McGuire Center News

A newsletter of the McGuire Center for Lepidoptera and Biodiversity ▪ Florida Museum of Natural History ▪ **APRIL 2013**

FROM THE EDITOR: Andrei Sourakov

Nearly a decade ago, the McGuire Center for Lepidoptera and Biodiversity was built on the UF campus. It seems that only yesterday we were putting the final touches on the "Wall of Wings" in anticipation of the "official" opening in August 2004. By that evening, the titanic labor of moving the collections into their new home was nearly finished, but much work remained in merging dozens of separate collections into a single, coherent system, organized taxonomically. The approximately 25,000 drawers of Lepidoptera that we moved carefully from the Allyn Museum of Entomology in Sarasota, Florida State Collection of Arthropods and the University of Florida were now housed under one roof. The vastness of new rooms designed to house three times as many drawers promised at least 50 years of growth unhindered by the lack of space. That day, only native Florida butterflies were flying in the Butterfly Rainforest, and there were only a dozen staff and students working at the center, with the lab spaces viewed from the public area of the Museum mostly unstaffed.

Today, one can hardly find room in the collection compactors on any of the three floors of the Center. All that space that looked so empty and vast in 2004 has been filled with incoming collections. Hundreds of amateur and professional lepidopterists chose the McGuire Center as the facility where their labor of love and, frequently, their life's work, would be stored in perpetuity and used by the researchers. Recently, thanks to external funding, 21,000 new drawers have been purchased for curation to accommodate this growth.

One of the most popular museum exhibits in Florida, the Butterfly Rainforest has seen more than 100,000 visitors a year. The exhibit has a continuous population of up to 1,500 butterflies from 60-80 species at any given time, with more than 150 species from four continents displayed since it opened. The butterflies are accompanied by a variety of birds, from small finches to large toucanettes.

More than 50 staff, students and technicians now work at the Center, accompanied by many volunteers from the ranks of UF students and local community members. Research at the Center has led to more than 400 scientific Lepidoptera publications, and our staff currently produces three scientific journals: *Allyn Bulletin of Entomology*, *Tropical Lepidoptera Research* and *Lepidoptera Novae*. Many more valuable contributions to science have occurred as a result of visiting researchers from around the world utilizing the collections. We are currently planning the 2013 annual meeting of the 2,000-member international Lepidopterists' Society. The 2006 meeting held in Gainesville attracted more than 200 people from every state and 20 countries, and attendance is expected to increase for this year's meeting. The Center has trained many students who graduated with their Master's or Doctorate degree and are now employed as professors, educators or applied scientists around the world, from China to the Caribbean.

This newsletter highlights the McGuire Center's worldwide impact. In today's economic environment and the increasing challenge in obtaining public funding, I hope readers will find the six articles on these pages convincing evidence of the difference the McGuire Center has made to academic and public audiences.

IN THIS ISSUE:

Ornithoptera victoria, Solomon Islands

Catasticta chelidonis, Ecuador

Callicore excelsior pastazza, Ecuador

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Scientists work to overcome challenges of South American butterfly research

Keith Willmott, Associate Curator

Training the next generation of South American butterfly experts is a vital step in building the capacity for research on this diverse insect group in South American countries, which have the Earth's greatest number of butterfly species. I have been studying the tropical American (Neotropical) fauna for more than 20 years and every expedition brings new discoveries. Nevertheless, the manpower needed to gain an adequate understanding of the distribution and biology of this region's butterflies in the face of ongoing habitat loss and climate change is severely limited. An important part of the solution to this problem is developing strong research bases in Neotropical countries.

Mention the word biodiversity and many people immediately think of the Amazon basin. While Amazon communities are highly diverse, the eastern slopes of the Andes Mountains contain the world's richest faunas per unit area. The Andes Mountains stretch more than 5,000 miles from Venezuela to Argentina, with species replacing one another across different elevations and valleys. Mapping the complex butterfly distributions and understanding the origins of butterfly diversity in these often remote and poorly explored mountains is a major challenge requiring a large-scale collaborative approach. To confront this challenge, several colleagues and I formed the Tropical Andean Butterfly Diversity Project funded by the United Kingdom's Darwin Initiative, to help unite scientists, institutions and organizations researching butterflies of the tropical Andes. During 2006-2007, the project conducted eight one-week training courses in Bolivia, Colombia, Ecuador, Peru and Venezuela with 180 students, some of whom are now enrolled as graduate students in various institutions, including UF.

The McGuire Center has had a particularly strong program in graduate research on South American butterflies, housing a number of South American and U.S. students studying Neotropical butterflies. These students include Christian Salcedo and Mirian Hay-Roe, who work on *Heliconius* biology; Jonathan Saunders, Delano Lewis, Elena Ortíz and Sebastián Padrón, studying the evolution and classification of Riodinidae, *Heraclides*, *Catasticta* and Preponini butterflies, respectively; María Checa, who has been exploring seasonality in equatorial forest butterflies; and Geoff Gallice, who examines the relationship between butterfly abundance and their distribution. National Science Foundation Research Experiences for Undergraduates grants have enabled the McGuire Center to involve undergraduate students, including Ian Segebarth, Derick Crespo and Kirsten Verster, in small projects focusing on the evolution and classification of particularly complicated butterfly groups.

In addition to training students, another important task has been to make information on butterfly taxonomy and distribution broadly available to South American scientists as a foundation for future research. The Tropical Andean Butterfly Diversity Project compiled distribution data from more than 170,000 butterfly specimens in museums and digitized a nearly complete collection of print photographs of Neotropical butterfly "type" specimens compiled by Gerardo Lamas in Lima. These images are now available online through a collaboration with the Butterflies of America project, www.butterfliesofamerica.com, as a vital identification resource. During a workshop and conference on tropical Andean butterflies in Urubamba, Peru, which brought together 120 people from 12 countries, project members began using distribution data to identify research and conservation priority areas in the tropical Andes. We hope future fieldwork will target these areas to improve knowledge of their faunas and enhance host country collections.

Tropical Andean Butterfly Diversity Project Workshop, Urubamba, Peru

In the near future, the McGuire Center plans to develop a broad program focusing on the evolution and classification of Euptychiina butterflies, a group of about 400 species of Neotropical forest and grassland butterflies. Few other animal groups that are so challenging to identify are as diverse, large, conspicuous and commonly encountered by researchers, students and naturalists. Hundreds of thousands of euptychiine specimens in collections hold untapped data for studies in evolution and conservation. However, we estimate 47 percent of specimens, about 14,000 specimens at the McGuire Center alone, cannot be confidently identified. We are seeking funding to bring a graduate student and postdoc to the McGuire Center to work on the group, in collaboration with colleagues in Brazil, Colombia, Europe and the U.S.

For more information on Neotropical butterfly research at the McGuire Center, visit http://www.flmnh.ufl.edu/butterflies/neotropica/.

Cithaerias pireta pireta, Isla Colon in Bocas del Toro, Panama

The McGuire Center's role in agricultural entomology

James Hayden, Curator, Florida State Collection of Arthropods/McGuire Center

To detect, intercept and control plant pests that threaten Florida's native and commercially grown plants and agricultural resources is the official mission of the Division of Plant Industry, a subset of the Florida Department of Agriculture and Consumer Services. The Florida State Collection of Arthropods was created many years ago as a reference for identification, repository for voucher and type specimens, and basis for taxonomic research. The collection has become a world-class resource for taxonomists. The McGuire Center provided a new home for the Lepidoptera of the Florida State Collection of Arthropods, as well as its curators (first John Heppner and now myself).

Careful curation of this collection is important as a source of pride to researchers, but also because identifications need to be reported in a matter of days or even hours. We cannot, therefore, depend on outside agencies to execute this function. Additionally, the specimens sent to us for identification must be easily retrievable. Lepidoptera, as the largest radiation of metazoan plant feeders, are an important part of the Florida State Collection of Arthropods. In other words, there are plenty of pests among moths (and, occasionally, butterflies) to warrant the importance of a reference collection and specialists working with it.

Because systematics is a global science and Florida has diverse agriculture and international commerce, the Florida State Collection of Arthropods is global in scope. On average, one new exotic arthropod or pathogen is reported by the Division of Plant Industry in Florida every month, so identification efforts must be outward-looking and proactive.

The Florida State Collection of Arthropods has been co-curated with McGuire Center collections since the Center was built, allowing researchers to benefit from both collections. Florida State Collection of Arthropods and McGuire Center overseas Lepidoptera collecting efforts have focused primarily on the tropics, for example, the Caribbean surveys which sample the regional fauna that sporadically immigrates into Florida.

However, the McGuire Center's collections of temperate and subtropical Lepidoptera uniquely complement the tropical holdings with the most comprehensive accessions of European and Asian moths that I have seen among North American collections. The Center works with collectors who sample faunas comprehensively, with the result that Old World collections include economically important species as well as rarities. Examples include *Dendrolimus* species (pine-tree lappet moths) from Europe and Russia, *Lymantria* species such as the Asian Gypsy Moth and the Nun Moth, and many tortricid leaf rollers. They are typically well-prepared and often already identified.

These reference specimens are useful not only for Florida's forestry and agriculture, but also are available to any agency that wants to borrow specimens. Many of these are the targets of ongoing regional and national pest survey programs or eradication efforts. The service extends beyond Florida also for species with little economic importance. For example, I recently confirmed a new record from the northern U.S. by comparing specimens sent to the Center with European holdings. The collections located at the McGuire Center and its experts serve as a valuable resource for species identification on a global scale.

More information about the agricultural role of the collections is available online: www.freshfromflorida.com/pi/.

Garlic Moth Borer, *Dyspessa ulula*, France

Nun Moth, *Lymantria monacha*, Greece

Red-belted Clearwing Moth, *Synanthedon myopaeformis*, Germany

Olive-tree Pearl, *Palpita vitrealis*

Brown Oak Tortrix, *Archips xylosteana*

Green Oak Tortrix, *Tortrix viridana*

Caterpillar on milkweed, Monarch, *Danaus plexippus*

Monarch pupa

Monarch, freshly emerged adult, Florida

Ecotourism expeditions play vital role in conservation efforts

Court Whelan, Expedition Travel/McGuire Center

The value of the environment has historically been based on the presence of natural resources like minerals, metals, fossil fuels and building materials. With the advent of ecotourism, a new calculation of land value is possible: one based on the assemblage of charismatic wildlife and the natural beauty that environmentally conscious tourists pay to observe and experience.

This new era of conservation through ecotourism is exemplified in one of nature's greatest phenomena – the annual migration of the monarch butterfly. Each year, approximately 2 billion Monarchs migrate thousands of miles from across eastern North America and southern Canada to ancestral overwintering grounds 100 miles west of Mexico City.

For the past several decades, lepidopterists, molecular biologists and animal behaviorists from UF, the University of Kansas, and Harvard have studied these butterflies to unlock a multitude of secrets. Each year, we learn more about how they migrate, navigate and survive throughout the year in variable environments and amidst growing environmental concerns. Largely due to the findings and support from these researchers, as well as conservation organizations across Mexico, the United States and Canada, more than 57,000 hectares of land have been preserved as part of a United Nations Educational, Scientific and Cultural Organization World Heritage Site termed the Monarch Biosphere Reserve. Now a new contingent of conservation-minded visitors plays an equally critical role in the future of preservation, land conservation and research, with the McGuire Center and Florida Museum of Natural History leading the way.

Each year, professors, curators and students from the McGuire Center and Florida Museum engage in what is now one of the most powerful conservation tools in the world today – ecotourism. Since the founding of the McGuire Center, 320 ecotourists from across the U.S. and world have joined 15 separate ecotourism expeditions to witness the overwintering monarch butterflies in Mexico.

The McGuire Center and Florida Museum Travel Program's sphere of influence in conserving the Monarch migration event extends far and wide. While on the trip, money spent on lodging, transportation, food, park entrances, souvenirs and guide services adds value to the area. Simply put, there are significant economic incentives for local residents to keep the forest healthy so visitors continue to return year after year to witness the Monarch event and support the local economy.

With deforestation being a major problem in these areas, ecotourism creates a local conservation culture. The idea that the forests are worth more alive and well than if they were cut down for short-term profits is easy to comprehend. When poverty is a constant concern, simple economics is one of the most powerful engines for change.

Inspired by the sights, sounds and stories from these expeditions, participants often return home and share the knowledge they gleaned from the trip with friends, family and other community members. They learn about benefits of planting milkweed to provide hostplants for Monarch larvae, and I learned that many not only engage in butterfly gardening following their trip to Mexico, but start giving presentations to local clubs and schools.

Before spring migration, Monarch overwintering site, Michoacán, Mexico

Monarchs drinking from puddles on a warm day, Michoacán, Mexico

Monarch colony, Michoacán, Mexico.

The McGuire Center is proud to be involved with the ecotourism movement on many levels. Not only is the Center directly involved in the industry by planning and leading ecotours, but it actively trains students on an academic level. Through collaborative efforts between the McGuire Center, Florida Museum and the UF Department of Entomology and Nematology, undergraduate, Master's and Doctorate ecotourism majors are now offered, which prepare students for careers in both the academic and industry arenas of ecotourism.

For more information on ecotours offered through the McGuire Center and Florida Museum of Natural History, please contact Court Whelan at Expedition Travel, expeditiontravel@gmail.com or 352-871-2710.

Monarch tagged in Gainesville, Florida, to monitor migration route to the Mexican overwintering colony.

A Blue Morpho feeds on fruit in the Butterfly Rainforest exhibit.

Butterfly plant sale during ButterflyFest

"Pollinator parade" during ButterflyFest

A group from a childcare center tours the Butterfly Rainforest exhibit.

Volunteer opportunities provide something for everyone

Amy D. Hester, Volunteer Coordinator, Florida Museum of Natural History

As a young child enters the "Wall of Wings" in the McGuire Center, her eyes fill with wonder as she marvels at the thousands of moths and butterflies, and a love of science is ignited. The soaring ceilings and incredible colors are breath taking, even for long-time visitors and volunteers. In the last nine years, as many as 100,000 people a year have visited the Butterfly Rainforest, while countless more have watched researchers work in the viewing windows of the collections and labs and enjoyed the changing exhibits in the West Gallery.

The opening of the McGuire Center has "dramatically changed the institution," according to Center for Science Learning Director Betty Dunckel. Financially, the Butterfly Rainforest is the first exhibit that contributes to the Museum's operations year round. The McGuire Center also has influenced the Museum programmatically. From the wildly popular Florida Wildflower & Butterflies brochure and app to the NSF-funded Project Butterfly Wings to the Museum's largest annual event, ButterflyFest, held each fall, the McGuire Center has changed the way the Museum interacts with the public.

The Butterfly Rainforest also increased volunteer and staff opportunities. The Rainforest employs 12 staff, as well as one security guard, a third of the Visitor Services positions and also contributes to record-keeping personnel. The Butterfly Rainforest "created a revenue stream for the Museum that hadn't existed before," said Operations and Visitor Services Coordinator Jeff Hansen. In addition to the direct revenue from ticket sales, money generated from plant sales, ButterflyFest and Earth Day contributes funds toward special events and Museum departments.

Volunteers are also able to work with scientists in the McGuire Center. Volunteers do everything from pinning moths and butterflies to transferring label information into databases. These volunteers have increased the productivity of the researchers and co-authored scientific publications. The open viewing of scientists and volunteers in the collections and labs has increased the visibility of the Museum's public education efforts.

Along with additional staff positions, the Rainforest also created maintenance and interpreter volunteer positions. Longtime volunteer Barb Fennelly contributes to both maintenance and interpretation. She loves the knowledge she's gained and is interested in learning about butterflies from all over the world. As a retired school teacher, Fennelly appreciates that working in the Rainforest "gives me a chance to do something I love without the stress of formal teaching."

Working in the Rainforest and assisting researchers is not limited to adults, but is also available for the Museum's junior volunteers. Students can spend their summers volunteering in the Rainforest or McGuire collections. Some have continued volunteering in collections and the molecular biology lab during the school year and developed their own projects. Several of these projects have received invitations to the state level science fairs and resulted in two scientific publications co-authored by these students.

Public education efforts have also increased as Keith Willmott created a relationship between Exhibits and Public Programs and researchers by having his graduate students help in the Butterfly Rainforest during scheduled school group tours. These interactions have contributed to the Museum's Butterfly and Moth Exploration becoming the No. 1 requested school program.

With one of the world's largest Lepidoptera collections, the McGuire Center attracts attention from many national associations as well as local students and professors. A walk through the Museum on any given afternoon will reveal students searching for answers to their professors' scholastic scavenger hunt. The McGuire Center has also hosted the monthly North American Butterfly Association meetings and the annual Monarch Society dinners, as well as international meetings of the Lepidopterists' Society, Association for Tropical Lepidoptera and Southern Lepidopterists' Society.

Junior Volunteers identify moths in the collections,

The McGuire Center not only attracts researchers, but event planners and brides as well. Many public and private organizations host meetings, dinners and other events in the McGuire Center. Brides and grooms also often use the Rainforest for engagement photos and weddings, and the surrounding galleries for their receptions.

From observing scientists and emerging butterflies to enjoying daily butterfly releases, the McGuire Center provides an array of opportunities for Museum visitors that were not available before its opening. Volunteers have found working with scientists and interacting with the public engaging and rewarding. Volunteer Leslie Klein sums it up best when she says, "It is a magical, wonderful place and the whole community has benefitted from the increased awareness of the world around us."

Nature conservation at the McGuire Center

Jaret Daniels, Assistant Director of Exhibits and Public Programs, Florida Museum of Natural History

Conservation of biodiversity forms the basis of the McGuire Center's overall research and education mission. With millions of specimens representing most of the world's 20,000 butterfly species and many of the estimated 245,000 moth species, it all starts with collections. This vast "library of life" catalogs new faunal inventories, facilitates the description of new species previously unknown to science, and enables researchers to study the diversification of living forms and their evolutionary history. The collections also help document changes through time. This may include the loss or decline of species resulting from dwindling habitat, range shifts or alterations to phenology triggered by global climate change, or differences in the genetic structure of imperiled populations. So whether it be dried adult specimens, various life stages preserved in alcohol or frozen tissue samples, the collections provide a rich resource for research – the extent of which continues to grow with ever-emerging scientific tools, techniques and questions. Beyond collections, the McGuire Center has strategically addressed numerous additional critical conservation needs.

Species Recovery: McGuire Center researchers have initiated various programs to conserve imperiled and at-risk species. These include efforts to help combat the alarming decline of several charismatic Florida butterflies, including the Schaus' Swallowtail, Miami Blue, Florida Atala and Frosted Elfin. In most cases, recovery and management of these species are exceedingly challenging owing to the lack of knowledge about their biology, severely reduced remaining habitat, poorly understood management needs and complex policy and stakeholder issues. Several programs involve more aggressive captive breeding and organism reintroduction efforts.

An Atala Butterfly bred in captivity at the University of Florida

Professional Development: Zoos, natural history museums, botanical gardens and state and federal wildlife agencies are progressively focusing on insects, particularly groups such as butterflies and other pollinators, to help advance local conservation efforts and foster increased public interest and community engagement. Insufficient experience and familiarity with insects, however, prevent staff and institutions from adequately planning, implementing and evaluating conservation activities. The McGuire Center-based Imperiled Butterfly Conservation and Management program was developed to address this need. The four-year initiative involved more than 27 institutions and targeted 20 critically imperiled species. Through six national workshops, the program improved participant skill levels and their capacity to develop new conservation programs or enhance existing efforts by providing hands-on experience on the latest laboratory and field techniques.

Pollinator Conservation: Pollination is an essential ecosystem service. By conservative estimates, 75 percent of the Earth's flowering plants rely on animal pollinators, primarily insects, to ensure reproduction. Alarmingly, managed and wild insect pollinators have suffered declines in recent years, prompting calls for proactive strategies to help bolster their populations. Continued declines could adversely affect agricultural systems, result in increased vulnerability of some plant species to extinction and increase overall ecosystem disruption.

Though much attention has been placed on alternative management approaches in agricultural systems, it is clear that effective pollinator conservation must be comprehensively incorporated to include locales outside the basic farm margin.

The McGuire Center has led or helped lead several key research initiatives. In a multi-year study with the Florida Department of Transportation, researchers are investigating how mowing roadside vegetation and wildflower augmentation affects native pollinator richness and abundance. The information will be used to further refine best practices for vegetation management and native plant establishment techniques in linear easements. Partnering on a much larger national effort called the Integrated Crop Pollination Project, Museum and UF Department of Entomology researchers are developing tailored tactics including combined use of different pollinator species, habitat augmentation and crop management practices to provide reliable and sustainable pollination of U.S. specialty crops. McGuire Center researchers also are working with the Florida Wildflower Foundation to evaluate the use of conventional, Florida-friendly and native residential landscaping practices for enhancing urban wildlife and pollinator diversity.

The McGuire Center's research, public education and collaboration efforts have synergistically generated progress and direct conservation impact. The McGuire Center continues to amass one of the most prominent global collections, train the next generation of scientists and emerging conservation leaders, conduct high profile research, and produce real and lasting educational benefits.

A bee pollinates native Coreopsis flowers.

Butterfly plant propagation facility, Natural Resources Conservation Services, Oregon

Miami Blue butterflies raised in captivity, a mating pair.

Captive propagation facility at the McGuire Center

Karner Blue Butterflies are released as part of a reintroduction effort, Ohio.

Recent Publications (2012-2013)

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Caterpillar of *Antheraea polyphemus*, Florida

MCGUIRE CENTER SEMINAR SCHEDULE FALL SEMESTER, 2012

Aug. 28: Sebastian Padrón, Craig & Ian Segebarth & Delano Lewis, The McGuire Center: **"What I did last summer."**

Sept. 11: Alexandra Sourakov, Adrian Duehl and Andrei Sourakov, The McGuire Center: **"Foraging Behavior of the Blue Morpho and Other Tropical Butterflies: the Chemical and Electrophysiological Basis of Olfactory Preferences and the Role of Color."**

Sept. 25: Charles Covell, The McGuire Center: **"The 2012 Lepidopterists Society Annual Meeting at the Denver Museum: A Report on a Full and Varied Agenda."**

Oct. 9: Paul Severns, University of Washington, Vancouver: **"The benefit of considering evolutionary ecology for butterfly conservation: examples from the Pacific Northwest."**

Oct. 23: Delano Lewis, The McGuire Center: "How to take genitalia images on a low budget" and **"Ongoing Phylogenetic, Systematic, and RFID projects from the Lewis Lab."**

Nov. 6: Sandy Koi, Dept. of Entomology & Nematology, UF, and The McGuire Center: **"Magical Mystical Atala: Preliminary Biological Data on the biology of *Eumaeus atala* (Lycaenidae)."**

Nov. 13: Caroline Williams, Dept. of Entomology & Nematology, UF: **"The forgotten season: evolutionary ecology of winter warming."**

Dec. 4: Keith Willmott, The McGuire Center: **"Why do the eastern Andes have the world's richest butterfly fauna?"**

Staff News

Courses Taught - **Keith Willmott** and **Andrei Sourakov** co-taught *Lepidoptera Biology* in the UF Department of Entomology and Nematology; **Sebastián Padrón** taught *Introductory Entomology* to undergraduate students in the Manglares Curute Reserve, Guayas, Ecuador; **Jackie Miller** and **Debbie Matthews** co-taught *Tropical Ecology, Entomology, and Ecotourism* and *Special Research Topics in Tropical Entomology* at the Pico Bonito National Park in Honduras; and **Akito Kawahara** taught *Invertebrate Field Biology* and a seminar in *Phylogenetic Systematics* in the UF Department of Entomology and Nematology.

Grants Received – **Keith Willmott and Andrei Sourakov** were awarded an *NSF grant for Research Experiences for Undergraduates* to study *Tegosa* butterflies. As a result, two students (Derick Hernandez from the University of Puerto Rico and Kirsten Verster from UF) had an opportunity to work at the McGuire Center for two months. **Maria Checa** received the *Schmink Award for Innovation in Tropical Conservation & Development* to support her project "*Feasibility of Butterfly Farming Initiatives as a Viable Tool for Sustainable Development and Capacity Building in Western Ecuador.*" **James Hayden, Akito Kawahara** and Sangmi Lee (Arizona State University) received a *USDA Farm Bill grant* for *Digital Identification of Microlepidoptera on Solanaceous Plants*; **Lary Reeves** received a fellowship through *the NSF Graduate Research Fellowship Program*; **Reeves** also received a *North American Nature Photographer's College Scholarship*. **Akito Kawahara** received a grant from the *Society for Systematic Biologists*, an *SBS Mini-ARTS Grant* to work on *Revisionary Systematics of the Critically Endangered Hawaiian Philodoria Leaf-Mining Moths*, a *National Geographic Society grant* for the project "*Molecular phylogeny, evolutionary origins, and diversity of the Tobacco Hornworm (Manduca sexta) and relatives*," and *NSF RAHSS* and *NSF REU grants*. **Charlie Covell** received funding from the *Visiting Taxonomists program at the Essig Museum* to visit the University of California, Berkeley, to conduct curatorial work and research on Geometrid moths. **Jaret Daniels** received several grants totaling more than $200,000 for projects to study the occurrence, distribution and ecology of the endangered Schaus' swallowtail butterfly, and to develop sustainable pollination strategies for U.S. specialty crops and plants for wildlife.

Collecting Expeditions and Fieldwork – **Keith Willmott** worked at the *Paris Natural History Museum* and in *Ecuador*; **Sebastián Padrón** spent a month in *Ecuador* collecting *Catasticta* butterflies for his dissertation research; **Debbie Matthews and Jackie Miller** worked at the *Pico Bonito National Park, Honduras*, and in *Summit County, Colo.*; they also visited collections at the *Denver Museum of Nature and Science* to identify its holdings of Pterophoridae moths and the *National Museum of Natural History, Washington D.C.*, where they worked on Cuban and Honduran Lepidoptera; **Andy Warren** collected specimens in the mountains of *Colorado*; **Akito Kawahara** conducted fieldwork in *Borneo, French Guiana, Hawaii, Japan, Korea, Malaysia and Arizona*; **Charlie Covell** worked in *Kentucky* and *Panama*; **Jade Badon** and **Lary Reeves** spent three months in the *Philippines*; **Reeves** also conducted a *Bio Blitz with the Nature Conservancy in Jamaica*; **John Heppner** led expeditions to *Guatemala, Panama, Peru* and *Vietnam*. **Thomas Emmel** and **Ian Segebarth** made photographic expeditions to *Ecuador, the Galapagos Islands, Honduras, Kenya, Madagascar, Mexico, Peru, Trinidad and Tobago, Alaska, Montana and Wyoming*.

Awards - **Keith Willmott** received a *University of Florida Research Foundation Professorship Award*; **Akito Kawahara** received a *Young Investigator Award from the International Congress of Entomology*.

Conferences - **Akito Kawahara** and **Keith Willmott** co-presented on the *Biogeography of Neotropical Hawkmoths and Andean Butterflies at the Florida Museum of Natural History* at the *Second Meeting of the Network for Neotropical Biogeography in Miami*; **Willmott** also presented with **Maria Checa** on *Standardized Sampling Methods for Tropical Andean Butterflies: Experiences in Ecuador* at the *Fourth International Meeting on Neotropical Lepidoptera, Montevideo, Uruguay*. At the same conference, **Andrei Sourakov** presented on *DNA Barcoding and the Radiation of the Endemic Caribbean Butterfly Genus Calisto*, while Elena Ortíz reported on her Master's thesis results concerning *Systematics of Preponini Butterflies*; **Debbie Matthews** co-authored a presentation with **Jackie Miller**, Terry Lott, Roger Portell and James Toomey at the *Entomological Society of America (ESA) Annual Meeting* in Knoxville, Tenn., and at two other meetings about the *Inventory of the Lepidopteran Fauna of the Guantanamo Bay Naval Base, Cuba*. At the **Lepidopterists' Society of America (LSA)** meeting in Denver, **James Hayden** spoke about *Larvae of Penestola and Sufetula in Florida* and **Andy Warren** presented "*Collections and collecting: we are running out of time!*" Hayden also presented on *Microlepidoptera on Solanaceae: an Online Resource* at the annual ATL/SLS meeting in Gainesville. During that meeting,

Caterpillar of the Lesser Purple Emperor, *Apatura ilia*, Russia

Staff News

Andrei Sourakov spoke on *Niche Partitioning and Life Histories of Moths Feeding on the Coral Bean in Florida* and many McGuire Center students also presented their work: **Francesca Ponce** co-presented with **Kawahara** on *Preliminary Molecular Phylogeny of Eumorpha Hawkmoths*; **Peter Houlihan** spoke about *Impacts of Forest Gaps on Butterfly Diversity in a Bornean Peat-Swamp Forest*; **Maria Checa** presented on *Bait-Attracted Butterflies from Ecuador and their Implications for Butterfly Conservation*; **Cassandra Romero** co-presented with Ian Kitching, Jesse Barber and **Kawahara** on *Hawkmoth Tibial Spur Variation and Evolution*; and **Sebastián Padrón** spoke on *Molecular Phylogeny and Biogeography of a Highly Diverse Genus of Andean Butterflies*, introducing preliminary results of his work on the pierid genus *Catasticta*. During 2012, **Kawahara** gave presentations at eight meetings. These included an invited symposium presentation at the *Annual Meeting of the Society for Integrative and Comparative Biology* in San Francisco, as well as a variety of presentations at different conferences including "*Escalation of the Bat-Moth Arms Race; Incomplete Gene Sample Augmentation Improves Phylogeny Estimate for Leaf-mining Moths and Relatives;*" "*Stridulating Genital Valves: Evolutionary Origins of Anti-bat Ultrasound Production in Hawkmoths;*" "*Carcass Scavengers and Snail Hunters: Evolution of Carnivory in Hawaiian Fancy-Cased Caterpillars;*" "*Larval Feeding Preference of the Dancing Moth, Dryadaula terpsichorella;*" "*The Leptree 'Backbone' Molecular Phylogeny Estimate;*" and *Hyposmocoma as a Model to Study Hawaiian Evolution and Conservation.*" **Charlie Covell** gave an invited talk "*The Wonderful World of Butterflies and Moths*" at the *Butterfly Society of Virginia*. He also spoke on the *Forum Herbulot 2012: a Gathering of Geometridologists in South Africa* during the **LSA** meeting in Denver. Covell also was a symposium co-chairman and speaker at *the ESA meeting* covering the topic of *Mentoring Young Entomologists*; **Jaret Daniels** presented a paper on the *Basics of Pollinator Conservation at the 2012 Association of Zoos and Aquariums Annual Conference*, co-presented on "*Operation Pollinator: Evaluation of Flowering Plant Mixes for Attracting Insect Pollinators in Agricultural Systems*" at the *ESA meeting* and spoke on *Taking Pollination Ecosystem Services to the Farm: Development of Habitat Management Practices to Support Sustainable Food Production*; **Daniels** also co-presented a poster on the *North American Butterfly Monitoring Network: Supporting Butterfly Research, Scientific Discovery, and Education* at the **LSA meeting** in Denver. **John Heppner** was a guest lecturer at Incheon University, South Korea.

Student News: **Clare Scott** and **Court Whelan** defended their dissertations. **Scott** worked on the *Revision and Phylogeny of the Genus Lycomorpha (Lepidoptera: Arctiidae: Lithosiinae) and Assessment of its Placement within the tribe Cisthenini*, while **Whelan** covered the topic of *Experiments with Entomological Ecotourism Models and the Effects of Ecotourism on the Overwintering Monarch Butterfly*. Several new students started their terms at the McGuire Center. **Peter Houlihan**, who completed his undergraduate work at Johns Hopkins University, moved to Gainesville and is expected to begin graduate studies this fall. Meanwhile, he is working on several projects and recently published a paper on butterflies of Borneo (see publications). **Qianju Jia** of China recently joined the McGuire Center to work on his Master's degree with **Akito Kawahara.** He will focus on *citrus-feeding micro moths*. **Lary Reeves** defended his Master's thesis, *The Ecological Importance of Secondary Forests to Frugivorous Butterfly Communities in Mount Kanlaon National Park, Negros, Philippines*. **Logan Locascio**, a Gainesville native and middle school student who worked with **Andrei Sourakov** as a summer junior volunteer, continued during the fall 2012 semester with a project on the *Biology of the Ornate Bella Moth*. **Locascio** presented the work at school and county science fairs, winning *First Place* in the *Zoology category at the Regional level* and competed at the 2013 Florida State Science Fair, winning third place.

Light Crimson Underwing, *Catocala promissa*, Russia

Other News: **Charlie Covell** started a new project: *An Annotated Checklist of the Inchworm Moths (Geometridae) of Panama*. **K. T. Park** initiated publishing a *Newsletter of Asia Lepidopterologists*, for which he serves as one of the editors, and assumed the Vice Presidency of the Korean Academy of Sciences and Technology this year.

Grizzled Skippers, *Pyrgus malvae*, Russia

MCGUIRE CENTER SEMINAR SCHEDULE SPRING SEMESTER, 2013

Jan. 8: Dale A. Halbritter, Univ. of Florida. **"Why did the butterfly cross the road? Impacts of roadside mowing on butterflies in north central Florida."**

Jan. 22: Stewart B. Peck, Carleton Univ., Ontario. **"Caves: their arthropods and other animals."**

Jan. 29: Jay C. Sohn, Univ. of Maryland. **"Molecular phylogeny, divergence time estimation and life history evolution of Yponomeutoidea"**

Feb. 12: Andrei Sourakov, The McGuire Center. **"Two heads are better than one: the story of the hairstreak butterfly and the jumping spider."**

Feb. 26: Marc Branham, Univ. of Florida. **"Fireflies and the Evolution of Bioluminescence in Beetles."**

Mar. 12: Paul A. Opler, Colorado State University, **"Studies of Western Blues: Incredible Species Richness and Associated Topography and Geological History of California's Owens River Drainage."**

Mar. 26: Don W. Hall. **"Natural History of the Southern Flannel Moth (Puss Caterpillar), *Megalopyge opercularis* (J.E. Smith), and its Relatives."**

Apr 4: Phillip Juan Torres Tambopata Nature Reserve, Peru. **"Research and Outreach in the Amazon: Butterfly populations, Spider Decoys, Tweeting, Funding, and Lack of Salt."**

Apr. 9: Jesse Breinholt, The McGuire Center. **"Phylotranscriptomics: Methods used to solve a phylogenetic conundrum of poor branch support and rapid radiation event in the Bombycoidea."**

Apr. 23: Juan P. Gomez, Ari Martinez, Elena Ortiz-Acevedo and Judit Ungvari-Martin. **"Training through participation: creating opportunities for Latin American undergraduate students."**

McGuire Center for
Lepidoptera and Biodiversity
Florida Museum of Natural History
University of Florida Cultural Plaza
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Leopard Moth, *Pantherodes* sp. (Geometridae)

Eulepidotis punctilinea (Noctuidae)

A tiger moth, *Cissura plumbea*

Coenostolopsis apicalis (Crambidae)

Azeta rhodogaster (Notodontidae)

The McGuire Center's impact in Mesoamerica

Jacqueline Y. Miller, Curator, McGuire Center

In 2009, Debbie Matthews and I initiated a comprehensive biodiversity survey of the Lepidoptera of Honduras. Since then, many Museum staff and students have taken part in the survey, and taught or taken the entomological field courses we have offered in this country.

The project was undertaken in collaboration with Centro Zamorano de Biodiversidad, Escuela Agrícola Panamericana–Zamorano, the Lodge at Pico Bonito, and the Centro Universitario Regional del Litoral Atlantico. Based on the results of five trips, the first checklist of the Lepidoptera of Honduras was published.[1] Subsequent surveys have increased the total number of butterflies and moths found there to nearly 3,000 species, but based on the fauna of neighboring countries, the species diversity of Lepidoptera in Honduras should exceed 6,000!

Mesoamerica is a biodiversity hotspot that includes all tropical and subtropical ecosystems from eastern Panama north and west through Costa Rica, Nicaragua, Honduras, El Salvador, Belize and Guatemala, including portions of southern and coastal Mexico.[2] Historical geological evidence indicates a wide separation of North and South America from the Cretaceous through the Oligocene, with the continents fully attached during the Pliocene. Honduras was the last geographical portion of this corridor to be completed, and the study of the butterflies and moths in that country provides a more substantial timeline for dispersal of species throughout the Caribbean Basin.

Surveys initially focused on biodiversity. Following each trip, we processed, labeled and identified specimens, and deposited a synoptic collection in the Centro Zamorano de Biodiversidad, Escuela Agrícola Panamericana–Zamorano. As a result, we have increased taxonomic representation in its collection and assisted with curation. We have also expanded our collaborations with institutions in neighboring countries through publications, informing them of other potential regional species.

Conducting these surveys has provided opportunity for educational outreach. McGuire Center staff have given lectures to educators, students and administrators about how the surveys are conducted and how specimens should be processed and identified. Most of the audiences have been previously involved in the study of vertebrates and have had little experience with invertebrates. Hence the lectures have provided them with novel points of view concerning the significance of butterflies and moths as bioindicators of environmental changes and about the possible conservation management implications of these surveys. Another aspect of educational outreach has been teaching the importance of making and preserving collections in general, and of collecting long series of specimens similar in appearance to study species variation and discover cryptic new species.

Field work in Honduras

We have taken students, colleagues and research associates on these trips to experience the joy of discovering species diversity and observing butterfly behavior. Night collecting has been especially rewarding as associates and students observe various moth groups attracted to light. The participants also had an opportunity to witness the dramatic predator-prey interactions when opportunistic birds and other predators come to feed on moths at the collecting lights before dawn. The survey has provided many opportunities to learn the inner workings of ecotourism at the lodge, and of conservation management and sustainability of the delicate tropical ecosystems. The project not only contributes to our scientific knowledge, but, perhaps even more importantly, increases the value and appreciation of the natural resources of Honduras for future generations of its citizens and those of the world.

[1]Miller, J. Y., D. L. Matthews, A. D. Warren, M. A. Solis, D. J. Harvey, P. Gentili-Poole, R. Lehman, T. C. Emmel, and C. V. Covell. 2012. An annotated list of the Lepidoptera of Honduras. Insecta Mundi 0205:1-72.
[2]Mittermeier, R.A., N. Myers, and C.G. Mittermeier (editors). 1999. Hotspots. Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions. CEMEX, S.A., Mexico City, Mexico. 431 pp.