been seriously damaged by the fire (probably because of rocky terrain and greater spacing between conifers there and accessibility to firefighters), I did not note that this was a prime area for Monarchs prior to migration until 2011. There are several streams here in the Kern River drainage that have permanent or semi-permanent water and one of those is Alder Creek which meets the Sherman Pass Rd. at 6800'. In the late spring and till about mid-August, this location often hosts 30-40 species on any given day despite the fact this location suffered almost a total loss of all coniferous and deciduous trees, most noticeably Incense Cedars (*Calocedrus decurrens* (Torrey)). Nelson's Hairstreak (*Callophrys nelsoni* (Boisduval)) formerly a dominant species at mid-elevations along the Sherman Pass Rd. have not recovered, but occasionally individuals turn up in the burn area (but not at the Alder Creek Crossing). Monarchs are frequently seen along Alder Creek in the spring, become scarce there around butterfly count time (usually around July 4th), then start to become regular there in August. But on June 29, 2014 during the annual butterfly count, three of us witnessed several Monarchs patrolling the stream there at about 4 PM.

Monitoring butterflies in general at upper levels west of Sherman Pass from 6800'-9200' and at Sherman Pass in late season August into early November several things have become apparent:

(1) Monarch Butterflies occur at lower elevations of the Sherman Pass region as temporary colonists or migrants in some numbers the entire season from late February into early November. They become most abundant from mid-August to very early November with peak numbers in September and October. This is before very high numbers of Monarchs usually become apparent in the Kern River

Valley about 20 air miles to the south and less commonly in the southern San Joaquin Valley well to the west. (2) Areas of higher density Monarch numbers found above 7600' have permanent water and an abundant mix of flowering vegetation in late August, September and the first part of October. Monarchs appear to use wind currents moving up the mountain slopes and lower riparian canyons to draw themselves upslope. (3) An area near the Snowmobile turnout above the 8000' marker where Monarchs are seen in numbers during the months of September and October was one of the worst burned areas during the McNally Fire. There are extensive areas where all conifers are gone, but there is border forest that did not burn and a stream with abundant fall blooming vegetation heavily used by Monarchs for nectar. This location has been monitored by me since the fire occurred and the movements of Monarchs to there have been a yearly event. (4) The relatively high elevation of Sherman Pass has been proven not to be a barrier to Monarchs from east of the Sierra since Monarchs are very abundant along the Sherman Pass Rd. on flowers just west of the Pass at 9100+.

The Sierran Crest does not appear to be a barrier to Monarchs in the Sierra Nevada

While not seen in big numbers, Monarchs are also seen regularly in the Tioga Pass area east of Yosemite National Park (California) during summer months at much higher elevations in the Arctic-Alpine life zone (Davenport, 2007): "Monarchs are occasionally seen even above timberline, but are usually uncommon above the Canadian Zone."

I have seen many Monarchs in the Tioga Pass area flying on the ridge east of Mt. Conness sympatric with Ivallda Arctics (*Oeneis chryxus ivallda*) and Behr's or Sierra Nevada Parnassians (*Parnassius behrii*) and many on both sides of Saddlebag Lake. Two high elevation records I did include in the Yosemite Butterflies record section were Mono County: Sonora Pass at 10,000' 27 August 2002 and west of Saddlebag Lake 28 August 2002, both observed by me.

There is also documented evidence that Monarchs tagged east of the Sierra Nevada turn up in California overwintering sites. A Monarch tagged in Gardnerville, Douglas County Nevada by Patricia Neyman 19 September 2012 was recovered in Santa Cruz, California on December 15, 2012 by John Dayton as reported in the 2012 Lepidopterist's Society Season Summary. So Monarch distribution in California does not appear to be seriously hindered by mountain barriers.

The Kern River Corridor

Many migratory and vagrant butterfly species from the Mojave Desert and Kern River Valley appear with some frequency along the Kern River. Monarchs are regularly seen along this corridor from spring to fall.

Lower elevations along the Kern River and up to about 6000' support populations of milkweed spp. utilized as larval hosts by Monarchs. Narrow Leaved Milkweed *Asclepias fascicularis* occurs commonly in seeps and drainages between rocky canyon walls of the Kern River Canyon along Mtn. Hwy. 99 and the Kern River. This area supports both Monarchs and some Queens (*Danaus gilippus thersippus*) at lower elevations. Narrow Leaved Milkweed and other milkweed species are utilized as larval hosts along streams in otherwise very arid areas around Sherman Pass.

Numbers of Monarchs at lower elevations of the Sherman Pass region do vary considerably in the spring and summer months from year to year based on yearly and monthly amounts of rainfall and stream water drainage. Numbers of Monarchs seen along the Kern River in the months August through November sometimes seem to markedly increase, but Monarchs often favor the higher elevations that time of the year because nectar sources are more available. On October 7, 2014 in a major drought year Monarchs were commonly seen at Calkin's Flat along the Kern River but less commonly at higher elevations around Sherman Pass, probably because Fall blooms crashed earlier in the season than usual and water sources had largely dried up.

Monarchs have been seen north of Kernville along the Kern River even in January and February suggesting that some Monarchs overwinter in the region.

Monarchs and Queens in the Kern River Valley

I have monitored this area regularly since 1981. Both Monarchs and Queens can be abundant (April to early November) downstream in the Kern River Valley surrounding Lake Isabella (Kern County, California) where riparian runoff from the north and south forks of the Kern River and Kelso Creek from the Piute Mountains supports milkweed growth in riparian oak woodland and open wet pastures. Peak flights of the Monarch around Weldon (many Monarchs breed within the Kern River Preserve protected by the Audubon Society) are in October and early November, when Painted Lady's also seem to peak. The biggest numbers of Monarchs and Queens here coincide with the blooming of fall composites and other flowers. Numbers of both species were much lower in very dry years with little rainfall like in 2013-14.

The two species can be remarkably abundant in the first and second weeks of November at Weldon, then abruptly become scarce. As the fall blooms disappear, Monarchs likely move either west to the Pacific Coast overwintering sites or into the Mojave Desert where there are winter records of adults in northwest Arizona (Havasupri Springs near Parker, December 11-15, 2000 by Alex Grkovich published in the 2000 Season Summary (Davenport, 2001)). Some of those may go to overwintering sites in Mexico. Queens may also move into the Mojave Desert. No tagging studies have yet been done to resolve such issues.

The Painted Lady (*Vanessa cardui*)

This species is also regularly seen in the region during spring and fall migrations and it can overwinter in Kern County, California, especially documented at the south end of the Sierra Nevada (observed in numbers in dry warm montane canyons at Mojave Desert's edge north side of Hwy. 14 between Cinco and Cantil November 24, 1997; December 22, 1997 and January 27, 1998 where the mountains meet the Mojave Desert). (Davenport, 2003 and 2007). Overwintering adults are also sometimes seen around Bakersfield.

Like the Monarch that can be found from spring to fall, this species favors the higher elevations of the Sherman Pass area in September and October and can be quite common above 8000' with individuals that can be quite worn or freshly emerged suggesting they do breed in the area as temporary colonists. Unlike the Monarch, Painted Ladies may be virtually absent at lower elevations in drier years.

West Coast Lady (*Vanessa annabella*)

Not well known as being a migratory butterfly, this species is normally rarely seen in the mountains away from lowlands, valleys and areas of human influence. Finding individuals in the Sherman Pass area during the summer months on a butterfly survey trip or count is almost always difficult.

But in late September and October on a yearly basis, this species becomes very abundant at higher elevations in the Sherman Pass area, especially visible visiting roadside flowers from 6800-9150' elevation. On October 7, 2014 they were also seen commonly visiting flowers at several locations including Calkin's Flat in the Kern River Corridor where they are also rarely encountered.

Why do West Coast Ladies show up so commonly this time of the year, even upslope at very high elevations? To find water and nectar sources not readily available elsewhere? Is this a true migration or just a seasonal movement limited to this local area? This needs more study to answer.

American Painted Lady Butterflies (*Vanessa virginiensis* Drury) also become more commonly seen in the region in August-October, but not in the numbers that Painted Ladies and West Coast Ladies occur.

Literature Cited:

- Davenport, Ken (Zone 3 Coordinator) 2001 News of the Lepidopterists' Society. The Lepidopterist's Society. 2000 Season Summary. 43: Supplement S1 7-8 under Arizona.
- Davenport, Ken 2003. Butterflies of North America. Butterflies of Kern and Tulare Counties, California. Contributions of the C. P. Gillette Museum of Arthropod Diversity, Colorado State University. Observations on 2002 McNally Fire effects and recovery. 3:51-59.

Continued on p. 13

Conservation Matters: Contributions from the Conservation Committee

Conservation and restoration for the endangered St. Francis Satyr

Nick Haddad

Department of Biological Sciences, Box 7617, North Carolina State University, Raleigh, NC 27695-7617
haddad@ncsu.edu



St. Francis' Satyr, *Neonympha mitchellii francisci*, has always been a mysterious butterfly. As my lab has unraveled its mysteries over more than a decade, we are learning about threats to the existence of this endangered butterfly and about opportunities for its recovery. (Left: Photo by Brian Hudgens)

destructive, incompatible with rare and threatened animals and plants, are actually where the butterflies thrive?

This brings us to the fourth mystery of St. Francis' Satyr: its affinity for dynamic and unstable environments. The butterflies live in highly productive wetlands. Yet, in this region, wetlands either remain rivers or streams, or grow quickly on their borders to dense riparian forest. Either condition is incompatible with the butterfly. St. Francis' Satyr lives in open grassy wetlands. Walks across the sites are always adventures, and inevitably entail sinking ankle-, knee-, or even waist-deep into wet muck. Where land is stable and vegetation undisturbed, there are no suitable wetlands.

I am most struck by four aspects of the mystery. First, by its late discovery in 1983 in a swamp on a military installation, Ft. Bragg in North Carolina. A relative of Mitchell's Satyr (*N. mitchellii mitchellii*), it was determined to be different from the nominate subspecies, also Endangered, based on morphological features. Even as other populations of the species complex have been discovered in Alabama, Mississippi, and Virginia (while others in Ohio, New Jersey, and Wisconsin have been lost), genetic analysis continues to support the existence of multiple subspecies.

Second, its small population size has predisposed it to local extinction, with populations teetering on the edge. In the late 1980s, the single small population where the butterfly was discovered, thought to number around one hundred individuals, was itself lost and worry grew that the subspecies was extinct. Some populations that were discovered afterwards also blinked out.

Third, and perhaps most curiously, is its affinity for bombs. The subspecies is contained entirely within the borders of Ft. Bragg. In the area of the base that is accessible at most times to biologists and conservationists, the range of the butterfly was tiny, covering perhaps a few hectares of wetlands. In the mid-1990s, biologists uncovered one of the greatest surprises of the butterfly. They were granted access to artillery ranges, normally the sites of heavy bombing and widespread fires, and there they found a number of St. Francis' Satyr populations. Although no rigorous population estimates have been made in these ranges due to limited access, the numbers of butterflies observed on short visits imply that the population size inside these ranges is many times larger than outside. Why is it that these areas, which might seem initially to be chaotic and



Nick Haddad standing at the edge of a canebrake occupied by St. Francis' Satyr in the interior of an artillery range at Ft. Bragg. (Photo by Beth Evans)

Unraveling this final mystery has led to deeper investigation of two forces that create environments habitable by this butterfly: beaver activity and fire. Beaver were once the dominant landscape architects across much of North America, damming virtually every small stream across the continent. After beaver abandon their ponds, a wet meadow forms. Here, the butterfly's food plants, sedges, grow densely, and a butterfly population can flourish. But these habitats are ephemeral; they quickly succeed to shrubs and then forest. Disturbance is a force both for good (habitat creation) and bad (butterflies do not survive flooding), and is absolutely necessary to sustain the butterfly.

Yet, there is another force that can maintain open wetlands even in the absence of beaver, and this explains the benefits of bombs. When I walk into an artillery range, I step into an ecologically different world, and I am struck by wide open views. This is not because of their devastation – these are pine woodlands like those standing outside ranges. The openness extends to wetlands along streams. Whether or not there are or were beaver, these open wetlands can be home to St. Francis' Satyr.

The force causing these woodlands and wetlands to be open is fire. Nearly annually, fires are set by flares or bombs that reduce trees and dense brambles in wetlands, permitting grasses and sedges to thrive. The implication is that regular burning in wetlands outside ranges should be included in management plans for the butterfly and other species dependent on early successional seres. Such management for fire or other forms of disturbance will benefit many threatened butterflies, including Fender's Blue, Karner's Blue, and Bartram's Scrub-Hairstreak, that we now know depend on it for populations to persist.

Given the forces needed to maintain the butterfly, it is not hard to construct its decline through recent centuries. As humans settled the landscape and converted forests to fields, they also removed the twin forces that the butterflies need to survive across the landscape: beavers were valued for their fur and later considered a pest to be eradicated, and fire was a force of destruction to homes and crops needing to be curtailed. As these forces were removed, St. Francis Satyr declined and retreated towards the last refuge of ecological disturbance – Fort Bragg's impact range.

My lab has monitored population sizes of St. Francis' Satyr outside artillery ranges since 2002, and two things have become clear. First, the population has never been large, hovering around 500 individuals for nearly a decade. Second, this butterfly lives in successional systems, and without disturbance local extinction is inevitable. New habitats have not been created and colonized since we began our work, and in the last five years a number of local populations have declined or become extinct. By 2012, the population outside artillery ranges numbered fewer than 100 individuals.

That low number points to the mistake we made. With perspective, I now realize that we were too cautious and gentle with the habitat of these butterflies. We have always known their habitat requires disturbance. We'd hoped that the disturbance would happen nearby, not within the places St. Francis' Satyr was flying. Nearly too late, and thanks to the efforts of Brian Ball and other biologists at Ft. Bragg, we started a more concerted effort at restoration.

Our efforts involve mimicking the environmental engineering efforts of beavers: we create dams and remove hardwoods. Although these words are easily written, in reality this effort entails rolling out hundred-foot-long coffer dams that are filled with water from the stream, and cutting hardwoods into pieces and hauling them out by hand. The sites are small, 30x30 m, but they have allowed us to complete restoration efforts and test their effects.



Nick Haddad's lab group restoring habitat for St. Francis' Satyr by removing hardwoods. (Photo by Nick Haddad)

In some ways, the effects of our restoration efforts were immediate and obvious. Sedges flourished, including species thought to serve as host plants for St. Francis' Satyr. They became the dominant plants visible across wetlands. More importantly, several sites that were near existing populations were colonized, albeit in small numbers.

Restored areas far from existing populations are unlikely to be colonized. Until St. Francis' Satyr habitat is much more extensive and connected, the only real hope of increasing their distribution is through translocation of individuals. Because populations are already so small and the majority of butterflies occur in restricted areas, we have recently turned our attention to captive-rearing as a means of providing livestock that could be used to seed unoccupied wetlands.

We have worked out many aspects of rearing. We collect wild females who oviposit before releasing them back into the wild. Most eggs hatch, and newly emerged larvae are placed on sedges grown in tubs that are then enclosed within

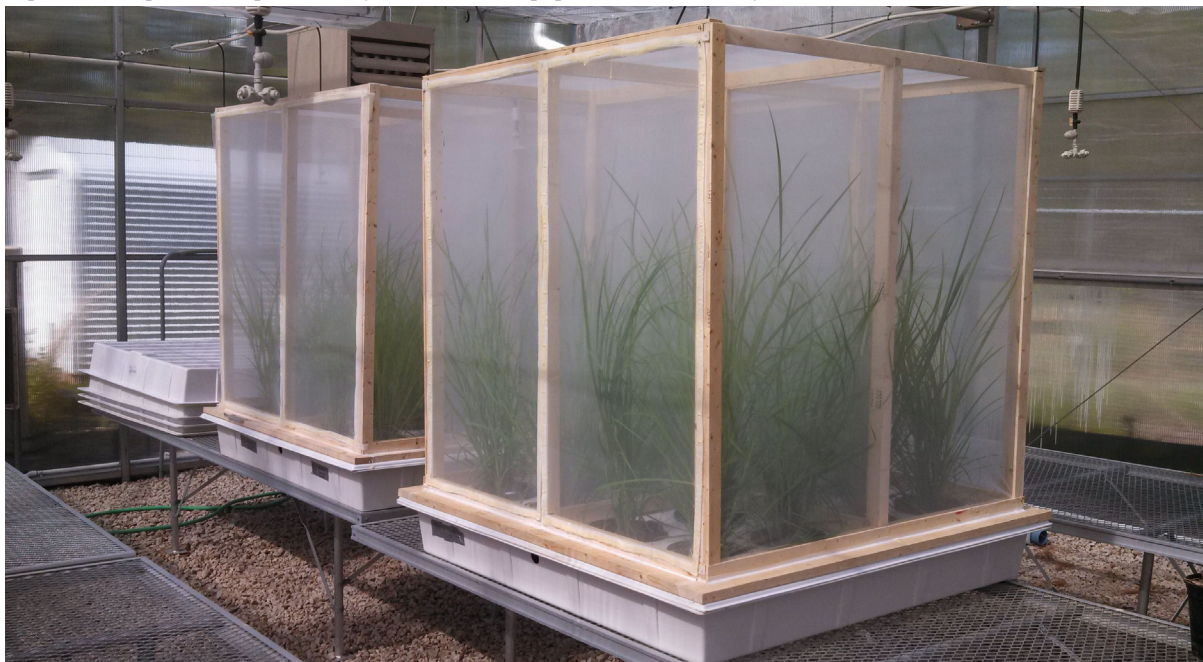
predator-free net cages. The ultimate fate of these adults is to be released in restoration sites. Before releasing them, we work to resolve our current biggest challenge: captive mating. This effort has been hampered by small numbers, irregular emergence, and, once male and female are paired, low rates of mating. One of our restoration sites is the locality of the population first discovered three decades ago, one that went extinct shortly after the butterfly's discovery. There we have released many of our captive-reared butterflies, about 20-40 individuals in each of the past three years. In 2014, this re-established population numbered 175 butterflies. Even more impressively, every butterfly observed outside artillery ranges in 2014 was in an area where habitat had been restored.

Restoration efforts should have been started a decade ago. Now that efforts have begun, it is clear the goal to maintain and increase populations of this butterfly is limited under the best conditions to small grassy wetlands. The task before us is to improve restoration techniques, target translocation more effectively, and expand from local to landscape-level restoration. Only when these goals are achieved will there be a stable and connected St. Francis' Satyr population.

Nick Haddad is William Neal Reynolds Professor of Biological Sciences at North Carolina State University. He is currently writing a book about his search for the world's rarest butterfly, including St. Francis' Satyr, to be published in 2016 by Princeton University Press.



St. Francis' Satyr (*Neonympha mitchellii francisci*): larva; pupa (both photos credit to Missy McGaw); marked adult that is part of a capture-recapture study to monitor its populations. (Photo by Nick Haddad)



Netted enclosures containing St. Francis' Satyr host-plants, *Carex mitchelliana*, and captive-reared larvae (photo by Erik Aschehoug)



The 64th Annual Meeting of the Lepidopterists' Society

**Purdue Department of Entomology and Purdue Entomological
Research Collection, Purdue University, West Lafayette, Indiana
47906 Co-hosted with Purdue University Conferences
July 28th – August 2nd 2015**

The Department of Entomology, Purdue Entomological Research Collection and Conferences at Purdue University invite you to attend the 64th Annual Meeting of the Lepidopterists' Society. Please mark your calendars for this meeting, which will be held at Purdue University in the Stewart Center in West Lafayette, Indiana. Purdue University is a land grant institution that was established in 1869 with the help of a large donation from John Purdue. Purdue currently has an enrollment just under 40,000 students (30,000 undergraduates, 9,000 graduates). Purdue is ranked in the top 10 Universities by U.S. news and world report in Aerospace, Industrial, Biological, Civil, Mechanical, and Electrical Engineering; as well as Pharmacy, Analytical Chemistry, and several Business Management majors. The Department of Entomology is a member of the College of Agriculture and is primarily housed in Smith Hall and Whistler Ag Research Building on the south portion of campus. Entomology at Purdue is currently home to 30 faculty, 40 Graduate Students, 20 undergraduates, and approximately 50 associated staff. The Purdue Entomological Research Collection (PERC) is also housed in Smith Hall and holds approximately 2 million pinned and wet-stored insect specimens. For more information about the PERC visit <http://www.entm.purdue.edu/PERC/>.

Meeting Events and Registration. The tentative schedule will include three field trips for photographers/watchers and collectors during the day on July 27th and July 28th, and a moth field trip/natural history art class at the Adam's Mill on the evening of July 29th. Transportation and boxed lunches will be provided for a fee listed on the registration form. If you would like to provide your own transportation and food at no charge you are welcome to come, but please note that



the number of participants associated with each field trip will be limited and thus this should be indicated in a separate email to Jennifer Zaspel at jzaspel@purdue.edu. The Executive Council meeting will be on Tuesday, July 28, in the PERC. Registration and an evening welcome reception (no charge) will be held on Tuesday, July 28 beginning at 5:30 PM, outside of the West Faculty Lounge until 8 PM (located on the second floor in the Purdue Memorial Union). Check-in will also be available beginning at 7:00 AM – 8:00 AM on Wednesday, July 29 outside of Stewart Room 302 on the Third Floor of Stewart Center (noted as STEW on the campus map). If you arrive outside of these times please check in outside of Room 302 on the third floor of Stewart Center. The Program itself will be in the **Stewart Center, 128 Memorial Mall**. The formal presentations and

poster sessions are scheduled for July 29th - August 1st. There will be no formal program on August 2nd. Other special evening events will include the traditional barbecue with live music (July 31), and banquet (August 1). Registration information, forms and further updates are available on the Lepidopterists' Society (www.lepsoc.org) as well as at a separate meeting website (<http://www.entm.purdue.edu/perc/lepsoc2015/>). For questions regarding local arrangements, please contact Dr. Jennifer Zaspel (jzaspel@purdue.edu). You can also xerox and use the forms presented here.

Travel. West Lafayette does not have a full service airport. Major airports in the area include Indianapolis (65 mi.), Chicago O'Hare (110 mi.; recommended for international flights) and Chicago Midway (125 miles). Lafayette Limo and Shuttle Service provide transportation from Indianapolis and Chicago O'Hare airports to Purdue Campus (Union Hotel & Dorms) (<http://www.lafayettelimo.com/>). If you are staying at the Hilton Garden Inn you can call for pickup/drop off from the Union Hotel on campus. Also check car rental costs for comparative prices.

If you fly into Indianapolis International, shuttle service is available to West Lafayette on the Lafayette Limo (www.lafayettelimo.com) or Star of America (www.charterstaramerica.com/shuttles/lafayette.htm). See the airport's Parking and Transportation site for shuttle and car rental options: www.indianapolisairport.com/parking_transportation.

If you drive to West Lafayette, visitor parking is available in the Grant Street Parking Garage (120 N. Grant Street). The maximum daily fee is \$10, with hourly rates available. Union Club Hotel guests receive free parking in the Grant Street Garage. Spaces in other campus garages or surface lots are reserved for University staff members who have paid an annual parking fee. If you are staying at the University Residence Halls then please park in the areas indicated on the map at <http://hfs.purdue.edu/Departments/ConferenceServices/Parking.html>. In making your travel plans, please note that Purdue University is in the Eastern Time Zone and observes Daylight Saving Time.

Meals. Refreshments will be provided during morning and afternoon coffee breaks. Box lunches are included in the price of field trip registration. Lunches and dinners are not included in the program; however, there are numerous excellent restaurants and a campus food court within short walking distance from the program location. If you have special dietary needs, please indicate this on your registration form and we will work to accommodate you. There will be gluten free and vegetarian options at both the BBQ and closing banquet. If you have any questions, please contact Dr. Jennifer Zaspel by email (jzaspel@purdue.edu) or phone (765)-494-4599.

Hotel and Residence Hall Accommodations. A block of rooms has been held at the full-service Union Club Hotel, 101 N. Grant Street, conveniently located in the Purdue Memorial Union adjacent to the Stewart Center. For information or to make a reservation, call (800) 320-6291 or (765) 494-8913, Monday through Friday, 8 a.m. to 5 p.m. **Mention The Lepidopterists' Society Annual Meeting when making your reservation.** *If you have children, you will want to stay here or at the Hilton -- the Residence Halls have a no child policy.* **Purdue Memorial Union Club Cancellation Policy:** Guaranteed reservations may be canceled until 6:00 p.m. on the arrival date.

Some participants in the Lepidopterists' Society Annual Meeting conference will be housed in University Residence Halls. These residential facilities are known nationwide for their comfort, cleanliness, service, and affordability. You will be notified by mail about two weeks prior to the program regarding your hall assignment. The check in date is Tuesday, July 28 and the check out date is Sunday, August 2. If your check in and/or check out dates vary from those listed please contact the coordinator to make arrangements. While staying in University Residences, complimentary parking is available in specified areas. Please visit this link for a parking map. <http://hfs.purdue.edu/Departments/ConferenceServices/Parking.html>. **Residence Hall Cancellation Policy:** No refunds will be made if the individual participant cancellation occurs within 5 business days prior to the check-in day.

A block of rooms is also available at the Hilton Garden Inn, 356 East State Street, located just minutes from campus. To make a reservation please call 765-743-2100 and **mention the group code LEP when making your reservation.** **Hilton Garden Inn Cancellation Policy:** Individual reservations must cancel 24 hours in advance to avoid being charged for one night's room and tax.

Purdue is committed to making its programs accessible to individuals with disabilities. If you require an accommodation or special assistance for this program, due to a disability, please contact the Conference Division at (800) 359-2968 or (765) 496-3667 at least one week before the program begins.

Camping and RV Services. Prophetstown State Park is located approximately 10 miles from Purdue University campus. It offers large RV facilities with full hookups as well as family campgrounds and a new water park. For reservations, call (765) 567-4919 or visit their website at <http://www.in.gov/dnr/parklake/2971.htm> for more information. The Adam's Mill (approx. 28 miles East of Purdue Campus in Cutler, IN) is easily accessible off US State Rd 26 and provides rustic cabins at \$35 per night and campgrounds at \$10 per night. For reservations, call (765) 268-2530 or visit their website at <http://www.adams-mill.org/> for more information. Also, Wildcat Creek Bed and Breakfast is located near the Adam's Mill in Cutler, IN and offers overnight accommodations in a country setting. For reservations, call (765) 268-2189.

Field Trips. There are currently three field trips scheduled before and during the conference. Participants have the option to collect, observe and photograph specimens at each site. The first trip will take place on July 27th at Muscatatuck National Wildlife Refuge (<http://www.fws.gov/refuge/muscatatuck/>). MNW is an 8,000-acre property established in the 1960's for the preservation and restoration of natural Indiana wetland, grassland, and mixed hardwood forest environments. Over 280 species of birds have been recorded from the site along with the once common river otters. Lowland marshes, managed grasslands, and flood-managed bottomland hardwood forests all provide a diverse insect fauna. Gareth Powell and Daniel Wood are leading this field trip (270 miles round trip).

The second field trip will take place on Tuesday, July 28th at Kankakee Sands Restoration (<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/indiana/placesweprotect/kankakee-sands.xml>). Kankakee Sands is a

restoration property managed by The Nature Conservancy in northern Indiana. The property is about 7,000 acres of mainly remnant and restored Indiana prairie with a few oak barrens also being actively maintained. The primarily sandy soil and fire-managed prairies are home to more than 130 species that are considered threatened or endangered in the state Indiana. This field trip will be led by John Shuey, Gareth Powell and Ted Anchor (125 miles round trip).

A moth collecting trip will be held on Wednesday, July 29th from 5:30 pm-12:00 midnight at the Adam's Mill on Wildcat Creek. For members that wish to participate, there will also be a natural history drawing and painting class held on site. Space is limited for the art class so please contact Dr. Jennifer Zaspel for details at your earliest convenience. Transportation and a picnic lunch are provided in the fee, however, there is no charge if you wish to drive your personal vehicle and bring your own food and go collecting (60 miles round trip). There will be a small supply fee for participation in the art class. For history of this location and more information please visit: <http://www.adams-mill.org/>. Please check the conference website for additional information regarding meeting times and places for these trips <http://www.entm.purdue.edu/perc/lepsoc2015/>.



Collection Resources. You are also invited to see the insect collections at the Purdue Entomological Research Collection of West Lafayette, IN and the Illinois Natural History Survey of Champaign, IL. Please coordinate your visit through Gino Nearn (PERC) at enearn@purdue.edu or with Chris Grinter (INHS) at cgrinter@illinois.edu.

Awards and Banquet Door Prizes. The banquet is one of the highlights of the Annual Meeting. The society has a number of special awards, which will be given that evening. In addition, if you would like to donate door prizes, please coordinate with Charlie Covell at ccovell@flmnh.ufl.edu.

Vendors are Welcome! If you would like to be a sponsor of the meeting and/or would like exhibitor space in our vendor area, please contact Jennifer Zaspel at jzaspel@purdue.edu for participation information.

Local Attractions. The Wabash River valley (including Lafayette and West Lafayette) offers numerous shops, restaurants, spas, and art galleries for more information, visit <http://www.homeofpurdue.com/>. Indianapolis (just 65 miles south on HWY 65) provides an excellent selection of dining, museums, and sporting events. For more information on all of the local activities, visit Indy's local tourism site at: <http://www.visitindy.com/>.



Logo Credits: Meeting logo "Emerge" (pattern on T-shirt) by Branden Apitz; Purdue Entomological Research Collection logo by collections manager Gino Nearn

Lepidopterists' Society Annual Meeting

Registration Deadline, June 1, 2015

Name _____

Title _____

Organization _____

Address _____

City _____

State _____ Zip _____

This is my ☐ home ☐ work address.

Phone _____ Fax _____

E-mail (required if you have one) _____

This is my ☐ home ☐ work e-mail address.

Purdue is committed to making its programs accessible to individuals with disabilities. If you require an accommodation or special assistance for this program due to a disability, please contact us at 765-496-3667.

Please complete all that apply.

- ☐ I prefer a vegetarian meal.
Any other dietary needs: _____
- ☐ If planning on Doubles Residence Hall housing, please provide first and last name of your Room mate: _____
- ☐ Please indicate your gender. ☐ Female ☐ Male
- ☐ Are you or anyone in your party under the age of 18 ? ☐ Yes ☐ No
- ☐ What t-shirt size do you prefer? ☐ Small ☐ Medium ☐ Large ☐ X-Large
- ☐ Will require shuttle to Friday night BBQ ☐ Yes ☐ No

Fees

Registration fee includes breaks, program, t-shirt, and other registration materials.

- | | |
|---|-------|
| <input type="checkbox"/> Registration Fee – \$140.00 If registered by 6/1/15 | _____ |
| <input type="checkbox"/> Late Registration Fee – \$165.00 If registered between 6/2/15 – 8/2/15 | _____ |
| <input type="checkbox"/> Student Registration Fee \$120.00 if registered by 6/1/15 | _____ |
| <input type="checkbox"/> Late Student Registration Fee \$145.00 if registered between 6/2/15-8/2/15 | _____ |
| <input type="checkbox"/> Housing Fee – Doubles – Residence Halls \$168.00 (Entire Program per person) | _____ |
| <input type="checkbox"/> Housing Fee – Singles – Residence Halls \$364.00 (Entire Program per person) | _____ |
| <input type="checkbox"/> Parking \$25.00 (Entire Program) | _____ |
| <input type="checkbox"/> Closing Banquet – Saturday, August 1 \$55.00 | _____ |
| <input type="checkbox"/> Friday Night BBQ – Friday, July 31 \$45.00 | _____ |
| <input type="checkbox"/> Optional Breakfast – Entire program \$50.00 (Residence Hall Housing Only) | _____ |
| <input type="checkbox"/> Adam's Mill Trip - \$41.00 -Transportation & Box Dinner Provided | _____ |
| <input type="checkbox"/> Muscatatuck NWR Field Trip – Monday, July 27 \$42.00 – Transportation & Lunch Provided | _____ |
| <input type="checkbox"/> Kankakee Sands Field Trip – Tuesday, July 28 \$42.00– Transportation & Lunch Provided | _____ |
| Total Enclosed \$ | _____ |

Payment Method *Payment is required upon submission of registration.*

- ☐ Enclosed is a check made payable to **Purdue University**.

(continued on next page)

☐ Please charge to my: ☐ VISA ☐ American Express ☐ Discover ☐ MasterCard
Account Number _____ Expiration Date _____
Authorized Signature _____
Printed Name _____

Please mail with payment to: PEC Business Services, Purdue University, Stewart Center, Room 110,
128 Memorial Mall, West Lafayette, IN 47907-2034

or fax your with credit card information to: (765) 494-0567

Please photocopy this form for additional registrants.

Purdue University is an equal access/equal opportunity university.

Call for Contributed Presentations
Registration for 64th Annual Meeting of the Lepidopterists' Society
Purdue Department of Entomology and Purdue Entomological Research Collection (PERC)
Purdue University, West Lafayette, Indiana
Co-hosted with Purdue University Conferences July 28th – August 2nd 2015

Author(s):

Address or P. O. Box:

Phone:

Fax:

email:

Please check: ☐ Poster ☐ Student Paper ☐ Other

Please enter both title and abstract, and limit the abstract to 1,000 characters or less

Title:

Abstract:

Each Contributed Paper is limited to a total of 15 minutes (12 minutes for the formal presentation and three minutes for questions). Information concerning the above, including the title and abstract, must be received by 1 June 2015 for inclusion in the printed program. To expedite this process, please fill out this form online which can be downloaded at (<http://www.entm.purdue.edu/perc/lepsoc2015/>) and send as an email attachment to Dr. Jennifer Zaspel (jzaspel@purdue.edu). If you would like to send this completed form in the mail, please send to Dr. Jennifer Zaspel, Department of Entomology, Purdue University, 901 W State Street, West Lafayette, IN 47907. A preliminary schedule of presentations and events will be available online by 1 July 2015 at <http://www.entm.purdue.edu/perc/lepsoc2015/>. Oral presentations will be given in PowerPoint. To avoid potential software compatibility issues, presentations may also be uploaded in PDF format. Arrangements for other special equipment should be made well in advance of the meetings in order to keep equipment costs to a minimum. All formal presentation sessions will be held on campus at the Stewart Center, 128 Memorial Mall, West Lafayette, IN 47907.

Book Review

The slug caterpillar moths (Lepidoptera: Limacodidae) and other Zygaenoidea of Ohio (Ohio Lepidopterists Research Report No. 6). Ohio Biological Survey Bulletin New Series Volume 16, Number 3. vi + 72 pages, 5 figures, 8 plates. Denis Profant, Eric H. Metzler and Steven Passoa. 2010. ISBN 978-0-86727-162-1. Softcover, \$25. Available from http://www.ohiobiologicalsurvey.org/books_posters/.

The Zygaenoidea are a fascinating and understudied group of moths, perhaps best known for the adults of some species that make their own cyanide and for the bizarre and often beautiful form of many of the larvae. Profant et al.'s synthesis of our knowledge of the Ohio fauna is a solid introduction to the eastern North American species and worthwhile reading for anyone with an interest in moths.

Before diving into the meat of the book, I should note that I took great pleasure in reading through the Materials and Methods section. Detailed herein are all of the institutions and collectors (and their collections), both historical and contemporary, which were consulted in the compilation of this volume, at a level of detail that one does not normally see. Especially now, as collecting and collections-based research are increasingly defunded and devalued, it is truly a delight to see a publication highlight just how extensively their data depend on the collective efforts of dozens, if not hundreds, of collectors and the institutional collections which are their stewards through time. This is not the first time that the Ohio Lepidopterists have lavished such attention on current and historical collections, as Rings et al. (1992) included similar text, though with a focus on noctuid moths. I wish more publications would follow these authors' lead.

The meat of the book is dedicated to individual species accounts of the zygaenoid moths occurring in Ohio (comprising the families Zygaenidae, Megalopygidae, Limacodidae, and Epipyropidae). For each species, at least one color photo is provided, both scientific and common names are given, and there are sections covering adult appearance, adult size, late instar larval appearance, pupal appearance, host plants/host insects, natural history, distribution, status, illustrations in other publications, and additional comments. For the different life stages, guidance is given on how to distinguish each species from other, similar species. Distribution not only covers the global distribution for each species, but also includes a county dot map of Ohio indicating the known distribution in the state. A bar graph showing the seasonal distribution of adults, based on label data from specimens in collections, is also provided for each species, along with how many collection records were examined. The descriptive text is straightforward and easy to follow, and references are cited for those wishing to pursue the information summarized in the sections in more detail.

Color plates are provided at the end of the book for adults and larvae, which are adequate for adult identification and helpful for larval identification; the plates are also useful for showing the relative sizes of the adults. Additionally, there are two plates with full color reproductions of Harrison Dyar's illustrations of limacodid larvae from more than a century ago, which are fascinating to compare to modern larval photos. Those wanting additional photos can refer to the references in the illustrations section for each species, as well as to excellent online sites such as the Moth Photographers Group and BugGuide.net.

Following the species treatments, there is a very useful three-page chart of host plants utilized by almost every species treated, making patterns of host plant use within these zygaenoids quickly and visually apparent (for example, zygaenids utilizing Vitaceae and limacodids utilizing Fagaceae). Rounding out the volume, there is a glossary of most of the technical terms used in the book, two bibliographies (the first of works cited in the text, the second of publications of general interest to those studying zygaenoid moths), the index, and short biographies of the authors.

Profant et al. state that "the purposes of this book are to add to our basic knowledge of the insect fauna of the state and to aid in the identification of these species [...] it is both understood and desired that much of the audience may consist of beginning entomologists or amateurs not familiar with this group." In the main, I believe they have succeeded in their goals. Especially for adult moths, identification should be straightforward using the illustrations and descriptions in the text. However, I do have a few minor nits to pick. The state map has a list below it of the number of collection records for each county, with counties with zero collection records not listed. I would have preferred instead to see the numbers included on the map, within the county boundaries, as was done in Rings et al. (1992) for the owl moths. Not only is it visually easier to parse such a map, but it also completely avoids the problem of accidental omission, where a county inadvertently left off the list is now assumed to have zero records. One must hope that any such omissions were caught before publication. I was also disappointed that almost all collecting techniques were left out—including guidelines on what data to record to ensure scientifically useful specimens—with readers being referred to Winter's (2000) opus, which many amateurs in their target audience likely do not have. Similarly, while the urticating hairs and spines of zygaenoid larvae are briefly mentioned on page 4, it is described as a minor and short-lived effect, when in fact for some people the reaction can be severe. Especially for amateurs unfamiliar with this group, I feel that they should have been made aware of that possibility.

More disappointing, though, was that very little space was given to the possibility of new discoveries. There was no discussion of the counties that are relatively unexplored and that would be likely to provide new distribution

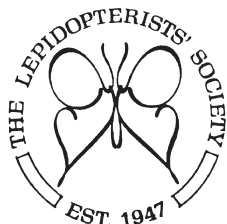
records. Comparing the maps in Rings et al. (1992) with Profant et al., we can see that Putnam Co. has zero records for either zygaenoids or owlet moths; Hardin Co. has zero owlet records and one zygaenoid record; Shelby Co. and Van Wert Co. each have one owlet record and zero zygaenoid records; etc. Profant et al.'s extensive experience in the state could have been turned into a "top ten (or twenty) least explored areas" section that encouraged readers to expand our knowledge by working in these areas. Similarly, Profant et al. list a few species in their checklist that are not known to occur in Ohio and illustrate them on the plates, yet provide absolutely no text about them. Why were they included? Why might they be likely to be found in Ohio? Where should an interested reader look for them? What is known about their flight period, host plants, etc. in nearby states? That information is known for the species in question and could have been included, and I feel it was a real missed opportunity. It is also confusing to the reader when they see the specimens on the plate and go to look up information about them, and find nothing there. I also don't know why *Monoleuca semifascia* was not included in the book, as it has far more records in bordering states than the included extralimital taxa do, and is a species I would eventually expect to be found in Ohio.

Taken as a whole, though, Profant et al. provide a solid and data-rich work on a relatively neglected group of moths. They make it easy to identify the Ohio zygaenoid fauna, and their work is useful not just for workers in Ohio but for anyone living east of the Mississippi. I strongly encourage anyone with an interest in this group to avail themselves of a copy.

References

- Rings, Roy W., Eric H. Metzler, Fred J. Arnold, and David H. Harris. 1992. The owlet moths of Ohio: Order Lepidoptera, Family Noctuidae (Ohio Lepidopterists Research Report No. 4). Ohio Biological Survey Bulletin New Series Volume 9, Number 2. vi + 219 pages, 9 figures, 16 plates. ISBN 978-0-86727-110-2. Softcover, \$30. Available from http://www.ohio-biologicalsurvey.org/books_posters/.
- Winter, William D, Jr. 2000. Basic techniques for observing and studying butterflies and moths. Lepidopterists' Society Memoir No. 5. xviii + 444 pages. ISBN 978-0-930282-07-3. Softcover, \$44 (non-member), \$29 (member). Available from http://www.lepsoc.org/techniques_manual.php.

David Bettman, Denver Museum of Nature & Science, 2001 Colorado Boulevard, Denver, CO 80205-5798, USA. david.bettman@dmns.org



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

Irving Finkelstein's collection finds a new home at the McGuire Center

Irving Finkelstein's Lepidoptera collection was transferred to the McGuire Center for Lepidoptera and Biodiversity/Florida State Collection of Arthropods in February, 2015, and is currently being accessioned. The collection includes seventeen legal-size filing cabinets containing beautifully made (by Irving) Riker mounts. Assembled over a period of 36 years, the collection contains a variety of interesting specimens, including a reared bilateral mosaic gynandromorph of *Speyeria diana* (front cover) that has been previously figured, an additional mosaic (mostly male) of the same species (Fig. 1), and other unique morphs (e.g., Fig. 2, Tiger Swallowtail). The collection also has been a source of numerous Georgia state records (Adams 2015), has many beautifully spread specimens from around the world (Figs 3 - 10, see back cover as well), and is a great resource for the future lepidopterological work, now easily accessible to the research community.

References

- Adams J. K. 2015. Moths and Butterflies of Georgia and the Southeastern United States <http://www.daltonstate.edu/galeps/Gynandromorphs.htm>. Last accessed 2-19-2015.
- Andrei Sourakov & Andrew D. Warren, McGuire Center, Gainesville, FL. All photos by Andrei Sourakov.



Figure 1.

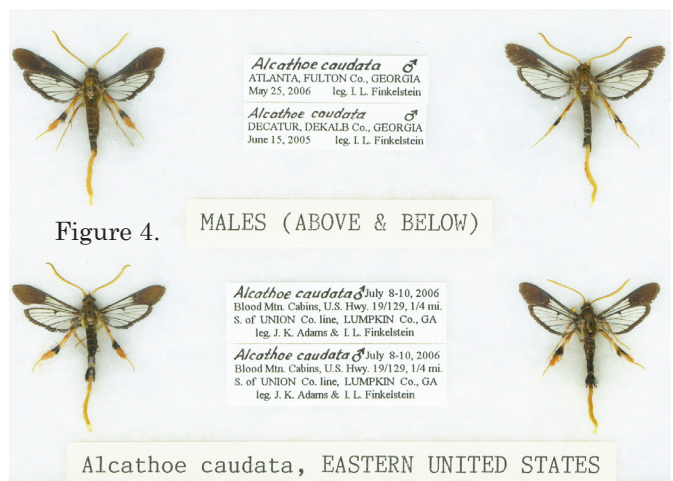


Figure 4.

MALES (ABOVE & BELOW)

Figure 2.

Papilio glaucus glaucus ♀
INTERGRADE FORM MOSAIC
McClure Road, 4 mi. W. of FAIRBURN,
FULTON Co., GEORGIA Aug. 29, 1994
leg. Kathleen Casses



TIGER SWALLOWTAIL (*Papilio glaucus glaucus*)
EASTERN & CENTRAL UNITED STATES

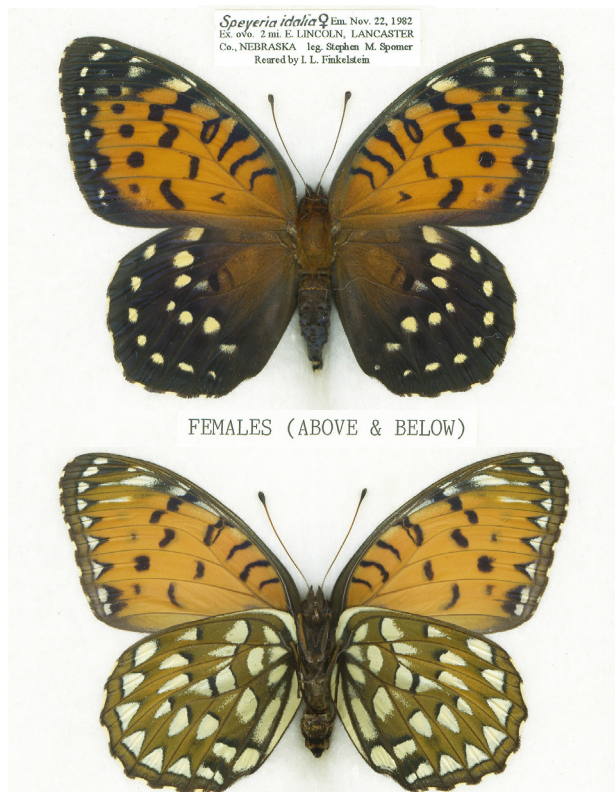


Figure 3.

Speyeria idalia ♀ Em. Nov. 22, 1982
EC ova: 2 mi. E. LINCOLN, LANCASTER
Co., NEBRASKA leg. Stephen M. Spomer
Rearred by I. L. Finkelstein

FEMALES (ABOVE & BELOW)

Speyeria idalia ♀ Em. Nov. 26, 1982
EC ova: 2 mi. E. LINCOLN, LANCASTER
Co., NEBRASKA leg. Stephen M. Spomer
Rearred by I. L. Finkelstein

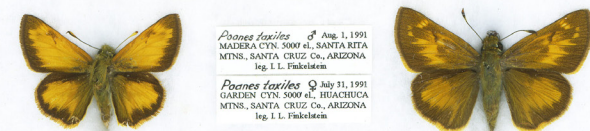
REGAL FRITILLARY, *Speyeria idalia*
NORTHEASTERN & NORTHCENTRAL UNITED STATES

Figure 5. FEMALES (ABOVE); MALE & FEMALE (BELOW)



Poanes taxiles ♀ July 31, 1991
GARDEN CYN. 5000 ft., HUACHUCA
MTNS., SANTA CRUZ Co., ARIZONA
leg. I. L. Finkelstein

Poanes taxiles ♀ July 31, 1991
GARDEN CYN. 5000 ft., HUACHUCA
MTNS., SANTA CRUZ Co., ARIZONA
leg. I. L. Finkelstein



Poanes taxiles ♂ Aug. 1, 1991
MADERA CYN. 5000 ft., SANTA RITA
MTNS., SANTA CRUZ Co., ARIZONA
leg. I. L. Finkelstein

Poanes taxiles ♀ July 31, 1991
GARDEN CYN. 5000 ft., HUACHUCA
MTNS., SANTA CRUZ Co., ARIZONA
leg. I. L. Finkelstein

Poanes taxiles, SOUTHWESTERN UNITED STATES



Atrytonopsis lunus ♀ July 31, 1991
GARDEN CYN. 5000 ft., HUACHUCA
MTNS., SANTA CRUZ Co., ARIZONA
leg. I. L. Finkelstein

Atrytonopsis lunus ♂ Aug. 1, 1991
MADERA CYN. 5000 ft., SANTA RITA
MTNS., SANTA CRUZ Co., ARIZONA
leg. I. L. Finkelstein

Atrytonopsis lunus, ARIZONA, NEW MEXICO & MEXICO



Codatractus arizonensis ♂
vic. CIUDAD VALLES, SAN LUIS
POTOSI, MEXICO Aug. 23, 1979
leg. I. L. Finkelstein

Codatractus arizonensis Aug. 1, 1991
BOX CANYON 4300 ft., SANTA RITA
MTNS., SANTA CRUZ Co., ARIZONA
leg. I. L. Finkelstein

Codatractus arizonensis, SOUTHWESTERN UNITED STATES & MEXICO

Figure 6.



Selenia kentaria ♂
Selenia kentaria ♂
Gates Chapel Road, 8 mi. N.W. of
ELLIJAY, GILMER Co., GEORGIA
Apr. 1-3, 2010 leg. I. L. Finkelstein

Selenia kentaria, EASTERN UNITED STATES



Lytrosis unitaria ♀
Lytrosis unitaria ♀
Gates Chapel Road, 8 mi. N.W. of
ELLIJAY, GILMER Co., GEORGIA
June 11-13, 2010 leg. I. L. Finkelstein

Lytrosis unitaria, EASTERN UNITED STATES



Lytrosis permagnaria ♂
Lytrosis permagnaria ♂
Taylor's Ridge Trail, 6 mi. N.W. of
VILLANOW, WALKER Co., GA
May 15/16, 2010
leg. J. K. Adams & I. L. Finkelstein

Lytrosis permagnaria, SOUTHEASTERN UNITED STATES

A sample of butterflies of the Rockies, some common, some not so common

George O. Krizek

2111 Bancroft Pl. NW, Washington, D.C. 20008

For someone who has photographed butterflies from many places in the world, any visit to any new place is always fun, as even the common species are brand new. In the southern Rockies, I found myself photographing almost continuously, and Montana was a paradise for me. Unfortunately, I was not always able to take pictures of all species I saw, as some terrain is very dangerous. I experienced several unpleasant falls, though fortunately I did not get any injury serious enough to require professional medical intervention.

I present here a selection of butterfly images for your enjoyment!



Pieridae: *Pontia occidentalis*, male.
July 21, 1996, Grand Teton National Park, WY.



Papilionidae: *Parnassius smintheus*, male, high elevation with no red markings. August 1, 2014, Beartooth Pass, MT.



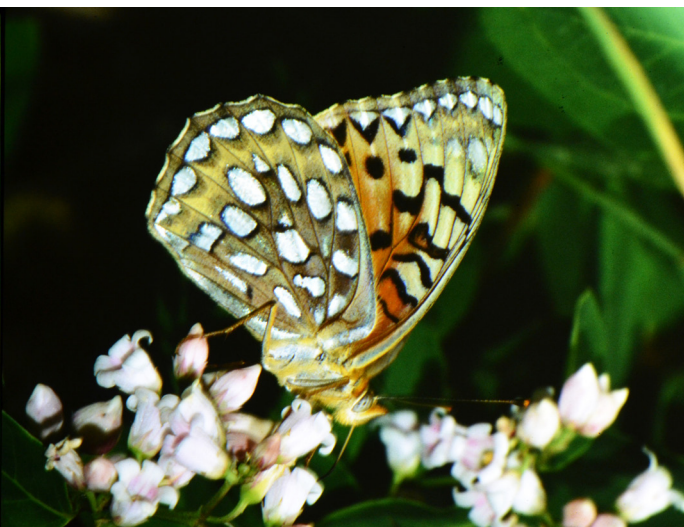
Pieridae: *Colias christina*, male.
July 31, 2014, Rock Creek Resort, MT.



Papilionidae: *Parnassius smintheus*, female.
July 19, 2008, Wolf Creek Pass, CO.



Pieridae: *Colias alexandra*, male.
July 21, 1996, Jackson Hole, WY



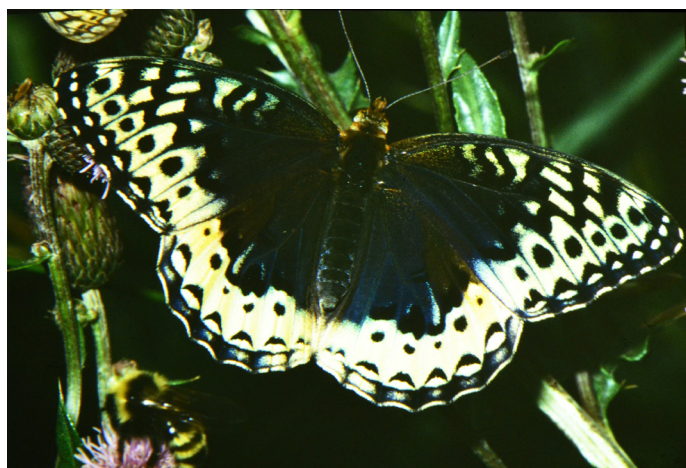
Nymphalidae: *Speyeria coronis*; upperside; underside. August 4, 2014, Rock Creek Resort, MT.



Nymphalidae: *Speyeria callipe*, male.
July 21, 1996, Grand Teton National Park, WY.



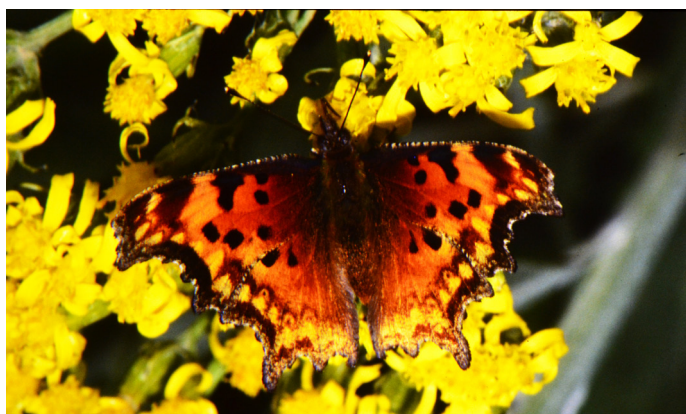
Nymphalidae: *Speyeria hesperis*, male.
August 12, 2012, Wolf Creek Pass, CO.



Nymphalidae: *Speyeria leto*, female.
August 4, 2014, Rock Creek Resort, MT.



Nymphalidae: *Aglais milberti*.
July 18, 1991, Wolf Creek Pass, CO.



Nymphalidae: *Polygonia gracilis*; upperside and underside.
August 8, 2012, Wolf Creek Pass, CO.



Nymphalidae: *Polygonia satyrus*; upperside and underside.
July 23, 1996, East Rosebud Lake, MT.



Nymphalidae: *Euphydryas anicia*, female.
July 24, 1998, Mt. Nebo, UT.



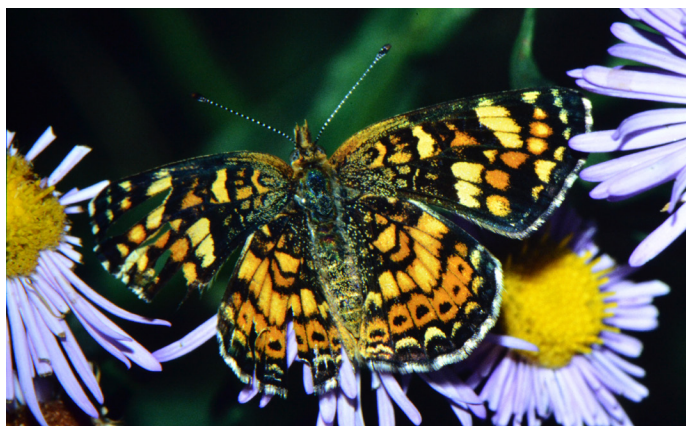
Nymphalidae: *Euphydryas editha*.
July 21, 1996, Grand Teton National Park, WY.



Nymphalidae: *Euphydryas chalcedona*.
July 26, 2008, Carson State Forest, NM.



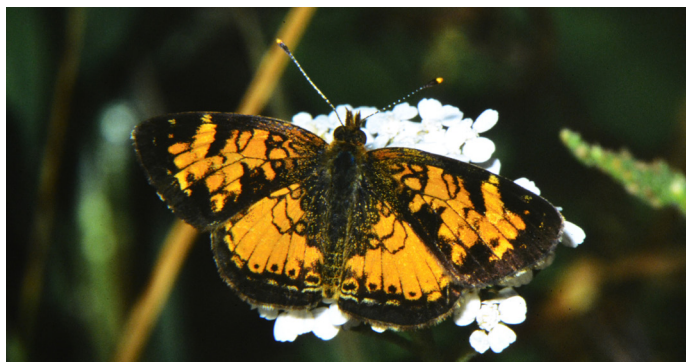
Nymphalidae: *Euphydryas gillettii*.
July 24, 2014, Yellowstone National Park, WY.



Nymphalidae: *Phyciodes pulchella*.
August 11, 2012, San Juan National Forest, CO.



Nymphalidae: *Erebia callias*.
July 22, 1996, Clay Butte, WY.



Nymphalidae: *Phyciodes cocyta*, top: male, bottom: female.
August 4, 2014, Rock Creek Resort, MT.



Nymphalidae: *Erebia theano (pawloskii)*.
July 22, 1996, Clay Butte, WY.



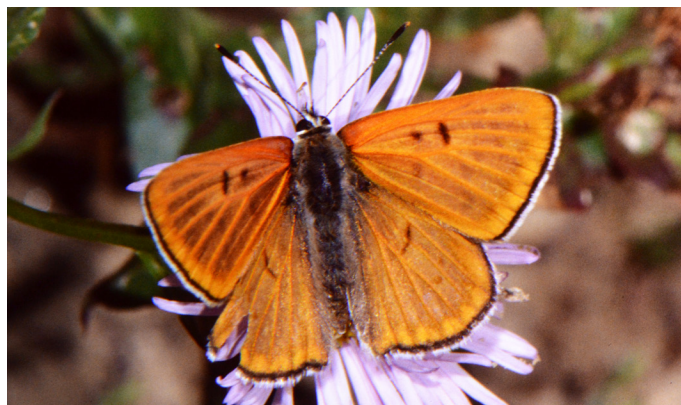
Nymphalidae: *Oeneis chryxus*, male.
August 1, 2007, Wolf Creek Pass, CO.



Nymphalidae: *Cercyonis* sp.
August 4, 2014, Rock Creek Resort, MT.



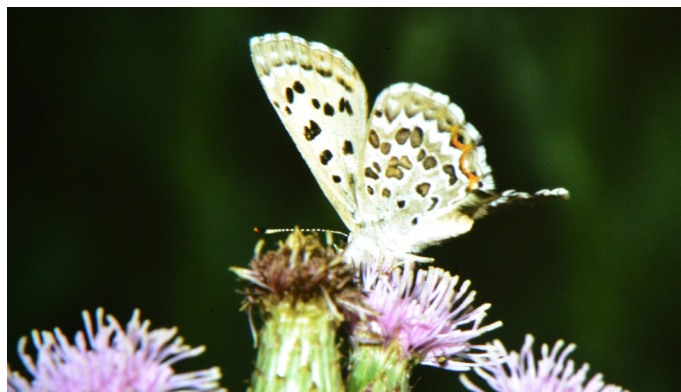
Lycaenidae: *Agriades glandon*.
July 12, 1993, Ashcroft, Aspen, CO.



Lycaenidae: *Lycaena rubidus*, male.
July 23, 1997, Kebler Pass, CO.



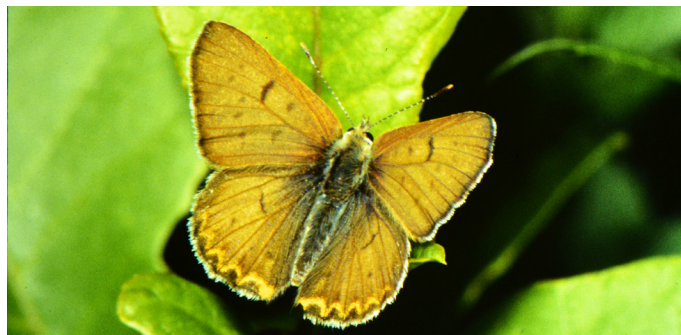
Lycaenidae: *Plebejus icarioides*.
July 13, 1993, Ruedi Reservoir, Aspen, CO.



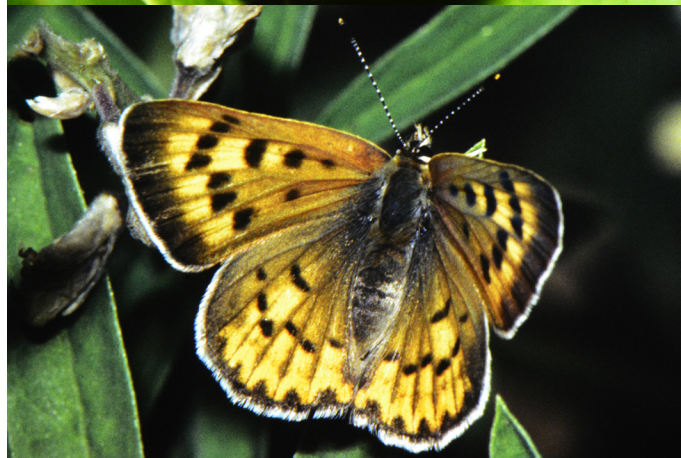
Lycaenidae: *Lycaena editha*, female.
August 4, 2014, Rock Creek Resort, MT.



Lycaenidae: *Plebejus saepiolus*.
July 12, 1993, Ashcroft, Aspen, CO.



Lycaenidae: *Lycaeides melissa*, mating.
July 16, 1993, Chimayo, NM.



Lycaenidae: *Lycaena nivalis*, top: male; bottom: female.
July 24, 1998, Mt. Nebo, UT..

Formative Experiences:

Richard L. Hardesty

P.O. Box 190855, Hungry Horse, MT 59919-0855

It's all Dennis' fault.

It was the Spring of 1962 in Douglas, Wyoming, and I was over at Dennis Groothuis' place (currently a Life Member) and noticed a couple of small glass-topped cases filled with butterflies hanging on the wall of his bedroom. I was startled, then entranced. My eyes were filled with a stunning vista of some of the most beautiful critters I'd ever seen.

"Where'd you get *those*?"

"Up in the mountains."

"I've never seen anything like that up there."

"That's because you haven't been *looking* for them."

Well, this preposterous proposition greatly perplexed me, and I determined to test its veracity. Not more than a few days later, I was up in the Laramie Mountains on upper Deer Creek with my family on a Sunday drive when the opportunity arose. We got out of the car for a stretch, and I began to look closely at the environs. At first, I saw nothing, but as I got used to looking up close and *really* observing things, suddenly they were everywhere! I was stunned by the knowledge that all this time, those lovely critters had been flying about and I had been completely blind to them. Never again! I just *had* to study these things.

Dad made my first net for me, and as neither of us knew anything about butterfly nets, it came up short. Literally. The handle was about 12" long with a bag diameter of about the same. This quickly proved wholly inadequate. I mentioned the problem to Dennis and he loaned me a catalogue for Ward's Natural Science Establishment. Being somewhat impecunious at the time, we bought a couple of the 18" net bags and contented ourselves with making the handle out of a 3' length of 1" dowel and clothesline wire, the solid stuff. A notch cut in one end, a couple of shallow holes drilled offset from one another, slip the wire through the bag top, bend it a bit, cross the ends through the notch & into the holes, tape it up with electrician's tape, *et voilà!* A butterfly net was born. Dad made some spreading boards based on the illustrations in the Ward's catalogue and made three cases. Those proved a bit unwieldy: about 2' square with sliding glass tops. They were later replaced with some cracker-jack cases made to USNM dimensions. Bought some insect pins and Dad cut up a lot of glass into small pieces of various sized to pin in place over the wings to keep them from curling. That was my starter kit.

Now, however, a problem arose: how to identify what we collected. Back then, W. J. Holland's *magnum opus* was still in print from Doubleday and \$15.00 secured me a brand new copy, which I still have, although it is somewhat the worse for wear. Then we discovered Brown, Eff & Roger's *Colorado Butterflies* and got copies of that book. Still, we had issues in identification, so I contacted the University of Wyoming entomology folks and got a nice reply from Dr. W. Don Fronk. He directed me to F. M. Brown and the rest, as they say, was history. Brownie became my go-to guy and mentor for many years, as he did for many another young lepidopterist (Jim Scott, Mike Fisher *et al.*). I never actually met him until years later, in 1973 after departing from the Air Force, but we corresponded heavily. Through him, I was put in touch with L. P. Grey, Harry Clench, Alex Klots and Don Eff. I corresponded with these men for a long time, although it tapered off for a spell while I was in the Air Force. They were always helpful, encouraging and generous of their time.

Paul Grey put me in touch with Art Moeck. He had a daughter living in Laramie, Wyoming, and one summer when he and his wife came out to visit, he made a side trip up to my neck of the woods to collect *Speyeria* with me as his local guide. This was ca. 1965 and was a day I will never forget. Art was so bloody knowledgeable and loved to share what he knew. I was somewhat in awe of the man.

Those were the men who formed me into a lepidopterist, not just a collector. All are gone from us now, and I miss them, but will never forget them. I still have their letters.



From the Editor's Desk

James K. Adams

Folks,

As we suffer through some of the coldest weather in many years here in north Georgia (week of Feb. 16-20), I can't help but think that Spring really is just around the corner. For those of you in warmer places who are already or continuously enjoying leps, I envy you!

As it warms up in the Northern Hemisphere I hope you will enjoy this Spring Issue of the News. Don't forget to send in your contributions for the Formative Experiences and First Encounters columns. I promise I will finally launch the First Encounters column with the next issue!

Also enjoy the images of some of Irving Finkelstein's donated collection. He is my collecting buddy, but is unfortunately in declining health. It is unpleasant facing a future where he will not be able to join me in the field.

Membership

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

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

Dues Rate

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

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

Change of Address?

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

Chris Grinter, Assistant Secretary
Illinois Natural History Survey
1816 S. Oak Street, Champaign,
IL 61820-0904; cell: 847-767-9688
cgrinter@gmail.com

Our Mailing List?

Contact Chris Grinter for information on mailing list rental.

Missed or Defective Issue?

Requests for missed or defective issues should be directed to: Julian Donahue, Asst. Treasurer, 735 Rome Drive, Los Angeles, CA 90065-4040, (323) 227-1285, julian@lepsoc.net. 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 Publications Manager, Ken Bliss (address opposite).

Submissions of potential new Memoirs should be sent to:

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

Journal of The Lepidopterists' Society

Send inquiries to:
Keith Summerville
(see address opposite)
ksummerville@drake.edu

Book Reviews

Send book reviews or new book releases to either of the following:

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

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

WebMaster

John A. Snyder
Dept. of Biology, Furman University
Greenville, SC 29613-0001
(864)244-7939
john.snyder@furman.edu

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.
2. Article (and graphics) on diskette, CD 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. Include printed hardcopies of both articles and graphics. The new InDesign software can handle most common wordprocessing software and numerous photo/graphics software. Media will be returned on request.
3. Color and B+W graphics should be good quality photos suitable for scanning or—preferably—electronic files in TIFF or JPEG format at least 1200 x 1500 pixels for interior use, 1800 x 2100 for covers.
4. Typed copy, double-spaced suitable for scanning and optical character recognition. Original artwork/maps should be line drawings in pen and ink or good, clean photocopies. Color originals are preferred.

Submission Deadlines

Material for Volume 57 must reach the Editor by the following dates:

Issue	Date Due
57 2 Summer	May 20, 2015
3 Fall	Aug. 15, 2015
4 Winter	Nov. 15, 2015

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

Executive Council

President

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

Past President

Andrew Warren
McGuire Center for
Lepidoptera & Biodiversity
Florida Museum of Natural
History, P.O. Box 112710
Gainesville, FL 32611-2710
(352)273-2015
andy@butterfliesofamerica.com

Vice Presidents

Todd Stout (1st VP)
1456 North General Drive
Salt Lake City, UT 84116-
4306, (801)438-3602
todd_stout29@hotmail.com

Mirna Casagrande
Departamento de Zoologia
Universidade Federal do
Parana, Caixa Postal 19020
81531-980 Curitiba, Parana
BRAZIL 41 3361-1569
mibras@ufpr.br

Delano Lewis, Director
Office of Research & Grants
Dept. of Bio., Chem., and
Environmental Science
Northern Caribbean Univ.
Mandeville, Jamaica, W.I.
1-(876)963-7744
delano.lewis@ncu.edu.jm

Secretary

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

Assistant Secretary

Chris Grinter, Illinois Natu-
ral History Survey, 1816 S.
Oak Street, Champaign, IL
61820-0904; 847-767-9688
cgrinter@gmail.com

Treasurer

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

Assistant Treasurer

Julian P. Donahue
735 Rome Drive, Los Angeles,
CA 90065-4040. Phone (323)
227-1285, FAX (323) 227-0595,
Julian@lepsoc.net

Publications Manager

Kenneth R. Bliss
2438 Falcon Drive
Round Rock, TX 78681-2755
(512)850-1700
krrbliss@gmail.com

Editor, News of The Lepidopterists' Society

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

Editor, Journal of The Lepidopterists' Society

Keith Summerville
Dept. of Environmental
Science and Policy, 131 Olin
Hall, Drake University
Des Moines, IA 50311-4505
(515)271-2265
ksummerville@drake.edu

Editor, Memoirs of The Lepidopterists' Society

Kelly Richers
(see Treasurer, above)

WebMaster

John A. Snyder
(see WebMaster opposite)

Members-At-Large

Megan McCarty, Kathleen
Prudic, Mark Walker,
Carol Butler, Michael
Collins, Jennifer Zaspel
John Calhoun, Wayne
Wehling, Robert Dirig

Season Summary Zone Coordinators

Refer to Season Summary for Zone coverage details.

Chief Season Summary

Coordinator and Editor

Leroy C. Koehn
3000 Fairway Court
Georgetown, KY 40324
(502) 370-4259
lepstraps@aol.com

Zone 1, The Far North:

James J. Kruse, Lakewood
Service Center, State and Pri-
vate Forestry, Forest Health
Protection, Forest Service,
Rocky Mtn Region
740 Simms Street
Golden, CO 80401
Cell: 720-724-1924
jjkruse@fs.fed.us

Zone 2, The Pacific Northwest:

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

Zone 3, The Southwest:

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

Zone 4, The Rocky Mountains:

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

Zone 5, The Plains:

Ronald Alan Royer
Division of Science,
Minot State University
Minot, ND 58707-0001
Office: (701)858-3209
FAX: (701)839-6933
ron.royer@minotstateu.edu

Zone 6, Texas:

Charles Bordelon
Texas Lepidoptera Survey
8517 Burkhardt Road
Houston, TX 77055
texaslepsyurvey@sbcglobal.net

Zone 7, Ontario and Quebec:

Maxim Larrivee
Collections entomologiques
et recherche, Insectarium de
Montréal/Espace pour la vie
4581, rue Sherbrooke E.
Montréal, Québec
Canada H1X 2B2
(514) 872-0474, [maxim.lar-
rivee@ville.montreal.qc.ca](mailto:maxim.lar-
rivee@ville.montreal.qc.ca)

Zone 8, The Midwest:

Leslie A. Ferge
7119 Hubbard Avenue
Middleton, WI 53562-3231
(608) 836-9438
lesferge@gmail.com

Zone 9, The Southeast:

Brian G. Scholtens
Biology Department
College of Charleston
66 College Street
Charleston SC 29424-0001
(803) 856-0186
scholtensb@cofc.edu

Zone 10, The Northeast:

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

Zone 11, Mexico & the Caribbean:

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

Finkelstein Collection donated to the McGuire Center (see article page 42)

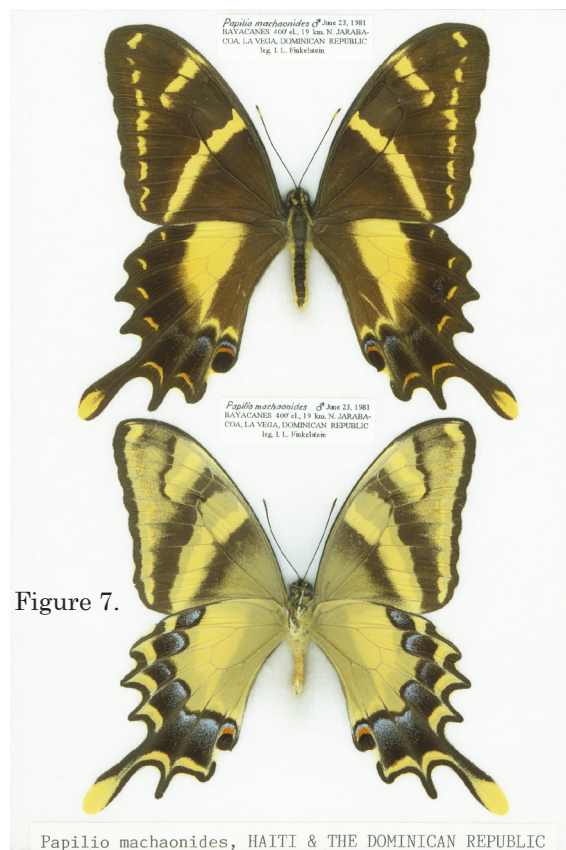


Figure 7.

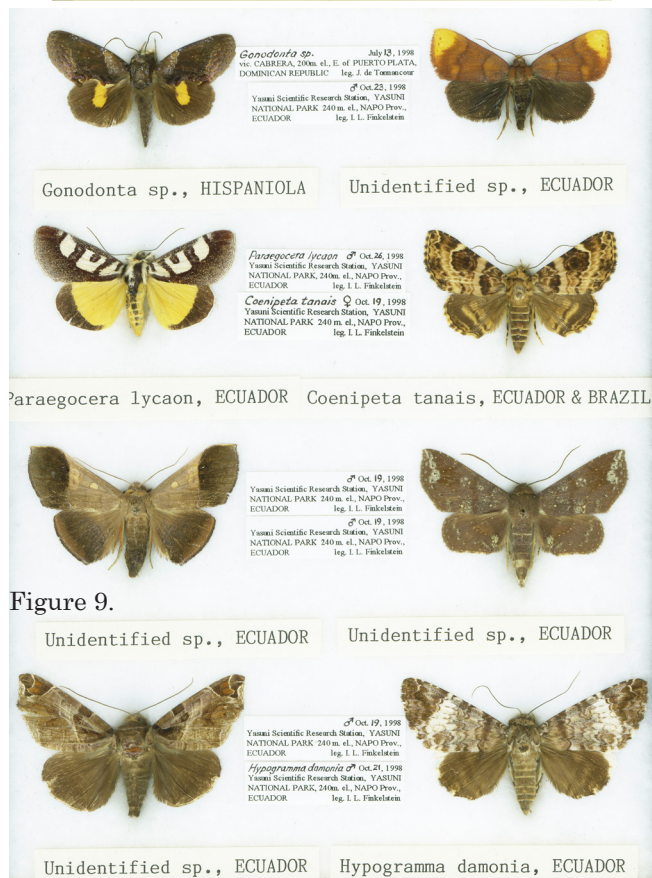


Figure 9.

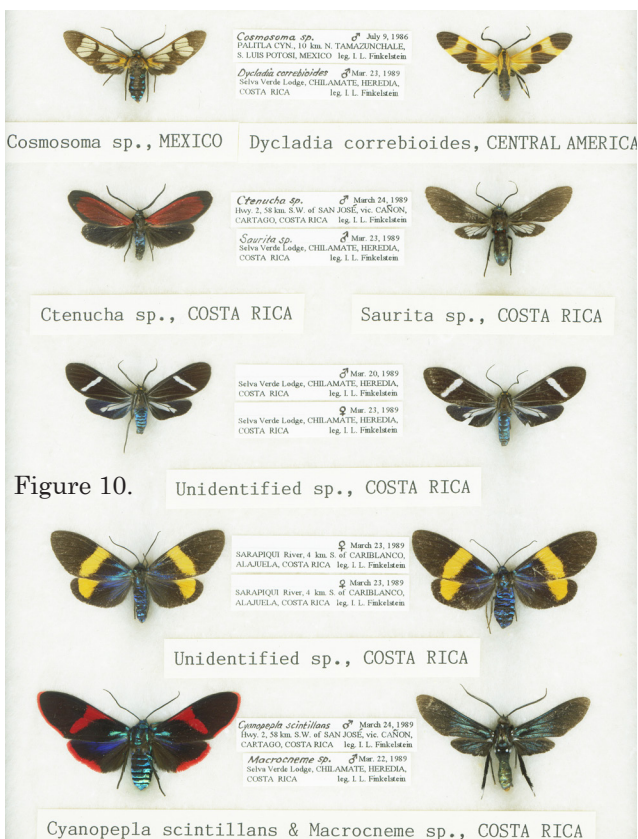
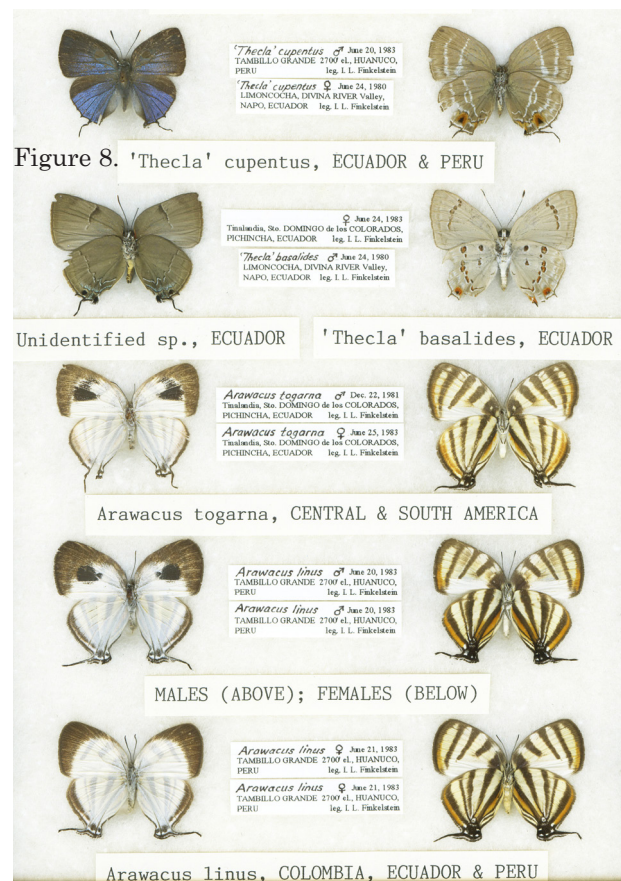


Figure 10. Unidentified sp., COSTA RICA