The Bug Dispatch

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The Windshield

by Terry L. Erwin

Looking Forward

At the time of the winter solstice, on the shortest day of the year in the northern hemisphere, I spent time reflecting on our diminishing numbers. The Department of Entomology is looking mighty lean these days! Jonathan Coddington's escape into the Directorate, Wayne Mathis on a six month fly-junket to Brazil, Warren Steiner taking the buy-out, and Tom Gaffigan's retirement from WRBU, PLUS those we lost earlier in the year means NMNH Entomology, at present, has a mere 15 employees that deal directly with the specimens in a collection of over 35 million and 300+ visitors on site per annum. Additional support staff amount to seven (plus the Admin office which is shared with IZ and VZ). Considering that the NMNH entomology collection is the largest "accessible" collection in the world, one might wonder how we can handle all the transactions. The simple answer is that we can't. Some parts of the collection have been deactivated to outside users; that is, we can't make loans in those groups unless the borrower comes to the NMNH and does the pulling, packing, and initial paperwork. The Directorate has made it quite clear that we cannot look to the Feds to solve our staff shortage problems – we need to be creative on that score. Everybody needs to pitch in with ideas, solutions, and hard work above and beyond the call of duty. Entomology carries 35% of all loans in NMNH and has the smallest staff devoted to collections on the biological side of the museum. Fortunately, our USDA-SEL colleagues help with the economic groups housed in the NMNH collections.

Interns and volunteers can also help and they do a lot. Involved students at the Undergrad, Grad, and Postdoctoral level, also can help. We won't have those extra hands unless each of our permanent staff goes into the recruiting business. Dave Furth and CJ Geraci are champs at recruiting and I ask all of you to take a lesson from them. We can also think about contractors. Thanks to the success of the Butterfly Pavilion, OD allowed us to contract Stephanie Swensen to help out with the work previously assigned to Mary Jo Molineaux and Holly Williams. And, we will aggressively battle for any new FTEs offered in the 2010 and future budgets. Onward >>>

In this issue of The Bug Dispatch, there are illustrated stories about the Oklahoma BioBlitz by our BioBlitz King, Gary Hevel, a detailed account of activities in the AntLab and BeeLab, a report on chasing hairstreak butterflies in Peru, a sabbatical letter from Brazil, a detailed view of three important visitors in Lepidoptera, a note from Warren about his plans for retirement, and a listing of recent publications from our very productive combined entomology staff.

It will not really be retirement!

by Warren Steiner, Jr.

"I have many papers and projects already started, some decades old that will finally be addressed over the coming seasons. They include reviews of New World genera of Tenebrionidae, reports of adventive species, and descriptions of larvae and pupae discovered and reared during many travels and backyard collecting. Much of this information will be incorporated into the co-authored (with Jim Dunford, Dan Young and Mike Thomas) draft of "The Darkling Beetles of the Eastern United States," a future book and related web site to serve as an identification manual, with images, data on species distributions and life histories.

The Phalacridae will also get renewed attention. My Master's thesis on this group (review of two small genera for North America) was never published, as was the 1981 review of a larger genus while I was Faculty Research Assistant a U. MD. I plan to collaborate with Matt Gimmel, current student (LSU) with a global view of this family, to get these studies in print. As I have always had one foot in the desert and the other in the creek, water beetles will not be forgotten either. Regional surveys, collecting and preparation of specimens will continue for aquatic insects as well as numerous terrestrial taxa.

The survey of Bahamian Tenebrionidae (and other insects) will progress as long as time and money will allow and permits are granted. Other Caribbean islands beckon also, and I hope to contribute to studies by Mike Ivie and his students on this rich fauna. Genera of flightless darkling beetles are of particular interest and have led me into some amusing predictive biogeography, where in many cases I have suspected the occurrence and discovery of certain new species on selected islands where, when known habitats were searched upon arrival, eureka! Many islands and island groups have yet to be sampled seriously by any entomologist and I hope to get to as many as possible."

Christmas in Brazil

by Wayne Mathis

Monday, December 28, 2009
Christmas in Curitiba, Brazil, was not white but it was enjoyed and memorable. Dianne and I have been here for just over three weeks now and we are settling in both at the Universidade Federal do Paraná and in our apartment. At the university, we are working with Luciane Marinoni on shore-fly projects, a tribal revision of Neotropical Ephydrini and a shore-fly biodiversity survey of the state of Paraná. We are also working with students. Our work here is being supported by a grant from CNPq (the Brazilian equivalent of NSF).

Some of you may remember Mirian Nunes Morales, who conducted research on flower flies for a few weeks this spring at the Museum. Mirian and Marcel Gustavo were married the week before Christmas in Santa Cruz do Sul, and we were the invited guests from the United States. We spent Christmas on a farm northwest of Curitiba near the city of Castro. The farm is owned by Luciane's brother-in-law, Robert, and we collected nearly 20 species while there. On the campus of the university, we have found about 40 species thus far, but who is counting. Many species are new records for Brazil, and, of course, a few are undescribed.

Luciane and her husband, Sionei, have been superb hosts, helping us work through the various levels of bureaucracy here. Actually, the extended Marinoni family has been involved, and it takes the whole family (or a village) to get us through the system here. I think we are almost Brazilian citizens. Yes, we were fingerprinted. Purchasing a car and driving in a city of almost 2.5 million has been another challenge. The number of one-way streets is formidable!

Today we are having lunch with Bob and Astrid. Astrid's sister lives in Curitiba. Although we are not in the land of gauchos, we are going to a churrascaria.

Please note that we have not talked about the weather except to say that collecting shore flies is great in the summer.

Enjoy the winter!

Tchau e um abraço, Wayne and Dianne

AntLab and BeeLab News

from the labs of Ted Schultz and Sean Brady

Departures

In September, NSF Postdoctoral Fellow and SI Postdoctoral Fellow **Scott Solomon** started his new job in the Department of Ecology and Evolutionary Biology at Rice University in Houston, Texas. But Scott remains an active member of the AntLab. As a NMNH Research Collaborator, he is working with Ted and Sean as the lead on two projects focused on the phylogenies of the two fungus-growing ant genera *Trachymyrmex* and *Acromyrmex.*

Matt Kweskin departed the AntLab on December 20 for a permanent position with NMNH LAB, where he now serves as the IT Manager. Matt has been associated with the NMNH Department of Entomology since 1994, when he was an RTP intern under the advisorship of Ron McGinley. Subsequently, in 1997, Matt worked as a contractor with Ted Schultz. After earning a graduate degree at UT Austin, where he conducted research on fungus-growing ants with Ulrich Mueller, Matt returned to the Washington, DC, area. During the past two years, we have been fortunate to have Matt working in the AntLab, where we have benefited from his diverse skills in specimen-based entomology, molecular systematics, and computers and databases. We look forward to continuing to work with Matt in his new position at LAB!

In February, SI Postdoctoral Fellow **Rachelle Adams** will leave us to become a prestigious Marie Curie Fellow in the lab of Koos Boomsma in Copenhagen. But, fortunately, we do not have to say good-bye! Rachelle will continue to hold a Visiting Scientist position in the AntLab and, at the end of her term as a Marie Curie Fellow in 2012, she will return to us to resume work on her SI postdoc.

Arrivals: Three new people have joined the AntLab.

Shelah Morita received her Ph.D. from UC Davis in 2006, where she studied the evolution of long-tongued tabanid fly pollinators. She has a longstanding interest in the evolutionary patterns of floral-associated morphology in the Diptera and how it leads to specialization and speciation. Shelah is currently a co-PI on a NSF Partnerships for Enhancing Expertise in Taxonomy (PEET) grant to study horse flies (Diptera: Tabanidae) and is conducting research utilizing the USNM Diptera collection. It's great to have a non-hymenopterist expanding our horizons in the AntLab! (below: *Philoliche gulosa* (Tabanidae))

Paul Amstrong received his Ph.D. in Zoology in 2001 from the University of Hawaii, where he worked on the conservation genetics of the Hawaiian monk seal. Paul has extensive experience in all aspects of molecular systematics, including designing and setting up George Roderick's lab at UC Berkeley. We are fortunate to have him working in the AntLab as a molecular systematics technician.

Hong Zhao received a Master's degree in Botany in 2001 from the Southwest Agricultural University in Chongqing, China. As part of the Lepidoptera AToL project, Hong worked for two years in the laboratory of Dr. Jerry Regier at the University of Maryland, where she acquired formidable skills in molecular systematics methods. Sean Brady and Ted Schultz are fortunate to have Hong working as a molecular systematics technician on a number of ongoing projects.

Welcome, Shelah, Paul, and Hong!

Other News

Ted Schultz and NMNH Research Associate **Natasha Mehdiabadi**, along with co-PIs (and NMNH Research Associates) Charlie Mitter, Ulrich Mueller, and Alexander Mikheyev and research collaborators **Sean Brady** and Steve Rehner (likewise a NMNH Research Associate), have been awarded a three-year National Science Foundation Grant for $445,000 for "Phylogenetic research on the origin and evolution of agriculture in ants." The grant was awarded through the University of Maryland to Ted as an Adjunct Professor there.

In the past few months, **Sean Brady** traveled to several professional meetings to give presentations, including the Third International Barcode of Life Conference in Mexico City (November), the Entomological Society of America meetings (December), and the Northeastern Arthropod Divergence Time Estimation Workshop at Rutgers (January). **Ted Schultz** also presented two talks at the Entomological Society of America meetings and one at the International Ethological Conference in Rennes, France (August), and attended the Global Ant Project meeting at the Field Museum in November.

Larvae!

The year 2009 witnessed the births of two new AntLabbers. **Sam** was born on March 8, 2009, to Rachel Hinton and husband Matt Kweskin. **Darius** was born on July 11, 2009, to Natasha Mehdiabadi and husband Cyrus Jilla.

Welcome, Sam and Darius, to our big, weird, wonderful world!

Lepidoptera Visitors

Stephanie Kirk

I am a research technician with the Biodiversity Institute of Ontario in Guelph, Canada, and am visiting the Entomology Department of the NMNH for a four month period (until the end of January, 2010). During my visit, I am contributing to the global efforts of the Barcode of Life Initiative: processing, databasing, photographing and sampling tissue from museum specimens to send back to Guelph for DNA barcoding. DNA barcoding is a widely accepted tool for rapid species identification using a standard 650 bp region of the cytochrome oxidase 1 (COI) mitochondrial gene. The Entomology department provides an ideal place to advance reference libraries of DNA barcode data for Lepidoptera by tapping into the wealth of species archived here.

Working with Dr. John Brown (USDA), my primary focus is to expand the barcode library on the Barcode of Life Database of the estimated 1250 species of North American Tortricidae and to advancve resolution of any taxonomic uncertainties that currently exist within this family of Lepidoptera. I am also working with Dr. Don Davis (SI) to build a barcode library for such primitive families of Lepidoptera as Gracillariidae, Epipyropidae, Acrolophidae and Adelidae. Previous research by Dr. Davis and his colleagues has led to the description of numerous new species and the support of COI data will be valuable to their work as well as to the Barcode of Life Initiative. Lastly, my attention is also focused on Tortricidae specimens that were reared from native fruit in Kenya. These specimens are of agricultural importance and DNA barcodes may contribute to a better understanding of species boundaries.

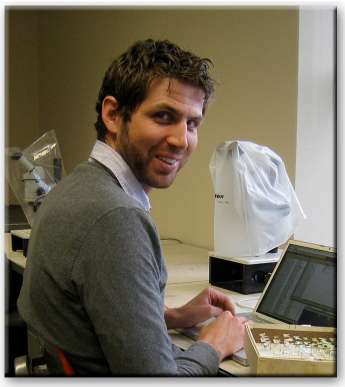
Matthew Madieros

I am a new Research Associate in the museum, having recently completed a doctorate degree at UC Berkeley and then moving to the DC area. I am currently working on a monograph of the New World Adelidae with Don Davis. Thirty four species are now recognized for the New World, and approximately 40-50 new, mostly neotropical species will be proposed. With the assistance of vistor Stephanie Kirk and the Barcode of Life project under the direction of Paul Hebert, we are now barcoding as many species as possible to assist in species determinations.

I am also continuing my previous research, which focuses on the biogeography and taxonomy of Hawaiian Lepidoptera. As a graduate student, I concentrated on groups that contain flightless species, and for part of my dissertation, worked with Don Davis on the evolution of a new species of flightless, Hawaiian moth that lives in dark zones of lava tube caves. More recently, I have published a revision of the Hawaiian *Thyrocopa* (Xyloryctidae), and am currently working on describing several new species of *Hyposmocoma* (Cosmopterigidae).

When I'm not at the museum, I teach biology and chemistry and coach football at the Landon School in Bethesda, MD.

Jeremy deWaard

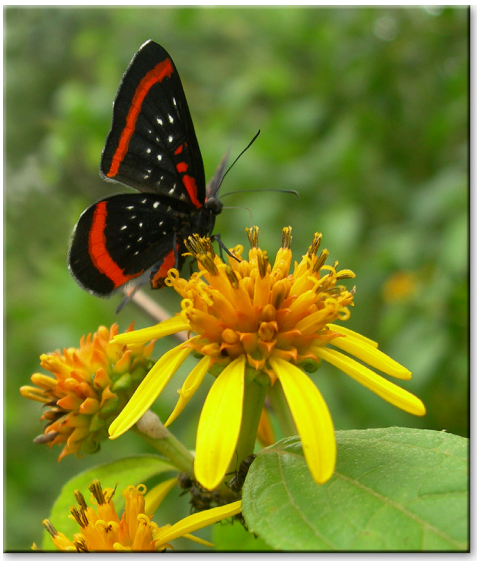


My PhD research at the University of British Columbia in Vancouver, Canada is exploring the application of molecular phylogenies and DNA barcoding to monitoring forest insect biodiversity. Reconstructing phylogenetic trees (i.e. the evolutionary relationships of organisms) is now commonplace in many branches of biology, and has recently penetrated the field of biodiversity science. Here phylogenies allow the estimation of an underappreciated level of diversity— phylogenetic diversity—or the variation in evolutionary heritage. Similarly, DNA barcoding also provides significant promise for applications in biodiversity science. Monitoring programs rely on the precise diagnosis of species, which can be complicated by sizeable trap samples, damaged specimens, immature life stages and a lack of useable identification keys. The recent advent of DNA barcoding, where the sequence variation in a short fragment of the mitochondrial gene cytochrome oxidase 1 (COI) can provide rapid and objective species identification, shows promise to circumvent these obstacles. It also allows two further levels of diversity to be readily assayed—species and genetic diversity. Therefore the integration of phylogenies and DNA barcoding into monitoring facilitates a more holistic approach to estimating diversity.

I'm now spending a semester in the Maryland area, visiting the Entomology Department of the University of Maryland (UMD) and the Lepidoptera Collection at the NMNH. In collaboration with Drs. Charles Mitter (UCMP) and Axel Hausmann (Bavarian State Collection of Zoology, Munich, Germany), I will be reconstructing a molecular tribe-level phylogeny of North American Geometridae. The looper moths are a hyperdiverse family and contain many important defoliators, including several native and introduced pests. Our work will generate the first hypothesis for the evolutionary relationships of this group in North America, and will form the backbone for calculating phylogenetic diversity in subsequent chapters of my PhD dissertation.

While in Maryland, I will also be completing an ongoing project to construct and test a comprehensive DNA barcode library for western North America's Geometridae. This project involves assembling and recovering the DNA barcode of all available species from the Pacific Northwest (roughly 350 species). The final stage of this project requires sampling the last few species

and confirming ambiguous identifications by comparison with *(Jeremy deWard cont'd)* reference material. The Lepidoptera Collection at the NMNH has the most complete representation of Geometrids in the Western Hemisphere. It is also unmatched in entomological expertise, with several pre-eminent moth researchers on staff. A short visit at the museum will allow the completion of the dataset and enable me to test the hypothesis that the barcode region is able to reliably discriminate species as demonstrated in other taxa.



Amarynthis meneria (Riodinidae)

Peru

by Brian Harris

Brian Harris returned to Southeastern Peru for two weeks last August to participate in a butterfly survey. He joined several colleagues in the Cosnipata Valley, and although the group had intended to collect during the dry season, most of the time in the field was uncharacteristically moist, with overcast skies. Sunny skies were present only during the last few days of the trip.

The fieldwork was the second of five intended trips to the general locality, and the data will be published at the conclusion of those collecting efforts. Collecting permits for Lepidoptera were gained by Gerardo Lamas, who along with Mike McInnis, are co-leaders for the project.

Concentration was devoted to collecting hairstreak butterflies (Lycaenidae), mostly by hand-netting. Some baits utilizing dead fish, bananas, and other fruits were placed to attract the butterflies.

Accommodations during the trip were at Manu Paradise Lodge, (above right) where Brian and one colleague collected arctiid and ctenuchid moths at night lights. Even a few butterflies were found at night lights, and those species were otherwise not found.

After the fieldwork, participants spent a few days in Lima at the Museo de Historia Natural to gain specimen data for the project. Gerardo and Brian found new species of butterflies on this trip. Analysis of specimens from the first trip revealed that three new species in three different genera of hairstreaks were collected by Brian; further examination of that material may reveal other new species collected by colleagues. The third trip of the project will occur later this month, but Brian won't be going this time.

Steve Kinyon, Dan Bogar, Mike McInnis (trip leader) & me(!) in the collection of the Museo de Historia Natural, Lima PERU.

OKLAHOMA BIOBLITZ

by Gary Hevel

When I heard that a BioBlitz was being conducted in Oklahoma, to occur toward the end of September, I immediately checked my schedule, and then contacted the organizers of the event, particularly Priscilla Crawford. It was to be on the weekend of September 18-19, during the days of Friday and Saturday, and at Robbers Cave State Park in the eastern section of the state. Another intriguing Oklahoma site was the Wichita Mountains Natural Refuge near Lawton in the western part of the state, so I made arrangements with the Manager (Walter Munsterman) of that location to collect insects there also. So the stage was set.

View at the trail head: Robber's Cave State Park, Oklahoma

I had participated on an annual basis in recent years at the National BioBlitzes that were sponsored by the National Geographic Society and the National Park Service. Those gatherings (Rock Creek Park, DC, 2007; Santa Monica Mountains, CA, 2008; and Indiana Dunes Lakeshore, 2009) were large events that widely invited the public, and that were near large cities. Held in May, they were strongly educational, and attended by thousands of school children who were bused to the fieldwork areas. In Oklahoma, the BioBlitz would not be on that scale. The second major difference with the Oklahoma BioBlitz was to be that I would not transport eighteen display drawers of specimens collected during my backyard insect survey efforts. And thirdly, I gained agreements from the organizers and managers from each Oklahoma site that specimens collected could be retained by the Smithsonian Institution.

I was enthusiastic about Oklahoma as a BioBlitz locality because of previous experiences in my earlier years. I had lived in Southeast Kansas (Oswego) for over two decades, and had frequently journeyed into Oklahoma for herpetological and entomological specimen collecting. In 1962, during my years at Pittsburg State University in Pittsburg, Kansas, I drove to western Oklahoma in the month of May to observe nature and chase reptiles and insects. The trip was replete with adventures good and bad. At Alabaster Caverns State Park I had spent part of the night collecting two western diamondback rattlesnakes and a few individuals of *Amblycheila cylindriformis*, a remarkable beetle known commonly and currently as the Great Plains Giant Tiger Beetle. I was aware of this beetle's presence in western Kansas and Oklahoma relative to the recorded fieldwork of Francis Huntington Snow, an earlier entomologist from Kansas University. Snow made a few excursions to western Kansas to collect specimens of this beetle along the shores of the Smoky Hill River, and sold duplicates to Europaean beetle collectors. My memory is that the beetles, considered rare at the time, were sold at $15 each, and the funds were used for subsequent collecting expedition expenses. Sadly, while driving back to Pittsburg State the following afternoon, my night-time collecting activities took their toll. I nodded while driving, crossed the road, hit a culvert and was knocked unconscious. This accident quickly was brought to the attention of the Kansas Highway Patrol, who arrived on the scene to witness various turtles and lizards escaping in the wreckage. I was quickly asked if I had any dangerous animals in the car, and I directed the officers to a bag in the trunk that held the two rattlesnakes. The accident was deemed newsworthy, and the story appeared on the Associated Press newsline, and was picked up by papers such as the Los Angeles Times.

Sorry for the lengthy side story. In short, I had previously enjoyed myself enormously in Oklahoma, and was thus pleased to have the opportunity to travel there once more. Enroute to the BioBlitz, I recognized that the route would be right through Red Oak, OK, and I was thrilled to pass through this hometown of the legendary beetle collector Karl H. Stephan. For some twenty years, Stephan collected beetles in Latimer County, and developed unusual collecting methods during the years. He was an excellent field naturalist, and from experience would know exactly where and when certain species would occur. After rains, certain beetles would be found under rocks, and at the right times, small flying beetles would be found trapped within the moisture of water tower supports, where the humidity had appeared. Many beetles collected by Stephan were studied by authorities and named as new species. The patronymic "stephani" was applied to a wide variety of numerous beetle species.

And here I was in Latimer County, for 24 hours of insect collecting at this Oklahoma BioBlitz. Robbers Cave State Park is hilly and covered with vegetation. The organizers of the event had advised participants well on what to expect. My wife Julie and I erected a small tent in a nearby field, and before the 3:00 pm official start of the BioBlitz, placed three Malaise traps in the surrounding area (to be "armed" immediately after the start). Most of the collecting was simply sweeping and beating various areas of vegetation for an accumulation of specimens and vegetation parts. We chased some butterflies and odonates, but with less enthusiasm because there were several colleagues after these groups. In the evening, we placed a blacklight bucket in the main gathering area in the central part of the park ground.

As with most BioBlitzes, I spent most of the night sorting specimens from the sweeping samples, then arose early in the morning to check the blacklight and Malaise trap collections. In sorting the blacklight material, I noticed and recognized a tiny hemipteran that I had never seen before. It resembled a small aquatic bug, but I knew that it was one of the Dipsocoridae/Schizopteridae members, considered as extreme rarities. Back at the Museum, Tom Henry determined it as a schizopterid , specifically *Corixidea major* McAttee and Malloch. Specimens of this species had been collected only four times previously, once in Tennessee, once in Florida, and twice in Virginia. Other blacklight material yielded some scarab and carabid beetles, among other insects. There were probably twenty carabid species, between the blacklight and Malaise traps. Sadly, most of the day on Saturday was finishing basic preparation and tallying the number of total species as well as possible. Ken Hobson, an entomologist from the University of Oklahoma, and I worked together for two or three hours, listing and estimating the numbers of species per family that we had found during the BioBlitz. The Oklahoma BioBlitz was a definite success., with some 1156 plant and animal species recorded from the two day period.

Julie and Gary Hevel chat with Berlin Heck.

After the BioBlitz, Julie and I drove westward in Oklahoma, but decided to divert our interest briefly to the Red River which runs between the borders of Oklahoma and Texas. On the Texas side, we collected for an hour or two, mostly sweeping vegetation. The soil there is quite sandy. I was pleased to see a species of cicada, with which I was familiar……*Tibicen robusta*. One of the remarkable mini-events at this collecting site developed in quick succession. Underneath the large bridge, out of site from humans, I recognized the need for a restroom, and abruptly produced human faeces. Within 30 seconds to a minute, two specimens of the colorful scarab beetle, *Phanaeus vindex*, one male and one female, flew in, landing next to the faeces. Many other western insects were collected at this site.

The Wichita Mountains Wildlife Refuge near Lawton, OK was our destination in western Oklahoma. This refuge is

vast, with 59,020 acres, and has many man-made lakes and numerous small mountain ranges. Prairie dogs, buffalo, elk and longhorn cattle have been brought to the refuge to flourish, with elk herds fenced away from the general visitor areas. With only a few days there, many interesting insects were taken for the Smithsonian collections. Upon return to the NMNH, a few mirids from the western trip were presented to Tom Henry for determination. Tom became excited to see specimens of a mirid genus, *Keltonia*, which he had revised not too long ago. After a few minutes examination, Tom declared that the species was new to science. Specimens from this new species were collected both at the Texas site and at the Visitors Center area at the Wichita Mts. Refuge. Hopefully, next year I will be able to attend the Oklahoma BioBlitz to seek further specimens of this new species and associate it with a host plant.

Another insect at WMNR found commonly was a tiger beetle known as the Large Grassland Tiger Beetle, *Cicindela obsoleta vulturina.* This subspecies was so abundant that carcasses of it were on the roads, where the beetles had been hit by passing automobiles. An exciting experience was gained at the Wichita Mountains during a streamside blacklight collecting evening. In the first hours after sunset, we heard the howling of coyotes, not an uncommon occurrence in the American West. But then came the bugling of male elks, surely one of the most distinct sounds of western areas. Many individuals bugled during our blacklighting outing, and neither Julie nor I had ever heard this sound before. The sound doesn't translate to text, but please ask me in person sometime to mimic this remarkable noise. Many small flies, some micro-Hymenoptera and a few bombyliid flies were also collected during our time at the Wichita Mountains.

We stopped at several other localities on the return trip. In particular, we collected on the outskirts of Hollis, OK, in respect for our recently fallen colleague Hollis (Holly) Williams. There we collected many flies, some trogid beetles, and a few Texas crescent butterflies. Another collecting site worth noting was in Cherokee County, Kansas, where strip-mining has produced an unusual land area locally called the strip-pits. Much of the area is devoted to hunting and fishing, and from my experiences in the past there are some insects worth seeking. I was searching in particular for two species of insects, 1) *Utethesa bella/ornatrix*, the Bella Moth, and 2) a boldly colorful scorpionfly, *Panorpa nuptialis*. I have found both of these species of dramatic appearance in the strip-pits in previous years, but could locate neither on this trip. Perhaps the timing of emergence and presence was a bit earlier (mid- September). However, we found other quality specimens, including a good series of one of the Megacyllene long-horn beetles, and a species of *Sphecius* wasp that differed somewhat in appearance from the eastern cicada killer.

New publications

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