

Lepidopterists' Society

50th Annual Meeting

52nd Anniversary Year



Windemere Hotel &
Conference Center

Sierra Vista, Arizona

August 4-8, 1999

**50th Annual Meeting of
The Lepidopterists' Society
(52nd Anniversary Year)**

**Windemere Conference Center and Hotel
Sierra Vista, Arizona
4-8 August 1999**

NOTE: Collecting and Photography may be carried out in units of the Coronado National Forest, surrounding the meeting site in southern Arizona. A group collecting permit was obtained by past-president Jim Tuttle. Collecting on Fort Huachuca, adjacent to Sierra Vista, or other sites not in the Coronado National Forest, must be arranged separately.

Wednesday, 4 August 1999:

8:30 AM: Field Trip for Collectors. Leader Richard Bailowitz. Meet at southwest front of Windemere Hotel at 8:30 AM. Destination to be decided on basis of local conditions at time of meeting.

8:30 AM: Field Trip for Observers and Photographers. Leader Jim Brock. Meet at northwest front of Windemere Hotel at 8:30 AM. Destination to be decided on basis of local conditions at time of meeting.

Cover design, *Pyrgus communis* (Common Checkered Skipper) drawing by Evi Buckner.

07/23/99

Thursday, 5 August 1999:

8:00 AM – 4:00 PM: Registration, hall in front of Grand Ballroom, Windemere Hotel.

8:30 AM: Field Trip for Collectors. Leader Richard Bailowitz. Meet at southwest front of Windemere Hotel at 8:30 AM. Destination to be decided on basis of local conditions at time of meeting.

8:30 AM: Field Trip for Observers and Photographers. Leader Jim Brock. Meet at northwest front of Windemere Hotel at 8:30 AM. Destination to be decided on basis of local conditions at time of meeting.

MEETINGS:

8:00 AM – 9:00 AM: Editorial Board.

8:30 AM – 9:30 AM: Standing Committee Meetings

10:00 AM – 4:30 PM: 9th or 10th Regiment conference rooms.

Executive Council. Interested Society members may sit in room except during closed segments of the Council.

6:00 PM: Moth collecting/observing trip. Leaders Tom Mooney and Howard Byrne. Meet in front of Windemere Hotel at 6:00 PM. Destination to be decided on basis of local conditions at time of meeting. No sign-up required.

5:30 PM – 8:30 PM: Reception, Windemere Hotel, Grand Ballroom. Welcome reception and mixer. Make your own sandwiches and no-host bar.

8:30 PM – 10:0 PM: Slide Fest. Windemere Hotel. Room to be announced. Attendees are encouraged to bring a short series of slides (no more than 8) to share with those who may be interested.

Friday, 6 August 1999:

NOTE: Posters will be on display in the meeting area throughout the meeting period for enjoyment by the attendees. The authors of the posters are scheduled to be at the poster during specific break periods to answer questions and discuss their projects.

9:00 AM – 4:00 PM: Commercial and member exhibits. Grand Ballroom annex, Windemere Hotel.

9:00 AM – 4:00 PM: Photo Salon, Grand Ballroom annex, Windemere Hotel.

8:30 – 8:50 AM:

Welcome and Opening Announcements.

8:50 – 9:10 AM:

The Resident Sphingidae of Southeastern Arizona.

By James Tuttle, 4285 North Homestead Avenue, Tucson, Arizona, 85749. Email: jtuttle@fiaaz.net

Abstract: The sphingid fauna of southeastern Arizona is best known because of the strong influence from the neotropical Americas. Although broadly distributed throughout Mexico, Central America, and even into South America, many of our resident species reach their northern limits in a handful of mountain ranges along the U.S.-Mexico border. However, there are also several species that are associated with the Rocky Mountain Chain to the north. The merging of northern and southern influences results in a diverse sphingid fauna. The following paper provides a brief snapshot of this unique biological diversity by discussing adult behavior and immature-host plant associations.

9:10 – 9:30 AM:

Biology of *Dalcerides ingenita* in the Huachuca Mountains, Arizona (Zygaenoidea).

By Marc E. Epstein, Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C., 20560.

Email: Epsteinm@nmnh.si.edu

Abstract: Observations on the biology of *Dalcerides ingenita* (Hy. Edwards) from nearby Ash Canyon in the Huachuca Mountains, Arizona, are documented with photographs and visual images. Dalcerid larvae have a dorsum that is covered with gelatinous warts. It is reported here that the head, pro-thorax, ventrum, and anal segment of larval dalcerids are molted apart from the gelatinous warts on the dorsum. The irregularly molted gelatinous warts are sloughed off and fed on the prepupa. Images of other behaviors include larval locomotion and use of the spinneret, feeding beneath the prothorax, cannibalism of unhatched larvae, and adult emergence and copulation.

9:30 – 9:50 AM:

Ecological explanations for larval food mixing of *Grammia geneura* (Arctiidae).

By Michael S. Singer, IDP in Insect Science, Forbes 410, University of Arizona, Tucson, AZ 85721. Email: msinger@u.arizona.edu

Abstract: The food-mixing habit of the woolly bear caterpillar *Grammia geneura* (Arctiidae) may be explained by dietary benefits (e.g. better growth), ecological constraints, defensive benefits, or some combination of these factors. Reduced growth efficiency of mixed-versus single-plant diets suggests other ecological factors maintain food-mixing. Small size and unpredictable availability of high quality host-plants along with late season parasitoid attack may discourage specialization on favored host-plant species. In addition, host-plant species differed in their defensive effects on tachinid parasitoids developing inside caterpillars. A mixed diet that includes both noxious and highly nutritious host-plants may provide caterpillars with the best balance of defense against parasitoids on one hand and maximal growth on the other.

9:50 – 10:10 AM:

Sonoran Lepidoptera Survey: A Progress Report for the Butterflies. By Jim P. Brock, 5150 North Stonehouse Place, Tucson, Arizona, 85750. Email: jimjoanjoy@aol.com

Abstract: The state of Sonora in Mexico lies just below the state of Arizona, is nearly identical in size and one of the least surveyed of all Mexican states. A brief overview of habitats will be presented as well as an update on the numbers and types of butterflies currently known.

10:10 – 10:25 AM: BREAK

Poster: The Lepidoptera Collection at the National Collection of Insects, Mexico.

By Manuel A. Balcázar-Lara, Coleccion Nacional de Insectos, Departamento de Zoología, UNAM, Apdo. Postal 70-153, C.P. 04510 Mexico, D. F., MEXICO. Email: mabl@servidor.unam.mx

Abstract: A brief summary of historical events related to the National Collection of Insects, Mexico, founded in 1929, is presented. The collection houses more than 150,000 spread specimens from all biogeographical regions of Mexico (more than 250 localities). Although the great majority of the specimens are from tropical Mexico and Mesoamerica, there are specimens from all zoological realms. At least another 300,000 papered specimens are kept in an associated collection. All families of Lepidoptera reported from Mexico are represented in the collection. The best represented groups are butterflies (Papilionoidea) with more than 50,000 specimens; as well as the families Saturniidae with more than 2,000 specimens; Sphingidae with 2,500; and Arctiidae with 6,500. With regards to this group, 95% of the species belonging to the fauna of Mexico are represented. The type collection includes 85 primary types (holo and lectotypes), and 198 tertiary types (para and allotypes) of 99 species mostly from Mexico. The collection is presently being catalogued with the program Biota, more than 65,000 specimens and associated information have been captured in the database to date.

10:25 – 10:45 AM:

Predation on Adult Butterflies.

By Richard A. Ballowitz, 1331 West Emerine Drive, Tucson, Arizona, 85704.

Abstract: Whether stalking with a net, camera or just observing, we tend to view ourselves as the ultimate predator. However, when it comes to hunting Lepidoptera we have plenty of competition. Many butterflies fall victim to arthropod predators but few such instances have

been reported in the literature. The current study offers a brief compilation of field observations of arthropod-butterfly predation in southeastern Arizona.

10:45 – 11:05 AM:

Portraits of Southeast Arizona Butterflies.

By Priscilla and Hank Brodtkin, 3050 East Carr Canyon Road, Hereford, Arizona, 85615.

Abstract: A snapshot of some of the lepidopteran delights available to those fortunate enough to live in this biologically rich area.

11:05 – 11:25 AM:

Intergradation of viceroy (*Limenitis archippus*) phenotypes along the Rio Grande in New Mexico (Nymphalidae).

By Gregory S. Forbes, Jornada Experimental Range, Box 30003 MSC 3JER, New Mexico State University, Las Cruces, New Mexico, 88003.

Email: forbesgregory@hotmail.com

Abstract: Based on recent collections, there is evidence that viceroy populations along the central Rio Grande in New Mexico formerly represented an extensive intergrade zone between *Limenitis archippus obsoleta* W. H. Edwards and the more northern *L. a. archippus* (Cramer). Despite extensive loss of riparian habitats, particularly in southern New Mexico, it has been possible to sample remnants of the zone and to gain some understanding of the phenotype frequencies involved and of the size and character of the intergrade zone itself.

11:25 – 11:45 AM:

Phenotypic Frequencies in Natural Populations as Support for a Balanced Interpretation of Larval Polymorphism in the Patched Butterfly, *Chlosyne lacinia*.

By Stanley A. Gorondenski, 1530 West Wescott Drive, Phoenix, Arizona, 85027. Email: stanlep@primenet.com

Abstract: Gorondenski (1969, Genetical Research. 14:333-336) discovered the genetic mechanism of three larval color polymorphs: nigra, bicolor, and rufa. The unlinked bicolor and rufa determining alleles are dominant over their respective homologues. The dominant rufa allele is epistatic over the nigra-bicolor locus. In a separate study, a sample of 17,000 larvae from time periods and localities suggest temporal stability and spatial homogeneity in natural populations. This supports a balanced interpretation of the polymorphism, i.e., the superiority of the heterozygotes. The frequencies of the bicolor and rufa determining alleles

were found to be near 0.6 and 0.1 respectively. The sampling and analysis problems posed by the gregarious nature of large sibships are presented.

11:45 – 12:30 PM: Lunch – On your own.

12:30 – 12:50 PM:

The Influence of Moon Phase and Temperature on Attraction of Moths to Lights: Is our Lunarphobia Warranted?

By Jerry A. Powell, Essig Museum of Entomology, 201 Wellman Hall, University of California, Berkeley, California, 94720. Email:

powellj@nature.berkeley.edu

Abstract: Hardwick (1972, Canad. Entomol. 104: 1767) concluded that there was no evidence of significant influence by the lunar cycle on numbers of noctuid moths captured by a 125-watt Ozram MV light trap at widespread localities in the western U.S. and Canada. Because this contradicts a widely held belief of moth collectors, I analyzed data from single-site collections at Walnut Creek, CA, in the 1960s and at Inverness, CA, in 1995-1998 made irrespective of the moon phase, to test the hypothesis that fewer moths are attracted to lights during full moon period than at other times of the lunar cycle. The results neither fully contradict nor corroborate Hardwick's analysis.

12:50 – 1:10 PM:

A Preliminary Assessment of the Lepidopteran Fauna of La Selva, Costa Rica.

By David L. Wagner, Ecology and Evolutionary Biology, U-Box 43, University of Connecticut, Storrs, Connecticut, 06269; Donald R. Davis, Department of Entomology, NHB 127, Smithsonian Institution, Washington, D.C., 20560; Jerry A. Powell, Department of Entomology, 201 Wellman Hall, University of California, Berkeley, California, 94720. Email: dwagner@uconnvm.uconn.edu

Abstract: La Selva Biological Station is a 1500+ ha low tropical rainforest reserve, located in the northeastern corner of Costa Rica. Although far from complete, our knowledge of the lepidopteran fauna exceeds that for any other comparable rainforest in the New World. Diversity estimates are discussed for several of the more well sampled groups: leafmining taxa (10 families); Tineoidea, Zygoidea, and Sphingidae. The fauna is contrasted with that of southern New England and rough estimates are suggested for the total lepidopteran richness at La Selva.

SYMPOSIUM: Species in Concept and Practice: Drawing Boundaries in the Landscape of Diversity.

1:10 – 1:40 PM:

Introduction.

By Michael M. Collins, 11901 Miwok Path, Nevada City, California, 95959 and Carnegie Museum, Pittsburgh, Pennsylvania. Email: mmc@oro.net.

Abstract: The Biological Species Concept (BSC), based on genetic cohesion within species and reproductive isolation (RI) from near relatives, has served biologists for 50 years; but recently has been challenged by the Phylogenetic Species Concept (PSC). Systematists, using computer-aided cladistic methods, question the practicality of demonstrating RI, and argue that using genetic compatibility is of no taxonomic worth, since it is a shared, ancestral trait. PSC species are monophyletic endpoints of branching ancestor-descendant lineages, established by analyzing patterns of shared, derived traits. Population geneticists concentrate on process: adaptation, population divergence, integrity of gene pools, and the origin of reproductive isolation. Defining species with different characters; often RI evolves slowly and gene exchange may occur between otherwise distinctive taxa. Furthermore, if select genes are surveyed, many species appear paraphyletic. Concepts based on gene tree concordance or gene pool cohesion address these problems. The PSC may best be applied to large species groups, genera and families; aspects of the BSC best apply to populations and nascent species/subspecies. The two disciplines can be complimentary. Our symposium tries to present a broad sampling of the application of various methodologies in practical studies of speciation in Lepidoptera.

1:40 – 2:10 PM:

The Case for Reproductive Character Displacement in *Hemileuca electra* (Saturniidae).

By Steve McElfresh, Department of Entomology, University of California, Riverside, California, 92521. Email: stevemce@ucr.edu.

Abstract: Reproductive Character Displacement (RCD) has been defined as "a pattern of greater divergence of an isolating trait in areas of sympatry between closely related taxa than in areas of allopatry" (Howard, 1993). RCD is one potential outcome of an allopatric speciation event in which a parental population becomes divided and gene flow between the two resulting populations ceases. After a period of time, the two populations may have diverged to such a degree that experimental hybrids between them are unfit or inviable. Should such populations become parapatric, prezygotic isolating traits tending to prevent interspecific matings will be perfected by natural selection, based on the reduction of gametic wastage in unfit hybrids. Although sound in concept, few convincing examples of RCD have been found in nature. My studies of the mating system in *Hemileuca electra* have revealed

geographic variation in the sex pheromone mating system. Both female sex pheromone chemistry, and male perception and response behavior can be explained as RCD in response to a congener, *H. burnsi*, limited to areas of sympatry. I contend that this may be the best demonstration of RCD in Lepidoptera to date.

2:10-2:40 PM:

Post-zygotic Isolation in Lepidoptera: The origins of hybrid sterility and inviability.

By Robert Hagen, Department of Entomology, University of Kansas, Lawrence, Kansas, 66045. Email: rhagen@ukans.edu.

Abstract: The establishment of reproductive isolation between formerly interbreeding populations is a central event in speciation. A common feature of this process is the evolution of postmating barriers, physiological or development traits that reduce the success of progeny from interspecific matings. Such traits reduce fitness and cannot be selected for, but rather are thought to evolve as the byproduct of overall genetic divergence in allopatry. Because the process cannot be observed directly, we must base our conclusions on genetic studies of populations and species at various stages of divergence. Two patterns are encountered commonly when animal species are experimentally hybridized. Haldane's Rule are cases of partial or complete sterility or inviability confined to the heterogametic sex (e.g. XY males). The second could be termed the "X-rule", genes responsible for postmating barriers are often sex-linked. Most data have come from genetic studies of *Drosophila*. Studies of Lepidoptera provide important confirmation of the generality of these models. Unlike fruitflies, lepidopteran females are heterogametic; dosage compensation for X-linked loci is not known; and chromosomes are usually numerous and relatively small. I review the theoretical background on the subject, the current state of knowledge, then discuss the promising hypotheses and directions for future work.

2:40 – 3:00 PM: BREAK

Poster: The Function of the Tentacular Organs of Lycaenids in the Context of an Ant-Lycaenid Mutualism.

By Jeniifer Weeks, University of Arizona, Department of Ecology and Evolutionary Biology, BSW Building, P.O. Box 210088, Tucson, Arizona, 85721-0088. Email: weeks@u.arizona.edu

Abstract: The larvae of many lycaenid butterflies possess specialized exocrine glands that mediate their associations with ants. The tentacular organs are paired structures located behind the dorsal nectary organ on the top of the seventh abdominal segment. When everted, the tentacular organs appear as long, inflated tubular structures capped by branched setae. Previous behavioral observations and chemical evidence suggest that the eversions are coupled with the release of a volatile substance mimicking the alarm pheromone of attendant

ants (Malicky 1969, Henning 1983). Videotaped observations of *Hemiargus isola* (Lepidoptera: Lycaenidae) and *Camponotus festinatus* (Hymenoptera: Formicidae) suggest that contact with the tentacular organs is necessary to elicit the alarm response.

Poster: A Survey of Fecal Firing and Housecleaning in Lepidopteran Caterpillars.

By Brent A. Salazar, 19 Heather Drive, LaSalle, Illinois, 61301. Email: basalaz@ilstu.edu
(Student Paper)

Abstract: The close proximity of conspecific feces may be an important liability for Lepidopteran caterpillars for at least three reasons: the feces may attract predators and/or parasitoids; it may harbor and spread microbial disease; and for shelter building caterpillars, the buildup of feces may necessitate the building of a new shelter. Fecal firing and fecal housecleaning are two behaviors employed by caterpillars to distance themselves from their feces. In this study, we tested caterpillars fecal firing and housecleaning in order to address the following four questions: are these two behaviors associated with shelter building and/or leaf position; are they negatively associated with morphological defenses (hairiness, spines, etc.); are they negatively associated with aposematic coloration; and are they phylogenetically distributed.

3:00 – 3:30 PM:

Incongruent Data Sets from Lycaeides.

By Chris C. Nice, Nicola Anthony, Denise Ganser and Richard French-Constant, Department of Entomology, 840 Russell Labs, 1630 Linden Drive, University of Wisconsin, Madison, Wisconsin, 53706. Email: ccnice@facstaff.wisc.edu.

Abstract: Different data sets often yield different explanations of evolutionary history. Data from geographic variation in wing patterns, male genital morphology and habitat/hostplant use from the *Lycaeides melissa/idas* group in North America are incongruent with biochemical and molecular genetics data. The genealogical species concept is employed to evaluate the possible role of parallel adaptation, introgression, and ancestral polymorphism in the evolutionary history of these closely related taxa.

3:30 – 4:00 PM:

Introgression: The Use of New Techniques to Measure Gene Flow and Introgression in Assigning Species Boundaries.

By Adam Porter, Department of Entomology, 102 Fernald Hall, University of Massachusetts, Amherst, Massachusetts, 01003. Email: aporter@ent.umass.edu

Abstract: Systematists describing new species use differences in diagnostic traits to infer the presence of reproductive isolation, justified by the assumption that introgression would have otherwise eliminated such traits. Interestingly, this assumption does not always hold. Natural selection can maintain diagnostic differences even when introgression in other traits is still strong. I am developing new techniques to detect and measure the extent of such introgression. A spectrum of introgression traits may occur between hybridizing taxa, depending on two factors: first, whether a trait is itself under selection and second, the degree of genetic linkage to other selected traits. In the *Pontia daplidice-edusa* hybrid zone in Italy, different markers introgress at significantly different rates. This also occurs when sympatric taxa hybridize. In the *Colias eurytheme/philodice* system, pure species phenotypes are reconstituted in F₂ and backcross generations because most differences are sex-linked. Evidence from a new method for measuring sympatric introgression in the face of stabilizing selection is presented. Both weak stabilizing selection and strong introgression act to homogenize differences in allozyme markers in *C. eurytheme* and *C. philodice*. Is this system better understood as a pair of species or as a single species with a complex X-chromosome polymorphism? The answer turns on how ecologists and evolutionary biologists use species classifications in subsequent research.

4:00 – 4:30 PM:

Cladistic Hypotheses and Species in Geographic Space: the Case of *Heliconius* butterflies.

By Andy Brower, Department of Entomology, Oregon State University, Corvallis, Oregon, 97331. Email: browera@bcc.orst.edu

Abstract: The paradox of species in evolutionary thought has promoted much debate, and numerous incompatible definitions and concepts. My paper will argue that although the phylogenetic species concept (my version of it at least) is no more accurate a description of speciesness than any other species concept, it possesses a logical basis that makes it more susceptible to empirical testing than other concepts. The practical implications of phylogenetic/cladistic species concepts for determining the boundaries between geographically differentiated sister taxa will be explored using the example of *Heliconius*, based on my work and the recent studies of Mallet and others. The question of

circumscription, with particular reference to the concepts of subspecies and geographic races, will also be addressed.

4:30 – 5:00 PM:

Review and Summary: In Search of the Perfect Fix.

By Arthur M. Shapiro, Division of Biological Sciences, Center for Population Biology, Storer Hall, University of California, Davis, Davis, California 95616. Email: kmmerk@ucdavis.edu

Abstract: We have repeatedly tried and failed to paper over serious problems with the conceptualization and definition of species. Everything that has happened recently has only made matters worse. Moreover, our success in raising public awareness of conservation issues has led inexorably to an impenetrable thicket of laws and regulation that depends on defensible definitions of taxa. Montaigne (1595) said that "there never were in the world two opinions alike.....the most universal quality is diversity". Can we reconcile legal and ideological formalisms with the compelling messiness of nature?

5:30 PM: Steak Cookout at Gammon's Gulch Ghost Town in Benson. Meet in front of the Windemere Hotel at 5:30 PM to arrange car-pooling and caravan for the 40 minute drive. Evening should last about 2 ½ to 3 hours.

Saturday, 7 August 1999:

9:00 AM – 4:00 PM: Commercial and member exhibits. Grand Ballroom annex, Windemere Hotel.

9:00 AM – 4:00 PM: Photo Salon, Grand Ballroom annex, Windemere Hotel.

8:30 – 8:45 AM: Announcements.

8:45 – 9:05 AM:

Demonstration of an Expert System for the Armyworm Genus *Spodoptera* Guenée, 1852 (Lepidoptera: Noctuidae).

By Michael G. Pogue, c/o Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington D. C., 20560-0168. Email: mpoque@sel.barc.usda.gov

Abstract: About half of the 31 species of *Spodoptera* are of economic importance to world agriculture. To more efficiently and accurately make identifications, an expert system was developed. An interactive computerized key or expert system is becoming the wave of the future in disseminating knowledge from the systematist or "expert" to the lay person. The system allows the user to select any character of their choice from a list of characters to identify a particular taxon. The user compares illustrations and written descriptions of the character states to the specimen selected for identification. As character states are selected, the system eliminates all taxa that do not have the selected state until the identification is made.

9:05 – 9:25 AM:

Complex Contact Between Modest Genitalic Differentiates, *Pyrgus communis* and *Pyrgus albescens* (Hesperiidae).

By John M. Burns, Entomology Department, Smithsonian Institution, Washington D. C., 20560-0127. Email: burnsj@nsmnh.sii.edu

Abstract: These skippers have had a checkered history. Repeatedly treated, they have been ranked by some workers as species and by others as subspecies. Superficially they are inseparable—a drawback with an advantage: it permits random sampling. Morphologically they differ in the valvae (or claspers) of the male genitalia. Over the past four decades, I have accumulated and dissected and pondered innumerable males. Widespread in North America, *Pyrgus communis* is essentially more northern than *P. albescens*; but the two species are in extensive and complex contact. Variation in the valvae is notably great. To interpret such variation in areas of contact, one must compare the variation outside of those areas.

9:25 – 9:45 AM:

Taxonomic Implications of Mislabeled Type Specimens from the O. T. Baron Collection at the BMNH, with Systematic Notes on Neotropical Skippers (Hesperiidae).

By Andrew D. Warren, Department of Entomology, Oregon State University, Corvallis, Oregon, 97331-2907. Email: warrena@ava.bcc.orst.edu

(Student Paper)

Abstract: Various skipper type specimens from the O. T. Baron collection in The Natural History Museum (BMNH), London, England, from "Zamora, Ecuador", are shown to be mis-labeled, and type-localities of two species are amended to "Guerrero, Mexico" (*Dalla mentor* Evans, 1995 and *Librita raspa* Evans, 1955). Other skipper specimens in the BMNH from Baron's collection, labeled from "Zamora, Ecuador", that are suspected of being from "Guerrero, Mexico" are identified. The possibility of the reverse mis-labeling error having occurred (specimens from Zamora, Ecuador labeled from Guerrero, Mexico) is discussed. Evans' concept of the genus *Librita* is discussed. With the type locality of *Librita raspa* corrected, *Pratrytone miahua* Steinhauser, 1996, is made a new synonym of *Paratrytone raspa*, (new combination). Taxonomic positions of *Librita librita* (Plötz, 1886), and the "rare" *L. heras* (Godman, 1900) are discussed, based on the recent discovery and collection of females of both species.

9:45 – 10:05 AM:**The Effects of El Niño on High Altitude Moth Populations in Northwestern Wyoming Wilderness Areas.**

By Karölis Bagdonas, Department of Biological Sciences, P.O. Box 2116, Sam Houston State University, Huntsville, Texas, 77341. Email: bio_krb@shsu.edu

Abstract: El Niño had dramatic effects on weather conditions in northwestern Wyoming in 1998 and subsequently affected the populations of most Lepidoptera throughout Wyoming. Particularly noticeable was the makeup of moth populations in northwestern Wyoming wilderness areas. Heavy snows, rains, and frequently changing warm winds especially altered moth populations in the Fitzpatrick and Washakie Wilderness Areas in the Wind River and Absaroka Ranges, respectively. Monitoring of grizzly bear moth food species in the family Noctuidae showed Noctuine, Plusiine, Euxoine, and Anartine species were in great abundance with many new species being recorded. The new species came from all directions with heavy representation from the Southwest, Northwest, Great Basin, eastern Plains, Canada, and the Southeast. Few moth species showed a decline in population levels in 1998. Most noticeable was the sharp decline of *Pradiarsia littoralis* and *Dicestra trifolii*, two noctuids important in grizzly diets in past years.

10:05 – 10:20 AM: BREAK**Poster: The Lepidoptera Collection at the National Collection of Insects, Mexico.**

By Manuel A. Balcázar-Lara, Colección Nacional de Insectos, Departamento de Zoología, UNAM, Apdo. Postal 70-153, C.P. 04510 Mexico, D. F., MEXICO. Email: mabl@servidor.unam.mx

Abstract: A brief summary of historical events related to the National Collection of Insects, Mexico, founded in 1929, is presented. The collection houses more than 150,000 spread specimens from all biogeographical regions of Mexico (more than 250 localities). Although the great majority of the specimens are from tropical Mexico and Mesoamerica, there are specimens from all zoological realms. At least another 300,000 papered specimens are kept in an associated collection. All families of Lepidoptera reported from Mexico are represented in the collection. The best represented groups are butterflies (Papilionoidea) with more than 50,000 specimens; as well as the families Saturniidae with more than 2,000 specimens; Sphingidae with 2,500; and Arctiidae with 6,500. With regards to this group, 95% of the species belonging to the fauna of Mexico are represented. The type collection includes 85 primary types (holo and lectotypes), and 198 tertiary types (para and allotypes) of 99 species mostly from Mexico. The collection is presently being catalogued with the program Biota, more than 65,000 specimens and associated information have been captured in the database to date.

Poster: A Survey of Fecal Firing and Housecleaning in Lepidopteran Caterpillars.

By Brent A. Salazar, 19 Heather Drive, LaSalle, Illinois, 61301. Email: basalaz@ilstu.edu
(Student Paper)

Abstract: The close proximity of conspecific feces may be an important liability for Lepidopteran caterpillars for at least three reasons: the feces may attract predators and/or parasitoids; it may harbor and spread microbial disease; and for shelter building caterpillars, the buildup of feces may necessitate the building of a new shelter. Fecal firing and fecal housecleaning are two behaviors employed by caterpillars to distance themselves from their feces. In this study, we tested caterpillars fecal firing and housecleaning in order to address the following four questions: are these two behaviors associated with shelter building and/or leaf position; are they negatively associated with morphological defenses (hairiness, spines, etc.); are they negatively associated with aposematic coloration; and are they phylogenetically distributed.

10:20 – 10:40 AM:**The Moth Fauna of the southern Appalachians: A Delightful Mix of Northern and Southern Influences.**

By James K. Adams, Department of Natural Science and Math, Dalton State College, 213 N. College Drive, Dalton, Georgia, 30720. Email: jadams@em.daltonstate.edu

Abstract: The moth fauna of the southern Appalachians, particularly in Georgia and Alabama, has been little studied. This presentation is intended to give an overview of the diversity of certain moth families (particularly Noctuidae, Geometridae, and Limacodidae) in the southernmost reaches of the Appalachians, emphasizing those species which represent significant range extensions to the south. Reasons for the impressive diversity here in the southern Appalachians are discussed, including significant topographical relief, comparatively mild winters (the winter moth fauna is particularly rich) and the fact that there is a significant influence from subtropical Florida to the south. An attempt has been made to show a number of species that are not illustrated in any of the available field guides (to date).

10:40 – 11:00 AM:

The California County Moth List: 15,000 Entries, 5th Version.

By Kelly Richers, 9417 Carvalho Court, Bakersfield, California, 93311.

Email: kerichers@lightspeed.net or kerichers@wasco.k12.ca.us

Abstract: This is the 5th rendering of this attempt to list the moths of California by where they occur in each county, with a listing of an actual locality and specimen from that location. About 30 copies of the list will be made available to attendees along with county lists for each California county. Usually this has been presented at the Pacific Slope meeting.

11:00 – 11:20 AM:

The Alaska Lepidoptera Survey: A Progress Report.

By Kenelm W. Philip, Institute of Arctic Biology, University of Alaska, Fairbanks, Alaska, 99775-7000. Email: fnkwp@uaf.edu

Abstract: The Alaska Lepidoptera Survey was begun in 1970. Since that time over 600 volunteer collectors (and myself) have contributed specimens from 24° of latitude and 245° of longitude in arctic/subarctic regions of North America and NE Russia. The Alaska butterfly fauna now stands at 83 species. Any additional species (aside from sibling species) are expected to come from the Yukon and British Columbia faunas. About 10% of the Alaska butterflies are endemic Beringian (NE Russia/Alaska/Yukon) species. Nearly half of these are satyrids, and nearly half (not the same half) are restricted to scree/blockfield habitats. Much more work on moths is needed before we approach the total fauna.

11:20 – 11:40 AM:

Connecticut's Changing Butterfly Fauna: Evidence from the Connecticut Butterfly Atlas Project.

By Jane E. O'Donnell, Ecology and Evolutionary Biology, U-43, University of Connecticut, Storrs, Connecticut, 06269-3043. Email: bioadm4@uconnvm.uconn.edu

Abstract: The composition of Connecticut's butterfly fauna as determined through the Connecticut Butterfly Atlas Project (CBAP) is compared with the pre-project fauna of the state. Museum searches indicate the historic presence of several species that apparently no longer occur in Connecticut. Conversely, CBAP vouchers from the first four years of the project reveal the existence of other butterfly species not previously reported from the state. Species in the former category are more numerous than those in the latter. Taxonomic, geographic and life history patterns are analyzed to determine possible reasons for the decline in the number of species. Implications for butterfly conservation in the state and region, and the role of surveys in documenting faunal change, are discussed.

11:40 – 12:00 PM:

Monarch Butterflies' (*Danaus plexippus*) Migratory State is Robust to Changes in Environmental Conditions.

By Sandra Perez, Department of Biological Sciences, 500 University Boulevard, University of Texas at El Paso, El Paso, Texas, 79968-0513. Email: sperez@u.arizona.edu

Abstract: Throughout the fall, eastern North American monarch butterflies migrate to Mexico. It is unclear whether the cues initiating migration, most likely a suite of environmental factors, is necessary for maintaining migratory behavior throughout the fall season or whether migratory condition is a state that, once triggered, remains turned "on". We investigated this migration trigger hypothesis in two ways, first by artificially changing the environmental conditions of migratory butterflies and second, by changing the natural environmental conditions (i.e. displacing the butterflies south). Migratory butterflies manipulated in both of our experimental treatment groups continued to show significant directionality, in contrast to non-migratory butterflies that showed no significant directionality. This is the first study to demonstrate experimentally that monarch butterfly migratory behavior once triggered is robust to changes in environmental conditions.

12:00 – 12:45 PM: Lunch on Your Own.

12:45 – 1:00 PM:

Magnetic Orientation on Monarch Butterflies.

By Chip Taylor, Department of Entomology, 7005 Haworth Hall,
University of Kansas, Lawrence, Kansas, 66045. Email:
chip@ukans.edu

Abstract: Fall migratory monarch butterflies, tested for their directional responses to magnetic cues under three conditions, amagnetic, normal, and reversed magnetic fields, showed three distinct patterns. In the absence of a magnetic field, monarchs lacked directionality as a group. In the normal magnetic field

1:00 – 1:20 PM:

Preliminary Assessment of Species Turnover in the Tortricid Moths (Tortricidae) of Plummers Island, Maryland, U.S.A.

By John W. Brown, Systematic Entomological Laboratory, USDA, c/o
National Museum of Natural History, Washington, D. C., 20560-0168.
Email: jbrown@sel.barc.usda.gov

Abstract: During the period 1901 through 1998, 103 species of tortricid moths (also known as leafrollers) have been present at one time or another on Plummers Island and the adjacent northern shore of the Potomac River, Maryland, U.S.A. The number of species of leafrollers has declined dramatically over the last century from 63, in the decade 1901-1910, to 31 in the decade 1991-1998 – a reduction of 51% in species richness. Of the 63 species present at the turn of the century, only 15 are still present, resulting in a faunal similarity between the two decades of 0.19 and a species turnover of 81%. These findings are consistent with previously reported species declines and turnover in the carabid beetle (Carabidae) fauna of Plummers Island, but are considerably more dramatic. The most likely explanation for the faunal turnover is community succession; the vegetation of the area has changed from an open juniper grassland at the turn of the century, to a sub-mature hickory-maple woodland today. This hypothesis is consistent with the proposal that forest maturation is the mechanism behind regional declines of several bird and mammal species that require early successional habitat in the northeastern United States.

1:20 – 1:35 PM:

A New *Sparganothoides* from Texas (Tortricidae).

By James J. Kruse and Jerry A. Powell, Division of Insect Biology, 201
Wellman Hall, University of California, Berkeley, California, 94720-
3112. Email: Kruse@nature.berkeley.edu
(Student Paper)

Abstract: A new species of *Sparganothoides* is described and illustrated, and compared with other members of the genus. This species is known only from Big Bend National Park, though at least three similar species may be found in nearby Mexico.

1:35 – 1:50 PM:

A mitochondrial phylogeny of the genus *Hemileuca* (Saturniidae)
By Daniel Rubinoff and Felix Sperling, Division of Insect Biology, 201
Wellman Hall, University of California, Berkeley, California, 94720.
Email: drubinof@nature.berkeley.edu
(Student Paper)

Abstract: The genus *Hemileuca* has its greatest diversity in the American southwest, however little phylogenetic work has been done on the group and relationships between species groups are poorly understood. *Hemileuca* has most recently been divided into seven species groups based on morphological and ecological characters (Tuskes, Tuttle and Collins 1996). We sequenced 600 base pairs from the COI gene of mitochondrial DNA from 13 species (including all seven species groups) to examine phylogenetic relationships and develop hypotheses about character evolution in the genus.

1:50 – 2:05 PM:

Is the Hemlock Looper, *Lambdina fiscellaria* (Gn.) more than One Species?

By Felix Sperling, Division of Insect Biology, 201 Wellman Hall,
University of California, Berkeley, California, 94720-3112 and
Department of Biological Sciences, University of Alberta, Edmonton,
Alberta, Canada, T6G 2E9. Email: sperling@nature.berkeley.edu

Abstract: A survey of mitochondrial (mt) DNA sequence variation across the range of the hemlock looper showed two distinct mtDNA lineages on the east coast and west coast ends of its range. However, there was substantial geographic overlap of these two mitochondrial lineages from Saskatchewan to Quebec, suggesting extensive gene flow between east and west.

2:05 – 2:20 PM:

Molecular Systematics and the Macroevolution of Host Plant Use in *Papaipema* (Lepidoptera: Noctuidae) with comments on other endophagous Apameini.

By Paul Z. Goldstein, Department of Entomology, American Museum of Natural History, Central Park West @ 79th Street, New York, New York, 10024. Email: zoltan@amnh.org

Abstract: DNA sequence data from mitochondrial and nuclear genes are used to reconstruct relationships among the extant species of *Papaipema*. Based on the most parsimonious reconstruction of those data, it is inferred that associations with all host plant groups for which there are more than one associated *Papaipema* arose multiple times, that is, host plant association appears to have been rarely conserved in the evolution of the group. An exception occurs in the *Papaipema birdi* complex, which are associated primarily with Apiaceae (=Umbelliferae). The rapid radiation of *Papaipema* and their concomitant colonization of a wide breadth of dicotyledonous host plants appears to have coincided with a primitive diapause shift from overwintering as larvae to overwintering as eggs.

2:20 – 2:35 PM:

Evolution of a Nucleotide Spacer Flanking Cytochrome Oxidase I in Lasiocampidae.

By Joshua Harbeck, Division of Insect Biology, 201 Wellman Hall, University of California, Berkeley, California, 94720. (Student Paper)

Abstract: A nucleotide spacer flanking the mitochondrial cytochrome oxidase I gene in the family Lasiocampidae is reported. The length of the spacer region varies across taxa, reaching its greatest size in the genus *Malacosoma*. The evolution of the spacer is analyzed in a phylogenetic context, and implications for its use in population genetics of the *Malacosoma californicum* subspecies complex are discussed.

2:35 – 2:50 PM: Break

Poster: The Function of the Tentacular Organs of Lycaenids in the Context of an Ant-Lycaenid Mutualism.

By Jenifer Weeks, University of Arizona, Department of Ecology and Evolutionary Biology, BSW Building, P.O. Box 210088, Tucson, Arizona, 85721-0088. Email: weeks@u.arizona.edu

Abstract: The larvae of many lycaenid butterflies possess specialized exocrine glands that mediate their associations with ants. The tentacular organs are paired structures located behind the dorsal nectary organ on the top of the seventh abdominal segment. When everted, the tentacular organs appear as long, inflated tubular structures capped by branched setae. Previous behavioral observations and chemical evidence suggest that the eversions are coupled with the release of a volatile substance mimicking the alarm pheromone of attendant ants (Malicky 1969, Henning 1983). Videotaped observations of *Hemiargus isola* (Lepidoptera: Lycaenidae) and *Camponotus festinatus* (Hymenoptera: Formicidae) suggest that contact with the tentacular organs is necessary to elicit the alarm response.

2:50 – 3:10 PM:

Population Dynamics and Displacement of Silver-studded Blue (*Plebejus argus*) in Open or Closed Habitats.

By Michihito Watanabe, 3904-2 Narusawa-mura, Yamanashi-ken, 401-0321, Japan. Email: mich2530@aol.com

Abstract: I've made surveys on population dynamics and adult displacement in two grasslands of Mt. Fuji in Japan, for 13 days in three successive seasons in 1996-1998 with mark and recapture methods. In Area I, closed grassland surrounded by forest, the estimated number by the Petersen Method would more fit for the real numbers than by the Jolly-Seber Method which under-estimated for 1997. Some resident male and female specimens were observed for about 2 weeks. In Area II (for one season), open grassland under the ski-lifts, the recapture rate was smaller than for Area I. The estimated number by the Petersen Method would have been over-estimated. These data would suggest that the frequency of displacement in adults would be most influenced by the environment of the habitat, whether it is open or closed.

3:10 – 3:25 PM:

How Butterflies See the World: Experimental and Pseudopupil Studies.

By Ron Rutowski, Department of Biology, Arizona State University, Tempe, Arizona, 85287-1501. Email: r.rutowski@asu.edu

Abstract: Although butterflies are well known as visual animals, surprisingly little is known about how they see the world. We have examined the structure and performance of their visual system using both pseudopupil analyses and experimental studies. Pseudopupil analysis reveals that butterflies have a huge visual field with little binocular overlap. Moreover, their visual acuity is highest in the frontal region of the field and in an equatorial band around the head. Males have larger eyes and more acute vision than females. Field experiments on eye performance corroborate inferences from the pseudopupil studies including the idea that

distance vision in butterflies is limited to a few meters. I will discuss the implications of these results for our understanding of the behavior and ecology of butterflies.

3:25 – 3:40 PM:

Bait Traps: New and Old Designs. The Pro's and Con's.
By Leroy C. Koehn, 6085 Wedgewood Village Circle, Lake Worth, Florida, 33463. Email: Leptraps@aol.com

Abstract: There have been two basic designs that have been widely used by lepidopterists. A cylinder with an inverted funnel and without. The flat bottom design increases the capture ratio over the inverted funnel and reduces the percentage of escape of the plain cylinder. Adding a shroud or hood to the top of the trap provides a dark area for moths to hide, especially *Catocala* moths, while reducing the frantic flight of trapped lepidoptera. The basic bait is still the most effective for general trapping.

3:40 – 3:55 PM:

A Reevaluation of *Parapedaliodes* Forster (Lepidoptera: Satyridae).
By Angel L. Vilorio(1), Lee D. Miller(2), and Jacqueline Y. Miller(2).
(1)Museo de Biología, La Universidad del Zulia, Maracaibo, Venezuela; (2)Allyn Museum of Entomology, Florida Museum of Natural History, Sarasota, Florida, 34234. Email: jmiller@virtu.sar.usf.edu

Abstract: Forster (1964) established the nominal genus *Parapedaliodes* with *Pronophila parepa* Hewitson as its type-species and included a group of Bolivian species: *Pedaliodes milvia* Thieme, *Pronophila parthoebia* Hewitson, and *Pronophila phintia* Hewitson. Upon review, we have concluded that *P. parthoebia* and *P. phintia* are not congeneric with the type-species of *Parapedaliodes*. Similarly, *Pronophila phoenicusa*, a species originally placed by Forster (1964) in the closely allied genus, *Muscopedaliodes* Forster is not associated with that assemblage. The parameters of *Parapedaliodes* will thus be redefined and include several new taxa from Ecuador and Columbia.

3:55 – 4:10 PM:

Chemical Ecology of *Cosmosoma myrodora*, the Scarlet-Bodied Wasp Moth (Arctiidae).
By William E. Conner(1), Ruth Boada, Frank Schroeder, and Thomas Eisner. (1)Department of Biology, Wake Forest University, P.O. Box 7325, Winston-Salem, North Carolina, 27109. Email: conner@wfu.edu

Abstract: The scarlet-bodied wasp moth has an intimate relationship with plants containing pyrrolizidine alkaloids (PAs). Although the larvae feed on the PA-free composite *Mikania scandens*, adult males in south-central Florida visit *Eupatorium* species and collect PAs from their surface. The PAs collected in this manner contribute to the defense of males against predators such as the orb-weaving spider *Nephila clavipes*. The alkaloids are also concentrated in the flocculent fibers of the subabdominal pouch of the male. The male explosively discharges the alkaloid laden fibers during courtship. The fibers adhere to the antennae and body of the female. An aliquot of the alkaloids are also transferred to the female during copulation where they may protect her eggs and contribute to her own chemical defense.

4:10 – 4:25 PM:

The Travelling Lepidopterist.
By John H. Masters, 26503 Hillsfall Court, Newhall, California, 91321.
Email: jhmasters5@aol.com

Abstract: Lepidoptera collecting expeditions, a long way from home, are more feasible and less expensive than ever before. Everyone has an opportunity to experience arctic, subtropical, alpine, etc. collecting in North America at a reasonable cost, no matter where they might live. Air travel, of course, is essential to this, but this can be far less expensive than you may think. Means to reduce air travel cost to 25-50% of published fares and, at the same time, to do away with some of the restrictions, are discussed. In addition to air, auto rentals, hotels, and guided services are discussed for North and Central America.

4:25 – 4:40 PM:

Selection for "Perfect" Mimicry Along a Model Unpalatability Spectrum.
By David B. Ritland, Department of Biology, Erskine College, Due West, South Carolina, 9639. Email: dritland@erskine.edu

Abstract: Defensive color-pattern mimicry only "works" if (a) the model is sufficiently noxious that predators learn to avoid it, and (b) the mimic is a sufficiently good imitation that it deceives predators and falls under the model's umbrella of protection. Theoretically, as a mimicry relationship evolves, visually discriminating predators continually select for better pattern-matching on the part of the mimic. Under certain circumstances, however, a "breakdown of mimicry" may occur, allowing imperfect mimics to persist in the mimic population. I assessed the degree of protection accruing to "perfect" and "imperfect" mimetic morphs of the viceroy butterfly (*Limenitis archippus*), using Florida queens (*Danaus gilippus berenice*) as models, and found that the strongest selection for mimetic perfection occurred when the model was moderately unpalatable. At either end of the model unpalatability spectrum, predator

discrimination breaks down, and "perfect" mimics have little advantage over "imperfect" mimics. This may be broadly significant in the continuing evolution of contemporary mimicry relationships.

5:30 – 6:30 PM: No-host social hour before the Banquet.

6:30 – 10:00 PM: Grand Ballroom, Windemere Hotel. Annual Banquet to be followed by the Presidential Address "Studying Southwestern Moths", Award presentations, and Door Prize drawing MC'd by Charles Covell. Also presented will be the Karl Jordan Medal honoree, Claude Lemaire, who will give a presentation on "Andean Lepidoptera (Saturniidae)".

Sunday, 8 August 1999.

8:30 – 8:40 AM: Announcements:

8:40 – 8:55 AM:

The "Not So Rare" Indra Swallowtail.

By Wayne H. Whaley, Department of Biology, Utah Valley State College, Orem, Utah, 84058. Email: whaleywa@uvsc.edu

Abstract: Historically the indra swallowtail was considered one of the rarest of North American butterflies. Its abundance and distribution is now better understood. The known distribution of the species is mapped. The distributions of the 12 described subspecies, including those most recently published (*Systematics of Western North American Butterflies*, T.C. Emmel, editor, Mariposa Press, 1998), are also delineated on maps along with the recorded larval host plants of each race. The ranges of some of the subspecies are known to be much more extensive than was once thought. Locations of newly discovered zones of introgression between races are provided. All 12 indra swallowtail races as well as their host plants are illustrated. Typical habitats of some of the races are illustrated.

8:55 – 9:10 AM:

Sagebrush (*Artemisia* spp.) Hosts of *Hemileuca hera* in Southeastern Idaho.

By Nancy Hampton, 545 E. 13th Street, Idaho Falls, Idaho, 83404.

Email: sahnlh@srv.net

Abstract: Big sagebrush *Artemisia tridentata* Nutt.) is widely cited as the principal, if not exclusive, food plant of *Hemileuca hera* Harris. However, food plants of *H. hera* in southeastern Idaho include both Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis* Beetle & Young) and threetip sagebrush (*A. tripartita* Rydb.). Although no previous reports of the use of *A. tripartita* by *H. hera* have been located, *A. tripartita* was formerly classified as part of the *A. tridentata* complex. Despite chemical and ecological similarities, there are also major differences between *A. tripartita* and *A. tridentata* ssp. *wyomingensis*. Because broad-scale disturbances to native sagebrush communities have increased, differences between host plant species may be important to the persistence of *H. hera* populations in southeastern Idaho.

9:10 – 9:25 AM:

Two New Species of Cochylini (Lepidoptera: Tortricidae: Tortricinae) from Eastern United States.

By Eric H. Metzler, 1241 Kildale Square North, Columbus, Ohio, 43229-1306. Email: spruance@infinet.com

Abstract: Intensive collecting in prairie habitats in Ohio and Indiana disclosed two undescribed species of Cochylini (Lepidoptera: Tortricidae). Illustrations of adults, ♂ genitalia, ♀ genitalia, and a distribution map for *Cochylis* new species and *Aethes* new species are provided. These two species may be indicators of habitat quality.

9:25 – 9:40 AM:

Three New Species and Two First North American Records of Geometrid Moths of the Subfamily Sterrhinae from Florida, Texas and Arizona.

By Charles V. Covell, Jr., Department of Biology, University of Louisville, Louisville, Kentucky, 40292-0001. Email: cvcove01@athena.louisville.edu

Abstract: During the past decade revisionary research by the author has revealed three undescribed species of *Idaea* Treitschke from Texas and Arizona, a new North American species record of *Idaea asceta* Prout from southern Texas, and a provisionally identified

