

LEPSOC 2003
54TH ANNUAL MEETING
OF THE LEPIDOPTERISTS' SOCIETY
JULY 23-27, 2003
OLDS COLLEGE, OLDS, ALBERTA, CANADA

CHAIR: Felix Sperling

ORGANIZING COMMITTEE: Gary Anweiler, Ernest Mengersen, Greg Pohl

LOCAL HOST: Ernest Mengersen

REGISTRATIONS: Gary Anweiler

PROGRAM: Felix Sperling, Vazrick Nazari

SYMPOSIA ORGANIZERS: John Acorn, Jens Roland

JUDGING AND DOOR PRIZES: Charlie Covell

PHOTO SALON: Jackie Miller, Chris Schmidt

FIELD TRIP LEADERS: John Acorn, Dave Lawrie, Chris Schmidt

STUDENT ASSISTANTS: Vazrick Nazari, Amanda Roe

GROUP/MEETING PHOTOS: John Acorn/ Rob Hughes

LOGO & T-SHIRT DESIGN: Greg Pohl, Lisa Raatz, Jim Troubridge

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THE LEPIDOPTERISTS' SOCIETY

54TH ANNUAL MEETING SCHEDULE OF EVENTS

JULY 23-27, 2003

Tuesday July 22

3:00 – 10:00 pm Registration, campus housing check-in, early arrivals
at Frank Grisdale Hall entrance (#16 on map)

Wednesday July 23

6:30 – 9:00 am Breakfast at Cafeteria (#18 on map) – cash only

9:00 am – 5:30 pm Field trip for Butterfly collectors/ photographers

Leaders: Chris Schmidt/ John Acorn

Meet at: P2 Parking Lot, west of Grisdale Hall

3:00 - 10:00 pm Registration and campus housing check-in
at Frank Grisdale Hall entrance (#16 on map)

8:00 pm – until late Field trip for moth collectors

Leaders: Dave Lawrie/ Chris Schmidt

Meet at: P2 Parking Lot, west of Grisdale Hall

Thursday July 24

6:30 – 9:00 am Breakfast at Cafeteria (#18 on map) – cash only

8:30 am – 10:00 pm Registration and campus housing check-in
at Frank Grisdale Hall entrance (#16 on map)

8:30 am – 4:00 pm Executive council & committee meetings
at Board Room, Duncan Marshall Place (#1 on map)

9:00 am – 5:00 pm Internet access, at 132 James Murray Bldg. (#2 on map)

9:00 am – 5:30 pm Field trip for Butterfly collectors/ photographers

Leaders: Dave Lawrie/ Chris Schmidt

Meet at: P2 Parking Lot, west of Grisdale Hall

6:30 – 9:00 pm Open reception at Faculty Lounge,
at basement of Learning Resources Ctr. (#14 on map)

8:00 pm – until late Local moth collecting field trip

Leaders: Dave Lawrie/ Chris Schmidt

Meet at: Patio outside reception at Faculty Lounge

Friday July 25

6:30 – 9:00 am Breakfast, at Cafeteria (#18 on map) – cash only

8:00 am – 5:30 pm Registration and campus housing check-in
at hall by Rm. 314, James Murray Bldg. (#2 on map)

8:30 – 8:45 am Welcome and opening remarks

at Rm. 314, James Murray Bldg. (#2 on map)

8:45 – 9:45 am	Symposium 1: The Future of Lepidopterology at Rm. 314, , James Murray Bldg. (#2 on map)
9:00 am – 5:00 pm	Internet access, at Rm. 132 James Murray Bldg.
9:45 – 10:15	Break
10:15 – 11:45	Symposium 1 (contin.), Rm. 314, James Murray Bldg.
11:45 – 12:00 am	Group photo: John Acorn – photographer at Gazebo in Botanical Garden e. of J. Murray Bldg.
12:00 – 1:00 pm	Lunch at Cafeteria (#18 on map)
1:00 – 2:45 pm	Contributed papers, at Rm. 314, James Murray Bldg.
2:45 – 3:15 pm	Break
3:15 – 5:00 pm	Contributed papers, at Rm. 314, James Murray Bldg.
6:00 – 9:30 pm	Barbecue, at Red Lodge Guest Ranch (catch buses at P2 parking lot; 15-20 minutes drive; is on Hwy 587, ~7 mi. W of Bowden & ~2 mi. SE of Red Lodge Prov. Park)
9:30 – 12:00 pm	Moth collecting – at Red Lodge Guest Ranch or Show-&-Tell slides, at 1027 Land Sciences Ctr. (#3) or visit Ent Collection, 1139 &1136 Land Sciences Ctr.

Saturday July 26

8:30 – 11:00 am	Breakfast, at Cafeteria (#18 on map) – cash only
8:15 am – 6:00 pm	Registration at Rm. 314, James Murray Bldg. (#2 on map)
8:45 – 10:00 am	Symposium 2: Lepidoptera Biology (+1 contrib. paper) at Rm. 314, James Murray Bldg. (#2 on map)
10:00 – 10:30 am	Break
10:30 – 12:00 am	Symposium 2 (cont.), at Rm. 314, James Murray Bldg.
12:00 – 1:00 pm	Lunch, at Cafeteria (#18 on map) – cash only
1:00 – 2:45 pm	Contributed papers, at Rm. 314, James Murray Bldg.
2:45 – 3:15 pm	Break
3:15 – 5:15 pm	Contributed papers, at Rm. 314, James Murray Bldg.
6:00 – about 10:00 pm	Social Hour and Annual Banquet – John Acorn as MC at Atrium of Land Sciences Bldg., (#3 on map)

Sunday July 27

8:30 – 11:00 am	Breakfast, at Cafeteria (#18 on map) – cash only
8:45 – 10:00 am	Contributed papers, at Rm. 314, James Murray Bldg.
10:00 – 10:30 am	Break
10:30 – 11:30	Annual business meeting, at Rm. 314, James Murray Bldg. (#2 on map)
afternoon	Ent Collection open, 1139 &1136 Land Sciences Ctr.

Abstracts:

Friday, 8:45-9:15

Catchers and watchers: symbiosis or civil war?

Robert Michael Pyle

Swede Park, 369 Loop Road, Gray's River, Washington 98621-9702, USA, email: tlpyle@willapabay.org

North America now has two distinct populations in pursuit of Lepidoptera: those who employ aerial nets to capture specimens, and those who eschew nets in favor of binoculars and cameras. While overlapping and potentially synergistic, these activities have become lamentably antagonistic. Watchers' hostility toward catchers is often based on biological naiveté and ideology; while netters may condescend to observers and discount their contributions. Lepidopterists rightly fear "bad calls" polluting the distributional data base, yet boorish collectors can spoil watching opportunities. As one deeply connected with both pursuits, I believe that mutual tolerance is the only sensible, adaptive way to go. I will give examples of productive cooperation, and speculate on the dangers ahead if we fail to reach rapprochement between the net-wielders and the eyeballers.

9:15-9:45

North of the sunset: tropical butterflies and biodiversity.

P. J. DeVries

Center for Biodiversity Studies, Milwaukee Public Museum, 800 West Wells Street, Milwaukee, WI 53233, USA, email. pjd@mpm.edu

Abstract: Consideration of tropical insect diversity has played a prominent role in the development of evolutionary biology, systematics, and conservation biology. Recent standardized sampling of species abundance distributions in Amazonian butterflies has provided strong insights into the structure and dynamics of complex tropical insect communities. Of particular relevance is that community diversity is strongly partitioned in small spatial and temporal scales. This has important implications for interpreting studies in tropical community ecology, conservation and biodiversity. Secondly, this model system has provided data for assessing empirical and theoretical patterns of ecological dynamics, diversification, and phylogenetic traits in tropical insects. Finally, this work makes it evident that the evolution of tropical insect communities and their role in conservation can only be understood through long-term studies.

9:45-10:15 Break

10:15-10:45

Monarchs, metalmarks, moths and molecules: will DNA reveal the tree of lepidopteran life?

Andrew Brower

Department of Entomology, Oregon State University, Corvallis, OR 97331-2907, USA, email. browera@mail.science.oregonstate.edu

Abstract: In the last 15 years, the proliferation of molecular techniques has led to a renaissance in phylogenetic inference or relationships among various butterfly and moth groups. This talk will review some of these studies, consider the state of the art, and offer some thoughts about opportunities for progress in the next ten to fifteen years. In general, DNA provides a rich source of data that augments but does not replace traditional research on morphological and life-history features. The fundamental importance of morphology will be illustrated with recent evidence from our collaborative research on butterfly families.

10:45-11:15

Eanie-meanie, chile-beanie, the spirits are about to speak.

John W. Brown

Systematic Entomology Laboratory, USDA, National Museum of Natural History, email. jbrown@sel.barc.usda.gov

Abstract: Although I am not on the cutting edge of any scientific issues, I will rely on personal experience at the U.S. National Museum of Natural History to identify a few advances that may affect the study of Lepidoptera in the future. I will talk about three specific areas of change:

1. Interaction with the National Park Service
2. Availability of type specimens.
3. Publishing of scientific information.

11:15-11:45

Virtual technology for real world lepidopterists.

Felix A.H. Sperling, Gary Anweiler, Chris Schmidt and Charles D. Bird

CW405A Biological Sciences Ctr., Edmonton, AB T6G 2E9 Canada, email. felix.sperling@ualberta.ca

Abstract: The University of Alberta Virtual Museum of Entomology (<http://www.entomology.ualberta.ca/>) is designed to unleash the legacy of generations of collecting. This virtual museum has two internet-accessible databases. The specimen database contains label information for specimens that are individually numbered, identified, and geo-referenced. The species database includes species pages, with notes on identification, natural history, high-quality images, and visual summaries of geographical and seasonal distribution of specimen collection data. The virtual museum is only one of several projects launched by members of the Alberta Lepidopterists' Guild

(http://www.biology.ualberta.ca/old_site/uasm//alg/index.html), and serves as an example of the synergy that is possible when information and communications technology is embraced by traditional naturalists and collectors.

11:45-12:00 Group Photo at Gazebo in Botanical Garden, east of Murray Bldg.
Photographer: John Acorn
12:00-1:00 Lunch

1:00-1:15

Why a skipper taxonomist thinks rearing caterpillars is a better way to collect adults.

John M. Burns

Department of Systematic Biology, Entomology Section, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0127, USA, email. burns.john@nsmnh.si.edu

Abstract: Adults that are reared are usually in better condition than those that are caught in the wild; so reared adults facilitate detection of subtle characters in the external phenotype. The rearing process itself provides much additional data of potential taxonomic value, such as what the caterpillar eats, how the caterpillar looks and acts (over time), and what eats the caterpillar. For both immature and adult stages, the soundest information comes from massive individual rearing that yields comparative series long enough to accurately reflect variation. Species whose adult behavior makes them hard to find (or, if found, to capture) can often be readily obtained as caterpillars.

1:15-1:30

Induction of migratory behavior of the Monarch butterfly (*Danaus plexippus*) by manipulation of environmental factors.

Waleska Rivera-Ríos and Sandra Perez

University of Texas at El Paso, Department of Biological Sciences, Animal Behavior Laboratory, PMB 347, 500 West University Ave. El Paso, TX 79968, USA, email. wriverarios@utep.edu

Abstract: Migration of the monarch butterfly (*Danaus plexippus*) is one of the unsolved mysteries of science. Several studies have been performed with this species to identify what triggers this migration from South Eastern Canada and North Eastern United States to Michoacan, Mexico. Environmental factors have been identified as possible triggers, such as light and temperature, as well as food quality. We have been able to control light, and are beginning to manipulate temperature in environmental chambers, where temperature and light can be equally controlled, with a higher number of organisms at the same time. We aim to

demonstrate, using directionality data, that migratory state can be indeed induced under laboratory conditions.

1:30-1:45

The evolution of butterfly wing patterns is associated with heterochrony in Notch pattern formation.

Robert D. Reed, Michael S. Serfas, and Lisa M. Nagy

Dept. of Molecular and Cellular Biology, 1007 E. Lowell St., University of Arizona, Tucson AZ 85721, USA, email. reed@u.arizona.edu

Abstract: Butterfly eyespots exist in a continuum of shapes ranging from lines to tear-drops to circles. Mathematical models suggest that this phenotypic gradient represents a developmental series where lines are precursors to circles, and that patterns have evolved through timing shifts along a line-to-circle developmental sequence. We compared spatiotemporal expression of the receptor molecule Notch in wing discs of eleven species of Lepidoptera and found that in eyespot-bearing butterflies Notch expression resembles previous models of eyespot determination, recapitulating ancestral intervein midline patterns prior to defining eyespot foci. Notch patterning in heliconiines has slowed down and terminates at an ancestral midline prepattern stage that corresponds to adult intervein midline pigment patterns. Notch signaling precedes Distal-less expression and is the earliest protein known to express in developing eyespots.

1:45-2:00

A higher-level phylogenetic study of the skipper butterflies (Lepidoptera: Hesperiiidae).

Andrew D. Warren

Department of Entomology, Oregon State University, Corvallis, Oregon 97331-2907, USA, email. warrena@science.oregonstate.edu

Abstract: The purpose of this study is to propose a phylogenetic classification for the family Hesperiiidae at the world-level. The classification proposed by Evans (1937, 1949, 1951, 1952, 1953, 1955) considers the fauna of each world region separately, and made little attempt to indicate relationships between closely related genera in different world regions. In this study, at least 100 genera from all of Evans' groups and world regions will be studied. A detailed morpho-logical study will complement DNA sequence analyses from regions of one mitochondrial (COI & II) and two nuclear genes (Ef-1a and wingless). Separate and combined analyses are made of these data sets. Preliminary results suggest that the Trapezitinae are mono-phyletic, and highlight the close relationships between the Hesperiiinae and Megathyminae as well as the Pyrrhopyginae and Pyrginae.

2:00-2:15

Fritillary phylogeny and nomenclature - a step towards resolving the chaos.

Thomas J. Simonsen

Department of Entomology, Zoological Museum, University of Copenhagen, Universitetsparken 15, DK-2100 Copenhagen, Denmark email. tjsimonsen@zmuc.ku.dk

Abstract: The nomenclature of the Fritillary Butterflies (tribe Argynnini) has been the subject of considerable debate, changes and controversies in the past. Suggestions ranging from 3 genera (*Argynnis*, *Speyeria* and *Boloria*) to as many as approximately 15 occur in present literature. The confusion is partly due to the fact that no comprehensive species-group phylogeny of the group has been available. Controversies on which groups to include in the Argynnini have also added to the confusion. Based on a species-group phylogeny of the tribe derived from detailed studies on the genitalic morphology I suggest a modified generic (and sub-generic) classification comprising 6-7 genera and a number of subgenera.

2:15-2:30

Morphologic variation in *Pedaliodes* Butler, 1876 (Satyrinae) in “páramos” of the “Sabana de Bogotá” and their influence in diversification processes.

Mónica Higvera and Giovanny Fagua

Carrera 28 No. 46-31; Apto 603, Bogotá, Colombia, email. fagua@javenana.edu.co

Abstract: We researched the morphologic variation of genitalia and coloration patterns of *Pedaliodes* in páramos of the “Sabana de Bogotá”. We studied the intraspecific and interspecific differences related with geographic isolation. We selected four páramos (two at the west slope and two at the east slope); we made four field trips to each place where we defined six sample plots (using net and traps). The intraspecific and interspecific variation was related with geographic isolation; however, parapatry and altitudinal stratification for some species are not well defined. We did not observe evidence of altitudinal replacement in the species or subspecies; this indicates the existence of only one subspecies. Our results don't show a clear difference between species and subspecies because an isolated geographic distribution does not exist.

2:30-2:45

Phylogeny of the tribe Luehdorfiini (Lepidoptera: Papilionidae) inferred from mitochondrial gene sequences.

Vazrick Nazari, Evgueni V. Zakharov and Felix A.H. Sperling

CW405A Biological Sciences Ctr., Edmonton, AB T6G 2E9 Canada, email. vnazari@ualberta.ca

Abstract: The swallowtail tribe Luehdorfiini (=Zerynthiini) is comprised of 5 genera and 16 Palearctic species, all of which feed exclusively on Aristolochiaceae. The origin and the course of evolution of the members of this tribe, and their relationship with *Parnassius*, *Archon* and *Hypermnestra* in subfamily Parnassiinae has been widely debated over the years. A previous evolutionary scenario by Hancock (1983) for Luehdorfiini, which suggests an East Asian origin for the European genera, is critically revised and a new hypothesis is presented. Based on COI/COII mtDNA sequences, *Hypermnestra helios* is placed in a basal position to *Parnassius*; and *Archon* is associated with *Luehdorfia*.

2:45-3:15 Break

3:15-3:30

A taxonomic study of the *Neominois ridingsii* complex (Lepidoptera: Nymphalidae, Satyrinae).

Matthew C. Garhart

1600 West Plum St. #33A Fort Collins, CO 80521, USA, email. mccgarhart@yahoo.com

Abstract: The butterfly *Neominois ridingsii* is restricted to North America and has only two recognized subspecies in Colorado and possibly a third in Wyoming. The *Neominois* genus deserves attention due to the highly variable morphologic characteristics within individuals in the complex and differences in ecological conditions contributing to behavior, mate-locating, oviposition, brood development and survival rates. Research is being conducted to determine the biosystematic and phylogenetic status of *N. ridingsii* and *N. wyomingo*. The testing being performed uses molecular phylogeny analysis of two mitochondrial DNA genes, COI and COII, behavioral characteristics and morphology including wing pattern and genitalia. It is hoped that analysis of these populations will reflect separation of intermediate species into three species, located on the Front Range, Western Colorado, and Wyoming.

3:30-3:45

Genetic lineages and morphological characters: important partners for coneworm (Pyralidae: Phycitinae: *Dioryctria*) identification.

Amanda Roe, G. Grant, J. Stein, N. Gillette, and Felix A.H. Sperling.

CW405 Biological Sciences Ctr., Edmonton, AB T6G 2E9 Canada email. aroe@ualberta.ca

Abstract: Coneworms are important conifer pests throughout the Pacific Northwest, particularly in seed orchards. Accurate identification is essential for effective control, but is daunting due to the remarkable range of morphological variation and overlapping larval hosts displayed by this genus. Mitochondrial (mtDNA)

sequences are useful for clarifying such complex species problems; we were able to identify seven genetic lineages using cytochrome-c oxidase I and II (COI-COII). Through subsequent comparisons to morphology and larval host, we identified seven species of *Dioryctria*. It is clear that mtDNA sequence data is an essential source of additional characters for species demarcation, but its true value lies when used in conjunction with morphological and ecological characters.

3:45-4:00

The systematics, ecology and conservation of a diverse group of Hawaiian moths.

Mandy L Heddle

Insect Biology, University of California, Berkeley, USA, email. mandy@nature.berkeley.edu

Abstract: The Hawaiian archipelago, 2000 miles from the nearest landmass, is the most remote archipelago in the world. Although Darwin's work would suggest the Galapagos as the showcase of evolution, the Hawaiian Islands are even more remarkable for the array of diversity that has evolved within the archipelago. The endemic Hawaiian genus of moths *Scotorythra* (Lepidoptera: Geometridae) is one of the largest radiations of macrolepidoptera within an island archipelago. This spectacular group of Geometrid moths consists of at least 46 species exhibiting a variety of geographical and ecological ranges. Because of the paucity of material available to earlier entomologists, and the within species variability exhibited by *Scotorythra*, species concepts for the group were very vague. Revisionary work on the taxonomy and systematics of the group was therefore essential before any conclusions about distribution, ecology, or conservation status could be made. I have revised the group, defined 16 new species, and established habitat and host-plant associations for many of the extant species. Species were delimited using genitalia and their monophyly confirmed by a phylogeny generated using mitochondrial COI and morphological data.

4:00-4:15

Morphological review of genus *Euchaetes* (Arctiidae: Arctiinae) in North America north of Mexico.

Paul Larson

1980 Folwell Ave. Room 219, Hodson Hall, St. Paul MN 55108, USA, email. lars1424@umn.edu

Abstract: The genus *Euchaetes* Harrison (Arctiidae: Arctiinae: Callimorphini) uses chemical and ultrasound for defense and mating, and has been extensively studied by chemical ecologists. *Cycnia* Hübner a possible congener, exhibits similar behavior, with males producing courtship pheromones in addition to species' specific ultrasound signals. A morphological study is timely given the confusion over the reciprocal monophyly of *Euchaetes* and *Cycnia* and their relevance to ongoing behavioral studies. This study will clarify the placement of *Euchaetes*

within the Arctiinae and its relationship to *Cycnia*. To date, 28 adults representing 14 of 18 species have been dissected. Data were analyzed using maximum parsimony implemented with Paup*. Preliminary results suggest that species are commonly misplaced among genera.

4:15-4:30

Preliminary phylogeny of the tiger moth tribe Callimorphini (Arctiidae: Arctiinae).

Michelle DaCosta and Susan Weller

University of Minnesota, 1980 Folwell Ave, Room 219 Hodson Hall, St. Paul, MN 55108, USA, email: daco0003@umn.edu

Abstract: Callimorphini includes some of the most spectacular and well studied pyrrolizidine alkaloid sequestering moth species (*Utetheisa* Hübner, *Amerila* Walker). Yet, relationships and monophyly of genera remain to be resolved despite several taxonomic treatments. We examined 22 of 31 genera (71%) and 67 of 218 species. Arctiini were used to root the analysis, and nine pericopines were included to test tribe monophyly. We defined 74 characters (208 states) from adults. Data were analyzed using maximum parsimony implemented with Paup*; heuristic search, random reps, and standard jackknife and decay indices were obtained. Preliminary analysis suggests that the Callimorphini s.s. of Jacobson & Weller is recovered in some, but not all trees.

4:30-4:45

***Smerinthus ophthalmica*: geographic form or cryptic species?**

B. Chris Schmidt

10941-74 Ave. Edmonton, AB T6G 0E5 Canada, email. bjorn@ualberta.ca

Abstract: The One-eyed Sphinx, *Smerinthus cerisyi* Kirby, is a widespread and often common species that occurs throughout the temperate regions of North America. Adult phenotype is geographically variable, and several names have been proposed for western populations. Based on morphological similarity and the often large amplitude in wing phenotype variation, all North American populations of the *cerisyi* species group have traditionally been treated as belonging to two species, *saliceti* Bdl. and *cerisyi*. A preliminary examination of additional morphological and ecological characters suggests that a third species distinct from both *cerisyi* and *saliceti* occurs in southwestern Canada and the U.S.

4:45-5:00

Lepidopterology in Japan.

Akito Kawahara

Department of Entomology, University of Maryland, Plant Sciences Building, College Park, MD, 20742 USA, email. kawahara@wam.umd.edu

Abstract: In Japan, several thousand amateurs and professionals study Lepidoptera. Many are interested in butterflies, but there are also a fair number of people studying moths. I will present how amateurs and professionals study Lepidoptera in Japan, and emphasize various aspects that differ from those used in the United States and Canada, such as how the general public perceives butterfly collecting, and how the Japanese educate children about insects and Lepidoptera. I will also demonstrate Japanese collecting techniques and specimen curation methods.

Saturday, 8:45-9:15

Cheaters in the moth/yucca mutualism.

John F. Addicott

Dept. of Biological Sciences, University of Calgary, Calgary, AB, T3A 4G4 Canada

Abstract: Mutualism between yuccas (*Yucca* spp.) and pollinating yucca moths (*Tegeticula* spp.) is exploited by “cheaters” (*Tegeticula corruptrix*). Cheaters provide no pollination service to yuccas, ovipositing in young fruit rather than flowers. The larvae of both pollinators and cheaters feed on developing yucca seeds. Unlike pollinators, cheaters can consume all the seeds in a yucca fruit. However, at many times and places the impact of cheaters is much less than the impact of pollinators. In this presentation I will examine the interactions between cheaters, pollinators and yuccas, focusing on four factors that affect why cheaters sometimes (but not always) have a high impact on yuccas: abscission of flowers/fruit by yuccas, intra- and interspecific competition among larvae, and spatial isolation.

9:15-9:45

Host-race formation and the generation of biodiversity in lepidopteran gallmakers of goldenrods.

Stephen B. Heard¹ and John D. Nason²

¹*Dept. of Biology, University of New Brunswick, Fredericton, NB E3B 6E1*

²*Dept. of Botany, Iowa State University, Ames, IA 50011*

Abstract: Among phytophagous insects, new biodiversity can apparently arise via host-race formation. However, it remains unclear how common this process is. We are assaying the frequency of host-race formation among insects associated with the goldenrods *Solidago altissima* and *S. gigantea*. Genetically distinct forms occur on each goldenrod in the gelechiid moth *Gnorimoschema gallaesolidaginis*, the cecidomyid fly *Rhopalomyia solidaginis*, the tephritid fly *Eurosta solidaginis* (work of W. Abrahamson), and an encyrtid parasitoid of *Gnorimoschema*, *Copidosoma gelechiae*. In contrast, the tortricid moth *Epiblema scudderiana* appears to be a generalist galling either goldenrod. But what ecological factors favour host-race formation – for instance, why has specialization evolved in

Gnorimoschema but not *Epiblema*? Answers to such questions will illuminate the forces that shape the origin of new insect biodiversity.

9:45-10:00

Vibrational communication in *Drepana arcuata* (Drepanidae), and other larval Lepidoptera.

Jayne Yack

Department of Biology, Carleton University, 1125 Colonel By Drive, Ottawa, ON, K1S 5B6 Canada tel. (613) 236-0985 fax. (613) 520-3539 email. jyack@ccs.carleton.ca

Abstract: Late instar larvae (3 to 5) of the common North American masked birch caterpillar, *Drepana arcuata*, use complex substrate-borne vibration signals in territorial encounters with conspecifics over leaf-shelters. The early instar larvae (1 and 2) live gregariously and also communicate acoustically, but for different reasons than do late instars. We are now learning that the ability to detect and produce sounds and vibrations may be widespread among caterpillars, and has broad implications for studying their social behavior.

10:00-10:30 Break

10:30-11:00

The breaking of the sequencer: *Phyciodes* and the fallacy of DNA barcodes.

Niklas Wahlberg,

Department of Zoology, Stockholm University, S-106 91 Stockholm, Sweden, email: niklas.wahlberg@zoologi.su.se

Abstract: Recently the use of about 650 bp of DNA sequence from the cytochrome oxidase subunit 1 (COI) gene in the mitochondrial genome has been suggested as universal identifier of species; a DNA barcode in effect. Through my work on the butterfly genus *Phyciodes* and other genera in the tribe Melitaeini, I have found that the said 650 bp of COI is an excellent barcode for well-differentiated species that are easy to identify morphologically, but an extremely poor barcode for presumably recently speciated entities that are very difficult to identify using morphology. I will discuss whether such results should cause us to rethink our species concepts, or whether we simply do not (and may never) have a barcode to identify all species-level entities on the planet Earth.

11:00-11:30

Montane meadow butterfly communities as indicators of global climate change.

Diane Debinski

Ecology, Evolution, and Organismal Biology, 124 Science II, Iowa State University, Ames IA 50011-3221, USA, email: debinski@iastate.edu

Abstract: Long-term data quantifying the effects of climate change on ecological communities are virtually nonexistent. Montane meadows may be some of the first areas to exhibit the effects of climate change because they are inhabited by short-lived organisms that have the potential to exhibit quick changes in distribution and abundance relative to variations in climate. My research focuses on analyzing butterfly species distribution and abundance patterns in montane meadows of the Greater Yellowstone Ecosystem. Over one hundred species of butterflies occur in this ecosystem and many are tightly correlated with specific meadow habitats. My 55 sampling sites were identified using remotely sensed classification to identify a moisture gradient of habitat types. Six meadow types were defined, ranging from extremely hydric willow meadows, to mesic forb/grass meadows, to xeric sagebrush meadows. I have identified a suite of butterfly species that are tightly linked to each of these meadow types and have shown that butterfly species composition can be used to differentiate the meadow communities with very high levels of accuracy. These species are the ones that I will be monitoring over the next decade as indicators of global climate change.

11:30-12:00

Dispersal of *Parnassius* butterflies among shrinking alpine meadows.

Jens Roland

Department of Biological Sciences, University of Alberta, Edmonton, AB, T6G 2E9 Canada, email. jens.roland@ualberta.ca

Abstract: We examine the effects of landscape, population size and habitat quality on dispersal of the non-threatened, non-endangered butterfly *Parnassius smintheus* using both mark-recapture methods and microsatellite DNA markers. Studies were done in a region where rapid rise in tree line is reducing the size, and increasing the isolation of alpine meadows in the Rocky Mountains of Western Canada. Dispersal rates to distant meadows was greater if the meadows were separated by more meadow compared to where they were separated by forest. Intervening forest was twice as resistant to *Parnassius* dispersal. Genetic analysis of DNA microsatellite data confirm an effect of distance through forest on genetic similarity, but no effect of distance through open meadow. Rising treeline is not only reducing the amount of alpine meadow habitat, but also reduces the connectivity among remaining meadows.

12:00-1:00 Lunch

1:00-1:15

Lepidopteran communities as indicators for tropical conservation.

Keith S. Brown Jr.

Museu de Historia Natural, Departamento de Zoologia, Instituto de Biologia, UNICAMP CP 6109, Cidade Universitária, Campinas, São Paulo, Brazil 13.083-970 email. ksbrown@unicamp.br

Abstract: The past 25 years have seen a great increase in inventories of Lepidoptera to assist in defining the prediction, placement, priority, and planning of nature reserves in the Neotropics. This is due to their diversification (500-2000 butterfly species in small sites) and specialization (narrow choice of landscape structure, foodplant, flight time and height, home range) to avoid costly competition with other species. Thus, the presence/absence, abundance, population biology, and seasonality of Neotropical butterflies are excellent indicators of many aspects of a site or landscape, including plants (flower/fruit resources, larval hosts) and other animals (ants, specialized bird and wasp predators), and details of the physical environment (rainfall, soils, hydrology, disturbance, connectivity and even paleoclimate). These permit fruitful monitoring of changes or “degradation” in these complex systems.

1:15-1:30

Butterflies in Belize: Ecological Gradients and Community Distributions.

John A. Shuey

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Abstract: The butterfly fauna of Belize is fairly simple by Neotropical standards – less than 850 species are reported from the country. Belize is a small country (23,000 sq. km) that ranges in elevation from sea level to just over 1,000 meters. With exceptions, the fauna is characterized by widespread lowland species of forested habitats and there are few country or regional endemic species. But within these geographic and biological boundaries, there are interesting biological patterns, and three basic ecological gradients can be used to broadly predict the distribution of primary habitat types and associated butterfly communities – geology /soil origin, seasonal rainfall patterns and altitude. I discuss how these ecological variables interact and affect species distributions.

1:30-1:45

The future of Lepidopterological research in Mexico.

James K. Adams

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Abstract: Mexico, a large neotropical country with an incredibly diverse fauna of Lepidoptera, has been largely inaccessible to biological research, even to its own scientists. The country has progressed in recent years, however, and it has become easier for researchers and museum scientists within Mexico to work on their own fauna. Thankfully, there has also been progress on the international front, especially for those who are doing joint work with Mexican colleagues. A pilot

survey of some of the moth fauna of the states of San Luis Potosí and Queretaro was carried out in August of 2002, and some of the intriguing locations and species sampled will be discussed.

1:45-2:00

Biodiversity of Bahama Butterflies.

Lee D. Miller and [Jacqueline Y. Miller](#)

Allyn Museum of Entomology, Florida Museum of Natural History, 3621 Bay Shore Road, Sarasota, FL 34234, USA email. jmiller@ncf.edu

Abstract: The butterfly fauna of the Bahama Islands in the West Indies is currently comprised of nearly 100 species, a few of which are uncommon vagrants. The general composition of the fauna is composed of 93 species with numerous subspecies, approximately 4% of which are endemic. The butterfly fauna is not as homogeneous as once believed, and possible reasons for this heterogeneity are proposed. This insular fauna shares taxonomic affinities with Florida, Cuba, and to a lesser extent Hispaniola and Jamaica. The current taxonomic composition is reviewed in light of island biogeography and examples are illustrated and discussed.

2:00-2:15

***Strymon* and the Biogeography of northern Peru.**

[Robert K. Robbins](#)¹ & Stanley S. Nicolay²

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Abstract: The dry areas of northern Peru (and parts of southern Ecuador) consist of the Atacama Desert (often called the Tumbesian Region), the Rio Marañon Valley, and the Rio Mayo Valley. Using several examples from the hairstreak genus *Strymon*, including some recently discovered species that we are describing, we show that this dry area fauna has complex biogeographic relations with other dry areas.

2:15-2:30

Right in our own back yards - new microlepidoptera records in Alberta.

[Greg R. Pohl](#) and Charles D. Bird

CFS Northern Forestry Centre, 5320 - 122 St., Edmonton, AB T6H 3S5, Canada, email. gpohl@nrcan.gc.ca

Abstract: We have surveyed for microlepidoptera extensively in Alberta for several years, and have redetermined some existing material in the Canadian Forest Service collection. From this work we have compiled 60 new records for Alberta, including

three new families for the province (Eriocraniidae, Glyphidoceridae, and Schreckensteiniidae). Habitats sampled regularly included boreal forest, mixedwood forest, aspen parkland, native grasslands, and prairie coulees. Our own back yards have been among the most productive sites. Details of some of the species we have found are presented. We conclude that many more species of microlepidoptera await discovery here.

2:30-2:45

Assessment of inventory efficiency for tortricid moths in coastal Californian and tropical Costa Rican reserves.

Jerry A. Powell and John W. Brown

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Abstract: Big Creek Reserve, Monterey Co., CA, and Estacion Biologica La Selva, Heredia Prov., Costa Rica, are each ca. 16 km², but they differ markedly in topography, climate, and vegetation. We used team, multi-year efforts to inventory Lepidoptera: 1980-2002 at Big Creek (215 sampling dates, 338 BL collections); 1993-1999 at La Selva (280 dates, 665 BL collections). We obtained 82 species of Tortricidae at Big Creek and an asymptote in species accumulation; 9 (11%) are uniques (known from one sample); 35 species were reared from larvae (43%), and 18 (22%) were taken only diurnally or as larvae. At La Selva we recorded ca. 195 species; their accumulation rate slowed but did not reach asymptotic; about 65 species are uniques (33%); 13 species were reared from larvae (7%), of which one was not taken at light; and only 2 were exclusively diurnal.

2:45-3:15 Break

3:15-3:30

Higher-level phylogeny and classification of the Heliconiinae.

Carla Penz and Djunijanti Peggie

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Abstract: Phylogenetic relationships among Heliconiinae genera are proposed based on early stage and adult morphology. Parsimony analyses of forty-nine species in twenty-nine genera indicate that Heliconiinae can be divided into four main groups: (1) *Pardopsis*, *Acraea* and *Actinote*, (2) *Cethosia* plus *Heliconius* and relatives, (3) Oriental genera and (4) fritillaries. Analyses of adult characters suggested that Oriental genera form a monophyletic group, whereas those of adult plus early stage characters artificially split this group into three separate lineages. Nonetheless, early stage characters strengthened the support for the grouping of *Cethosia* with *Heliconius* and related genera. The classification of the Heliconiinae is revised based on our results.

3:30-3:45

Ancient relationships of Madagascar endemic species in the *Papilio demoleus* group (Lepidoptera, Papilionidae).

Evgueni V. Zakharov¹, C. Smith², D.C. Lees², A. Cameron³, R.I. Vane-Wright², F.A.H. Sperling¹.

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³ Faculty of Biological Sciences, School of Biology, University of Leeds, Leeds LS2 9JT, United Kingdom.

Abstract: Phylogenetic relationships for all five recognized species of the *Papilio demoleus* group are hypothesized from morphology and about 4 kb of nucleotide sequences of two mitochondrial (COI and COII) and two nuclear (wg and EF-1 α) genes. Different phylogenetic signals were recovered from different data partitions. The conflict stems primarily from disagreement about the basal relationships within the species group. *P. morondavana* appears to be the oldest species of the group according to mtDNA genes, while nuclear genes suggest that *P. groesmithi* is the stem species. Little or no intraspecific genetic variability was recovered. We did not find indications of genetic differentiation among the subspecies of *P. demoleus* available to us, with the exception of ssp. *sthenelus*.

3:45-4:00

The Alucitidae of North America.

Bernard Landry¹ and Jean-François Landry²

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Abstract: Based on the examination of more than 600 specimens, we are able to show that the North American fauna of Alucitidae includes three widespread species: *Alucita montana* Barnes & Lindsey, 1921 (not Cockerell, 1889), and two new species. *Alucita hexadactyla* (L., 1758) does not occur in North America. We will illustrate and compare the diagnostic morphological features of the three North American species. We will also illustrate their distribution and discuss their biology. The caterpillars are associated with *Lonicera* and *Symphoricarpos* (Caprifoliaceae).

4:00-4:15

Alien on *Allium*: the Leek Moth in Canada.

Jean-François Landry

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Abstract: The leek moth, *Acrolepiopsis assectella* (Zeller, 1839), (Lepidoptera: Acrolepiidae), a species native to Europe, was first reported in North America in 1993 where it was found in a garden in Ottawa. The species is now established and has begun spreading in eastern Ontario and western Quebec. Larvae are leafmiers on *Allium*, preferring leek, garlic, and onion. There may be two generations per summer in Ontario. In warmer climates, the leek moth has several generations per year and may even breed continuously. Adults are compared to those of the native *A. incertella* (Chambers), which resembles it closely but feeds on *Smilax herbacea*. In Canada, *A. incertella* is currently known only from southern Ontario. Reliable separation of the species is through examination of genital characters.

4:15-4:30

***Empyreuma* species and species limits: Evidence from morphology and molecules (Arctiidae: Arctiinae: Ctenuchini).**

Susan J. Weller, Rebecca B. Simmons, and Anders L. Carlson

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Abstract: Species limits within *Empyreuma* are addressed using a morphological study of male and female genitalia and sequence data from the mitochondrial gene COI. Currently, four species (*E. pugione*, *E. affinis*, *E. heros*, *E. anassa*) are recognized. Based on morphological studies, two species can be readily distinguished, the Jamaican *E. anassa* and the widespread *E. pugione*. Neither *E. affinis* nor *E. heros* can be distinguished by coloration or genitalic differences. Analysis of COI haplotypes suggests that the population of the Bahamas (*E. heros*) is weakly differentiated from other *E. pugione* haplotypes; however, sequence divergence (0.09%) does not support recognition of a distinct species. We place both *E. affinis* Rothschild, 1912, and *E. heros* Bates, 1934, as new synonyms of *E. pugione* Hübner 1818.

4:30-4:45

A molecular systematic analysis of the *Proserpinus* Clade of Sphinx moths including evolutionary and conservation implications.

Daniel Rubinoff

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Abstract: The sphinx moth genera *Arctonotus*, *Euproserpinus*, and *Proserpinus* are thought to represent a monophyletic clade. All but one species in the group is restricted to North America, but systematic relationships within and among the three genera have not been examined. This group also holds one of the two

federally listed endangered moth species in the United States. I present the first molecular phylogeny for the three genera, based on mitochondrial DNA sequence and using various tree construction models. Specific reference will be made to phenotypic, phenology, and hostplant evolutionary patterns suggested by the phylogeny. Unexpected results of this study have implications for both the evolution and conservation of taxa in all three genera.

4:45-5:00

What is *Copitarsia* (Noctuidae)? Mistaken identity, misplacement, and other quandaries.

Rebecca B. Simmons, M. G. Pogue, and S. J. Scheffer

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Abstract: Species of *Copitarsia* are pests of crops in Central and South America and are of concern to U.S. agriculture. Unfortunately, its confused taxonomy and lack of phylogenetic information compound these issues. Though *C. incommoda* (Walker) is reported to be a pest of many crops in Peru, Mexico, and other countries in Central and South America, it appears that this species has been misidentified. Additionally, the genus *Copitarsia* has been placed in the Cuculliinae; preliminary morphological and molecular evidence indicates that it is more closely related to members of the Noctuinae. Finally, the monophyly of *Copitarsia* will be examined using morphological and molecular evidence.

5:00-5:15

Phylogenetic placement of some Chinese *Dioryctria* Zeller (Lepidoptera: Pyralidae: Phycitinae) based on combined analysis of morphology and mitochondrial DNA.

Yanli Du and Felix A. H. Sperling

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Abstract: Coneworms in the genus *Dioryctria* Zeller are considered the most important holarctic lepidopterous cone pests. Seventy *Dioryctria* species names have been applied and 9 species groups have been defined, but a globally unified classification of species groups has not been attained. We examined the morphology of 14 *Dioryctria* species belonging to 6 species groups, as well as DNA variation in a 2,300 bp segment of the mitochondrial COI + COII + tRNA gene. Four phycitine species (*Oncocera* (*Laodamia*) *faecella* (Zeller, 1839), *Ceroprepes ophthalmicella* (Christoph, 1881), *Euzophera ostricolorella* Hulst, 1890 and an unidentified species) served as outgroups. Parsimony analyses of the combined molecular and morphological data sets indicated that the four included Chinese species (*D. yiai*, *D. abietella*, *D. magnifica* and *D. rubella*) are distinct from North

American taxa at the species level and are placed in three groups interspersed among the nearctic species. *D. yiai* showed only a basal relationship to *D. auranticella* even though they have previously been considered to be part of the same species group.

Sunday, 8:45-9:00

Status of the Dalton Highway (Alaska) butterfly survey 1999-2003.

John H. Masters

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Abstract: Since 1999 I have been making annual butterfly trips to the Dalton Highway (Alaska's Pipeline Road on the North Slope) to study butterfly populations and in particular biennialism. In this report the findings to date, including the 2003 collecting trip, are summarized. The study has centered on four genera, *Colias*, *Erebia*, *Oeneis* and *Boloria*, where biennialism (or even triennialism) seems to be the norm.

9:00-9:15

The changes in grizzly bear lepidopteran feeding strategies with the 2002 return of El Niño to the Greater Yellowstone ecosystem.

Karölis R. Bagdonas

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Abstract: In late December 2001 and January 2002, El Niño returned to northwestern Wyoming wilderness areas after an extended four year La Niña drought. Except for a three-week dry span in July, 2002, brought colder and better conditions, which continued through the fall and winter of 2002-2003. Many grizzly lepidopteran food species were greatly reduced in numbers or absent altogether throughout the summer. However, in July 2002, *Euxoa* species had formed aggregations in the Alpine and other important food species emerged in lower montane areas. As a result, a growing population of grizzlies, in the Greater Yellowstone Ecosystem, was feeding over a wider distributional range on a greater number of moth species from low montane to high alpine regions during the 2002 summer.

9:15-9:30

A summary of more than two decades of July 4th butterfly counts in Oldham County, Kentucky.

Charles V. Covell Jr.

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Abstract: The 23-year history of the July 4th Butterfly Count in Oldham County, near Louisville, KY is given, along with count statistics on 62 butterfly species over the period. Possible trends and implications on population dynamics of these species are discussed.

9:30-9:45

The California Moth County List: 27000 entries.

Kelly Richers

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Abstract: The California County moth list has reached 27.000 entries, representing some 4000 identified species. Reloads indicate challenges with subspecies identification, as well as range anomalies which remain to be resolved. A web database version is available on the internet at <http://moth.biology.ualberta.ca/>.

9:45-10:00

Scientific Names List for Butterfly Species of North America, north of Mexico.

Paul Opler¹ and Andrew D. Warren²

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Abstract: The "Opler-Warren list" was published in the Gillette Museum series in late 2002, and has been published since in revised hard copy form at periodic intervals. It is the most recent scientific name list for butterfly species since Miller and Brown and the Ferris supplement. More importantly, the list is also made available from several servers on the internet [including BNet Site served by Andrew Brower at Oregon State University (USA) <http://ent.orst.edu/bnet>, and the Strickland Museum web site at University of Alberta (Canada) http://www.biology.ualberta.ca/old_site/uasm//Opler&Warren.pdf]. The 80+ page list includes the following features: 1. All names of North American butterfly species are included and numbered. 2. Where necessary or helpful, comments or annotations are provided to help the user understand the information provided. 3. Excluded species are included in an appendix with individual annotations. 4. An effort made to accommodate differences between Eurasian, Latin-American and North American advances and name usages. 5. Input sought and provided by experts in bibliographic research and taxonomic specialists, notably J.D. Lafontaine, Gerardo Lamas Mueller and Jonathan Pelham. 6. An extensive reference section is provided in support of the list and its annotations.

Posters:

Comparative morphological observations of *Cactoblastis cactorum* (Berg) (Lepidoptera:Pyralidae:Phycitinae) and related genera in Florida with notes on its ecology and larval mimicry.

Jesse Hardin, Jacqueline Y. Miller, and John B. Morrill.

Abstract: The phycitine moth, *Cactoblastis cactorum* (Berg) is one of the most remarkable examples of biological control of *Opuntia* spp, especially in Australia. Originally described from northern Argentina, this species has also been introduced for biocontrol measures in South Africa and in the West Indies. However, *C. cactorum* is quite opportunistic and has subsequently proven detrimental to endemic, native *Opuntia* species in Florida. Although Heinrich (1936, 1956) reviewed and completed a revision of North American Phycitinae and Habeck and Bennett (1990) provided a formal key, further morphological studies on Florida populations document some distinct populational differences and provide further insight into the sensory and physiological structures. Other observations on the life history of populations in Florida confirm more diurnal activity than previously reported and cohabitation in native *Opuntia* with three species of Diptera (Syrphidae): *Copestylum florida* Hull, *C. mexicanum* (Macquart), and *Phaenicia caeruleiviridis* (Macquart). The potential role of aposematic coloration in a mimicry strategy is also discussed.

Frugivorous butterflies (Lepidoptera: Nymphalidae) as indicators of forest fragmentation in São Paulo Plateau.

Uehara-Prado, M., A.V.L Freitas, K.S. Brown Jr., Jean Paul Metzger, Luciana Alves, and William Goulart da Silva

Museu de História Natural, Departamento de Zoologia, Instituto de Biologia, Universidade Estadual de Campinas, CP 6109, São Paulo, 13083-970 Brazil.

Abstract: Frugivorous Nymphalidae (70 species, 1,810 individuals) and their ecological indicator status were evaluated in continuous forest (Morro Grande Reserve, Cotia, SP) and nearby fragments. The sex ratio of most species was not male-biased. Brassolinae were more abundant in the reserve, Biblidinae and Charaxinae in the fragments. Faunistic similarity between landscapes was high (81%), but cluster analysis separated reserve from fragment faunas, indicating forest fragmentation effects on the community composition. Satyrinae were equally distributed in both landscapes and showed no correlation with any physical or vegetation variable. Biblidinae and Charaxinae correlated with variables that responded positively to fragmentation. Frugivorous butterfly species richness was positively correlated with tree species richness, suggesting that this butterfly guild may act as a biodiversity indicator, and be useful in conservation monitoring.

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