Moths and Butterflies (Lepidoptera): Identification, Specimen Preparation and Taxonomy

June 25 – July 1, 2017

General Seminar Information

Cerma cora (Owl-eyed Bird-dropping Moth)

This seminar is designed for students at nearly every scale of knowledge or interest. With two instructors — one specializing moths, one in butterflies, and together offering an array of field and lab instruction — the course is rigorous yet flexible. Moths, in terms of diversity and abundance, dominate this seminar. But anyone seeking a general introduction to butterflies, for example, can be as busy as an experienced lepidopterist looking to advance with particular macro-moth taxa. Students can allocate their time to any aspects of this order: moths, butterflies, field photography, specimen collection and preparation, taxonomy, or all or part of the above. Our approach to learning generally features:

- Pre-breakfast moth identification and photography from the prior night's light stations; post-breakfast lectures on ecology, conservation, taxonomy and family- and genus-level characteristics; late-morning specimen sorting and identification.
- Afternoon outings for field identification of macro-lepidopterans (mostly butterflies), net-and-release techniques, specimen collection, photography, or your own field aspirations.
- Hands-on sorting, identification, and, if requested, dissection of moth specimens trapped during the seminar.
- Sleep deprivation owing to late nights with an abundance of live moths at UV lights.
- Hours in the blissful company of moth photographs or trays full of specimens.
- A more leisurely pace at wonderful field sites (from bogs to woods roads to wildflower meadows) in the company of these insects.

In short, students can complete this seminar without ever having to swing a net or touch a specimen, or by netting or trapping specimens and assembling their own reference collections. Although we will generally learn as a group, Hugh McGuinness will take the lead on moths in lectures, in the field, and at lights and traps at night; Bryan Pfeiffer will cover butterflies (including the finer points of net or binocular technique) in lectures and during optional afternoon field outings. Bryan is also the seminar's lead instructor for photography — at the lights and in the field.

Instructors

Dr. **Hugh McGuinness** (hdmcguinness@gmail.com) received his Ph.D. in Ecology and Evolutionary Biology from the University of Michigan in 1987. A former faculty member at Friends World Program of Long Island University, he currently teaches science at Maret School in Washington, DC. He also does volunteer curatorial work in the moth collection at the Smithsonian Museum. Since 2004 he has worked as a consultant for The Nature Conservancy conducting surveys of moths to evaluate land management practices and to document the occurrence of rare species. His current research focuses on using moths as indicator species in successional habitats, the spread of introduced Lepidoptera, various aspects of Lepidopteran taxonomy and systematics, and documenting Lepidopteran biodiversity on Long Island, NY, where he has encountered more than 1000 species of moths. He lives in Washington, DC, with his wife and two children.

Although he is most certainly a field entomologist, **Bryan Pfeiffer** (bryan.pfeiffer@uvm.edu) is probably more of a teacher at heart. Over the course of three decades, he has lectured and guided people in the discovery of birds and insects. As a consulting field birder and entomologist, Bryan has worked for governments, timber companies, private landowners, and conservation groups. Bryan was a co-founder of the Vermont Butterfly Survey and its principle field lepidopterist, which means he spent six years chasing butterflies around Vermont. Bryan has collected, watched, and photographed butterflies from the tropics of Central America to above the Arctic Circle in Scandinavia. He now teaches professional writing to graduate students in the University of Vermont's Field Naturalist and Ecological Planning Programs.

Class limit: 16 participants **Seminar location:** Steuben, Maine, and nearby field sites

Lectures, Lab and Field Schedule

Lepidoptera has the potential to be a 20-hour-per-day pursuit. Our days will generally begin with optional "leftover" identification and photography of moths remaining at our lights from the previous night's wonderful "moth mayhem." (Owing to late nights with moths, we may have breakfast later than the traditional Eagle Hill 7:30AM meal.) After breakfast we'll be indoors for lectures or work with moth specimens, including the "Daily Moth Dump," our time to hone identification skills using either specimens from a trap or on-screen images of moths photographed the night before. On most days, we'll be in the field after lunch. After supper, you'll have time for individual pursuits with specimens or to work on photography. The seminar's "second daily session" starts at 9 PM, when moths begin to arrive at our light stations. Because prime time for moths may run until 1 AM, students who stay out late will have options for some down time each day. In general, Hugh and Bryan can be flexible once we know you preferences and goals for the seminar. Because weather and sleep play a huge role in the pursuit of these insects, the following is a tentative agenda; it will most certainly change:

Sunday June 25

- Afternoon to early evening: informal greeting and getting acquainted
- 7 PM – Supper
- 8 PM – A general discussion of the course, who we are, and our objectives
- 9:30 PM – Lighting for moths at Eagle Hill

June 26-30 **The seminar will generally follow the daily schedule listed below, with Hugh and Bryan and students choosing topics from "The Lepidoptera Learning List" (to the right). Before the course, Bryan and Hugh will poll students on preferences, but we should be able to cover much of what's listed here.**

7:00 AM	Optional morning photography at the lights
8:00 AM	Breakfast
9:00 AM	Morning Lectures and Discussions
12:30 PM	Lunch
1:30 PM	Field Outing
7:00 PM	Supper
8-9:30 PM	Evening discussion or instruction
9:30 PM-??	Moths and the lights or our traps

Saturday, July 1

7:00 AM	Morning discussion and "de-briefing"
8:00 AM	Breakfast
9:00 AM	Farewells

Plebejus idas empetri (Crowberry Blue)

The Lepidoptera Learning List

Morning Lectures and Discussions

- Basic Lepidoptera Anatomy (Adults)
- Basic Lepidoptera Anatomy (Larvae)
- A "Day in the Life" of a Lep (Natural History)
- Anatomy of Sex: Lepidoptera Mating Systems
- Introduction to Families of Micromoths
- Moth Families - I
- Moth Families - II
- Moth Families - III
- Moth Families - IV
- Moth Families - V
- Butterfly Families
- Skipper (Hesperiidae) Identification
- Important and Use of Museum Collections
- Ecology of Lepidoptera: The Importance of Leps in Terrestrial Ecosystems
- Lepidoptera Conservation: Designating Rare Species or Others Worthy of Conservation
- State and Regional Lepidoptera Survey and Monitoring Projects
- Lepidoptera Evolution
- Lep-based Field Studies with a Focus on Basic Biology and Conservation
- Dissection (if interest warrants)

Afternoon Field Outings

- Net technique, field observation and optional collecting
- Lepidoptera of Peatlands
- Lepidoptera of Sedge and Other Wetlands
- Field Photography
- Field Trapping
- Field Practicum

Evening Discussion and Instruction Topics

- Specimen Preparation and Curation - I
- Specimen Preparation and Curation - II
- Nighttime Photography

Books, Field Guides and Other References

The following field guides are highly recommended (depending on your own interests for the seminar). See our notes for certain titles.

Moths

- Beadle, D. & S. Leckie. 2012. Peterson Field Guide to Moths of Northeastern North America. Houghton, Mifflin, Harcourt. ISBN: 978-0547238487 — If you intend to purchase one moth field guide, this is the one.
- Covell, C. 2005. Field guide to eastern moths. Virginia Museum of Natural History. ISBN: 1884549-22-5

Butterflies

- Glassberg, J. 1999. Butterflies through Binoculars, The East. Oxford University Press — Great for beginners in eastern United States.
- Brock Jim and K. Kaufman. 2003. Kaufman Focus Guide to Butterflies of North America — A fine guide for all of North America.
- Glassberg, J. 2012. A Swift Guide to Butterflies of North America — A detailed guide featuring more species that the Kaufman guide; it's designed for quick field identification, and lacks species accounts.

Larvae

- Wagner, D. L. 2005. Caterpillars of eastern North America: a guide to identification and natural history. Princeton University Press. ISBN13: 978-0-691-12144-4

Techniques

- Winter, W. D., Jr. 2000. Basic techniques for observing and studying moths and butterflies. Memoirs of the Lepidopterists' Society No. 5. ISBN 0-930282-07-8. Available through Lepidopterists' Society for $44 ($29 for members)

Suggested reference books:

- Borror, D. J., C. A. Triplehorn and N. F. Johnson. 1989. An introduction to the study of insects, 6th ed. Harcourt Brace Jovanovich College Publishers. ISBN 0-03-025397-7
- Handfield, L. 2010. Les Papillons du Quebec. Broquet inc. ISBN 9782896542451 (in French; get the identification guide, not the scientific version unless you are a full-fledged fanatic).
- Scoble, M. J. 1995. The Lepidoptera: form, function and diversity. Oxford Univ. Press. ISBN 0-19-854952-0
- Cech, R. & G. Tudor. 2005. Butterflies of the East Coast: An observer's guide. Princeton University Press ISBN 0-691-09055-6 — A masterpiece featuring the identification and natural history of eastern coast (and inland) butterflies.
- Scott, James A. 1992. The Butterflies of North America: A Natural History and Field Guide. Stanford University Press.

Web References:

- http://mothphotographersgroup.msstate.edu/MainMenu.shtml
- 2http://www.butterfliesandmoths.org/
- http://www.cbif.gc.ca/spp_pages/misc_moths/phps/mothindex_e.php
- http://bugguide.net/node/view/15740
- http://mbs.umf.maine.edu/Butterfly%20Species%20List.htm
- http://www.naba.org/chapters/nabambc/index.asp

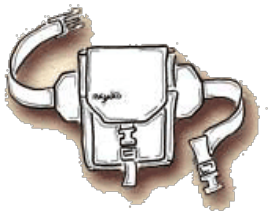
Field Clothing and Gear

Harrisimemna trisignata (Harris' Three-Spot)

Wear standard field attire (muted greens, tans, browns, grays or camouflage are best) and plan for occasional wet feet. Because we'll visit wetlands on occasion, quick-dry nylon pants are highly recommended. Other important points about field clothing for Lepidoptera:

- **Footwear** – You can elect to keep your feet dry throughout this seminar, but we will occasionally visit wetlands, particularly bogs, for moths and butterflies. Old lightweight boots, beat-up tennis shoes or specialized water sandals or water shoes are fine. High rubber boots will often work for pursuing butterflies and moths, but in some bogs you run the risk of water higher than your boots or water pouring in when you kneel for macro photography or close looks at plants and insects.
- **Field Vest** – If you like to use a vest, bring it; but it's not necessary for this seminar. At most, you'll carry a field book, a field guide, and a box for your specimens (if you choose to collect or temporarily hold leps for identification later). For many of us, a standard field bag on a belt or a lumbar (fanny) pack will hold most of the field supplies we need (see below).

Field Supplies



- **Field Bag** – If you'll be collecting leps or doing catch-identification-and-release of butterflies, you'll need something easily accessible for holding live specimens. Your best bet is a field bag worn around your waist that holds your specimen box, glassine envelopes, a field book and pencils, and a field guide. One option is a Pajaro brand field bag or something similar: http://www.pajaro.com/fieldbag.shtml#original. Also check Army surplus shops for these kinds of field bags.

- **Specimen Box** – If you'll be catching butterflies for specimens or for identification-and-release, you'll need a sturdy box to hold your live subjects in glassine envelopes measuring 3" x 5". Don't get a box more than one or two inches deep (so that it can fit easily fit into your field bag). Plastic or aluminum is fine. One or two of these is <u>required</u> unless you do not plan to catch any butterflies.

- **Flat-tipped (Stamp Forceps)** – If you prefer to catch, identify, and release butterflies, get a pair of pair of flat-tipped forceps. You'll learn a rapid field survey technique for safe extraction of your butterfly from a net in order to grab a quick photograph for identification later or for a photo voucher.
- **Insect Net** – Although it's not required, a net will help you learn during this seminar. Most lep nets are 15" in diameter. Consider spending a bit more for a telescoping handle. If you plan to order a net, DO IT NOW; don't wait until the last minute or you may be without your own net during the seminar. We'll have several extra nets for borrowing during the seminar.
    - **BioQuip** (http://www.bioquip.com)
    - **Atelier Jean Paquet** (http://www.atelierjeanpaquet.com/en/default.aspx)
    - **Rose Entomology** (http://www.roseentomology.com) – Expensive (but nice) insect nets

Lab Supplies

We will have some lab equipment for making specimens, including pins, spreading boards, etc. If you plan to collect many specimens and build a reference collection, however, please bring your own materials. Contact Hugh if you have any questions about specimen supplies.

Other Supplies and Lab Materials

Mandatory	Highly Recommended	Optional	To Be Supplied for You
• Daypack	• Field book and mechanical pencils or pens for notes in the field	• Camera (even if you're not attending for photography)	• Glassine envelopes for field use
• Water bottle	• Dissecting Scope (if you happen to have one and care to bring it; we'll have plenty of other scopes on hand)	• Bug dope, sunscreen, personal first aid, GPS unit, laptop computer	• Ethyl acetate, killing jars and other supplies for specimen collection and preparation

Credits and Grading

College Credit

Most participants will be taking this seminar for reasons other than for degree purposes. However, there are two options for earning credits for participating in this seminar:

1 - You may arrange with your home institution to receive credits directly from the Eagle Hill Institute, in which case we provide your institution with a copy of the syllabus, the instructor's CV, and a grade roster for 2 credits. There is a fee.

2 - Most seminars qualify for 2 credits from the University of Maine at Machias, in which case we will also provide your institution with a copy of the syllabus, the instructor's CV, and a grade roster for 2 credits. The standard University of Maine at Machias application from needs to be filled out. Please inquire about details.

Hyalophora columbia (Columbia Silkmoth)

In both cases, the office staff and the instructor need to know of your interest in earning credits at the latest by noon of Monday, the first seminar day, and preferably much sooner. You also need to confirm your plan to earn credits with your home institution. Options for the required after-seminar projects include a written paper based on additional fieldwork, comparison of field data with published reports, development of curriculum materials, and/or completion of a literature review on an agreed-upon subject. You are welcome to make a suggestion based upon your personal interests.

Continuing Education Units (CEUs)

You can earn CEUs through the University of Maine Orono for a fee. If you are interested in earning credits, you need to let both the office staff and the instructor(s) know about this at the the latest by noon on Monday, the first seminar day.