The Ohio State University

Museum of Biological Diversity

Newsletter

Fall 2012

College of Arts and Sciences. Department of Evolution, Ecology and Organismal Biology

Dear Readers:

Welcome to the Fall 2012 MBDNewsletter! This issue is packed with interesting stories and facts. We open with a report from Sam Bolton, a graduate student in Acarology, on an exciting discovery right here in our backyard. His SEM of the bizarre, but beautiful worm-shaped mite graces our cover. Another highlight is the neat article on meadowlarks by Sara Focht, an undergraduate student working at the Bird Collection. Joe Cora reports on the Museum Informatics efforts and Rich Bradley tells us about the Spider collection.

Our regular features – **News & Updates**, **Recent Publications & Presentations**, **Field Work & Research Travel** – provide a broad view of our activitie and projects, highlighting our most significant accomplishments. In a **Special feature** that we called "***Users's Perspectives***", we hear from some of our stakeholders, people who use our collections in various ways and, in many cases, depend on our holdings to accomplish their own studies and professional goals. We hope you will find this issue of the MBDnewsletter to be informative, interesting and enjoyable. Please keep sending your comments and suggestions for improvements and for future articles. Have a great Fall Season! ☘

In this issue:

Museum of Biological Diversity

Discovery · Documentation · Interpretation · Education

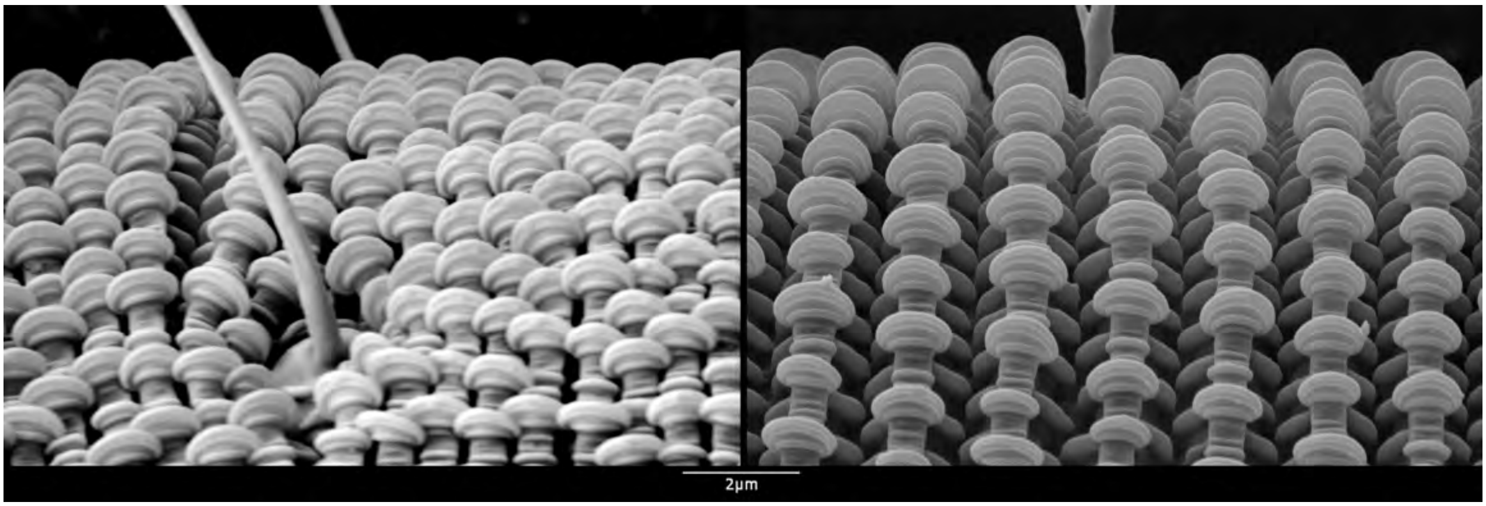
Newsletter

Editor: L. Musetti

New worm-shaped mite from Ohio State University campus grounds.

Samuel Bolton, Graduate Research Assistant, EEOB

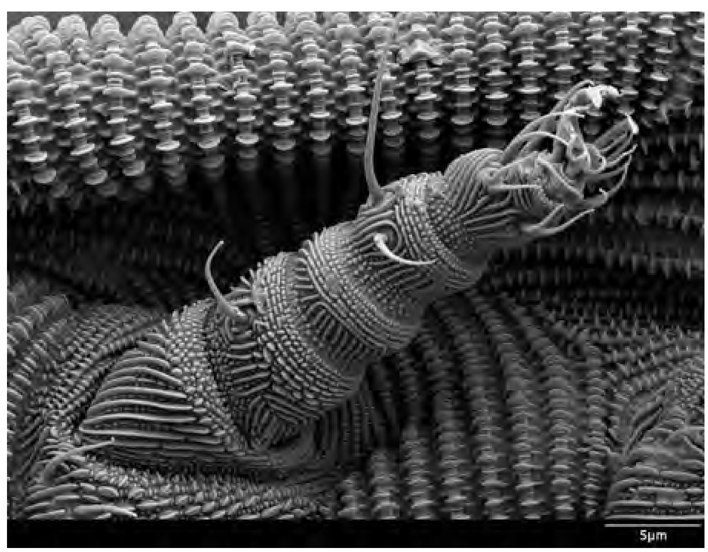
When most of us hear the word 'mite' our minds disquietingly conjure up images of tiny spider-like organisms living in our mattresses or in the fur of our pets. Many of us are unaware that the majority of mites live in the soil or that a number of them can strongly deviate from a round spider-like shape. Some even appear more like worms. The Nematalycidae are an unusual looking family of soil mites that very strongly resemble worms (see cover); so much so that a well-known acarologist was able to play an amusing practical joke by asking a nematologist to identify a mite from this family. Apparently it took a considerable period of observation for the nematologist to wise up to not being the most suitable expert for the task.



SEM images of the integument of the new genus. The unusual evolutionary path towards the vermiform appears to have effected dramatic changes in the integument of this family of mites, which can contract and extend in a similar way to an earthworm. Overlying the integument are ridges lined with plates that neatly interlock when it contracts (*see left image*).

The mites in this family are thought to live exclusively in sandy soils. However, I am currently writing up a new species and genus of Nematalycidae recovered from clay soil from the campus grounds of the Ohio State University (see cover). So far only four species have been described for the whole family. This is partly because they are exceptionally small (typically half a millimeter to a little over a millimeter in length) and therefore difficult to describe accurately.

Fortunately I had the opportunity to use one of the most high tech scanning electron microscopes (SEM) around to study the morphology of this new species. This variant of SEM uses large volumes of liquid nitrogen to freeze the mite almost instantaneously as well as keep it at a very low temperature while in a vacuum. This ensures that the integument of the mite completely retains its form and integrity and provides some of the best images one can hope to get of a mite. The results were spectacular and we were able to obtain images that, for the first time, showed a member of this family in all of its intricate and glorious detail. Some of the integument was revealed to be very highly sculpted with many fine ridges in varying orientations.



Intricate patterns of ridges on leg of the new genus.

This new species of Nematalycidae is very distinct from the others in this family. Although it is not as elongated as some of the other species, it does have a couple of unique and interesting characters. The body setae (hairs) are exceptionally long and unbranched, projecting relatively far out from the surface of the integument. It also has very unusual mouthparts, which comprise a vessel shaped structure into which the chelicerae (pincer-like structures) neatly slot.

The Nematalycidae represent an interesting evolutionary tangent that surely warrants more investigation. They appear to have evolved as an all-female lineage, having abstained from sex for perhaps tens or even hundreds of millions of years. This is remarkable given the large scale evolution that they have undergone. They may yet prove to be a very important and useful model evolutionary organism for the field of asexual biology.

Acknowledgments: SEM imaging was carried out at the USDA, Maryland with Ronald Ochoa & Gary Bauchan. Thanks also to my PhD advisor, Hans Klompen.

Special feature: User's Perspectives

We asked some of our stakeholders to provide insight on the value of the Museum of Biological Diversity Collections from their point of view. These are people, groups or organizations that have an interest in the Museum's various Collections and the services we provide. The stakeholders for the collections include scientists and visitors from Ohio, the USA and abroad, citizen scientists and amateur collectors, science educators, governmental agencies and partner organizations, volunteers, among many others. The stories that follow provide valuable insight on the various ways the MBD Collections benefit stakeholders as well as contribute to our community.

Borror Lab aids in educational publications.

Jim McCormac, Ohio Division of Wildlife

The **Borror Laboratory of Bioacoustics** is a treasure trove of bird and other natural history sounds. Its 40,000+ recordings are invaluable to researchers in the ever-evolving field of bioacoustics, and a tremendous resource for authors of natural history publications. I sorted through hundreds of recordings at the lab while developing the Warblers of Ohio CD and guidebook for the Ohio Division of Wildlife, which was released in 2007. This publication is in its fourth printing, and nearly 100,000 copies have been distributed. We have also used Borror lab recordings to create three additional bird CD's and guidebooks, and collectively have distributed approximately 243,000 CD's, and 475,000 of the accompanying guidebooks. The quality recordings provided by the Borror Lab were integral to the success of all of these CD's, which have proven to be invaluable in educating people about birds and natural history.☘

Herbarium: a rich resource for botanists.

Brian Riley, Environmental Manager, Camp Ravenna Joint Military Training Center, Newton Falls, OH

As a field botanist and frequent contributor to **The Ohio State University Herbarium** (OS), I find it difficult to put into words just how valuable and necessary a resource the herbarium is to researchers like myself all across Ohio and throughout the world. When it comes to learning plants, there is no substitute for seeing them in their native habitat or escaping into the landscape as is the case with certain exotic species. However, often times before you can venture out into the field, you need to know exactly what you are looking for, especially when what you are looking for is something that superficially resembles several other species. And when it comes to learning how one species differs from another, there is no better resource to turn to than the herbarium.

My passion for plants lies not just in learning their names, but also learning everything else there is to know about them--range of variation in a given taxon, preferred habitat, distribution of the species and the ecological niche that a particular species occupies. As one friend said to me years ago, the great thing about botany is that you can never run out of plants to learn. Perhaps no truer words have been spoken. Be that as it may, I do not see this simple fact as a reason not to try. Furthermore, helping others to learn about plants and promote an ever greater understanding of the botanical sciences is another genuine passion of mine and is the fundamental reason why I enjoy documenting and, when appropriate, vouchering personal plant finds, especially those representing new county occurrences of a given species.

I find it truly rewarding to give back to the OS Herbarium through plant donations (now approaching some 2,000 specimens). It gives me a great sense of pride and satisfaction knowing that the carefully collected, pressed and mounted specimens will be around for centuries to come and will forever be a part of Ohio's Natural Heritage, cited in botanical literature and viewed by other scientists and casual botanists for a myriad of purposes. For these reasons, every time I find myself "leafing" through stacks of specimens at the OS Herbarium, I cannot help but think about with great appreciation the many skilled and dedicated individuals who have spent untold hours carefully mounting hundreds of thousands of fragile dried samples so that they can be made available for study and observation. In my humble opinion, they are the most critically important members of the herbarium staff and for their time, talents and service, I cannot thank them enough. Fortunately, we do not have to wonder what it would be like without herbaria such as Ohio State and others across Ohio, and that is exactly why I continue to support the **OS Herbarium** and its mission. I strongly encourage you to do the same.☘

Tetrapod Division: Why does the ODOT care about bats?

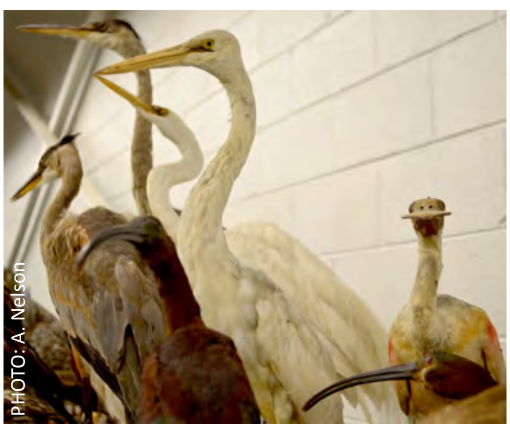
Adrienne Earley, Office of Environmental Services, Ohio Department of Transportation

Big brown bat, *Eptesicus fuscus*.

I did not find it strange to be sitting in a collection room at the Museum of Biological Diversity at Ohio State on a Friday afternoon in late May. After all, I received my Bachelor's in Zoology and Master's in Entomology from OSU, and had spent many hours reviewing the insect collection and taking lab practicals. What was odd was that I wasn't at the museum as a staff member or student from Ohio State or a researcher from another university, but I was at there to review Ohio bat skins to assist in my job at the Ohio Department of Transportation (ODOT).

As a member of the Office of Environmental Services at ODOT, one of the tasks that we perform in order to clear roadway projects is mist net surveys for the endangered Indiana bat. Katie Dunlap, Matt Perlik and I are fortunate enough to possess a collector's permit from U.S. Fish & Wildlife Service to survey for the presence of the endangered species across Ohio. Every spring before bat survey season begins, we want to refresh our identification skills, and for the past 2 years Angelika Nelson, Curator of the **Borror Lab of Bioacoustics** and **Tetrapod Division**, has graciously allowed us to review the bat specimens at the museum.

As with many other groups of taxa, one species can superficially look like multiple other species, and the same is true for the Indiana bat. Since finding an Indiana bat in a roadway project area can have significant temporal and financial implications for ODOT, we need to ensure that our bat identification skills are sharp and precise. We have also conducted and funded Indiana bat research projects, one of which involved faculty and students at Ohio State. The bat collection offered a variety of specimens that displayed variation of characteristics within and between species. Angelika and her staff were very accommodating and offered us a large table to study the bats, and any materials that we needed during our review. We were able to access all the bat specimens. We were also able to offer our expertise in recommending corrections to a few misidentified specimens. Upon completing our review, we felt that extra edge of confidence after a long winter in the office to tackle the first bat survey of the season the following week. Thank you Angelika and staff for sharing your bats with ODOT!☘



A valuable Bird Collection.

Bill Whan, researcher and former editor of the "Ohio Cardinal" magazine

As a researcher interested in the history of Ohio ornithology, and editor of the state bird journal, I was lucky to live only a few miles from **OSU's Museum of Biological Diversity (MBD)**. In its original incarnation, that was the first public repository for natural history specimens in Ohio. These materials accumulated in the Capitol Building during the 1880s as the Archaeological and Historical Museum and were moved to OSU in 1894. Since that time, the MBD collections have been a joint enterprise of the Ohio State University and the Ohio Historical Society (OHS), with a much smaller number of specimens now curated at the OHS facility. For birds, Ohio's two other major collections, the Cincinnati Museum Center and the Cleveland Museum of Natural History, are larger, but lack the MBD's local variety and historical depth. There is no more important repository of Ohio specimens. To the wealth of its more than 23,000 specimens (round skins, egg sets, and skeletal material) must be added a great number of published works, manuscripts, and holographic records about birds--as well as a reference library of works on biology, now regrettably dissolved.

The MBD has benefited from contributions, both material and intellectual, from many ornithologists and collectors in the past two centuries. Over the years, shifting scientific and academic trends have overall reduced the significance of museum collections in biological studies. The accomplishments of faculty and others at the MBD over the years are recognized as valuable in a historical sense, but the specimens retain characteristics of great value—certainly for teaching, for example—and likely more in times to come. One example of the specimens value was the study of the Museum's eggs of falcons that helped demonstrate the degradation of their shells via organochlorine contamination. This work contributed to the continent-wide recovery of many raptor populations. In a more general way, accumulated scientific records of occurrences of certain bird species provide important information about various aspects of their changing populations, habitats, and distributions over time. Certainly, other ways in which we can learn from the collections remain as unforeseen as the questions and methodologies of the future.

Museum studies at the MBD and OHS were vital resources for articles I and other members of the public have written on Ohio birds, and curator John Condit was always an amiable and well-informed guide to the Museum's riches. He organized a dozen students and volunteers to enter data from all the higher vertebrate specimens into an electronic database, now complete, for eventual installation on the internet along with those of other institutions with significant holdings.

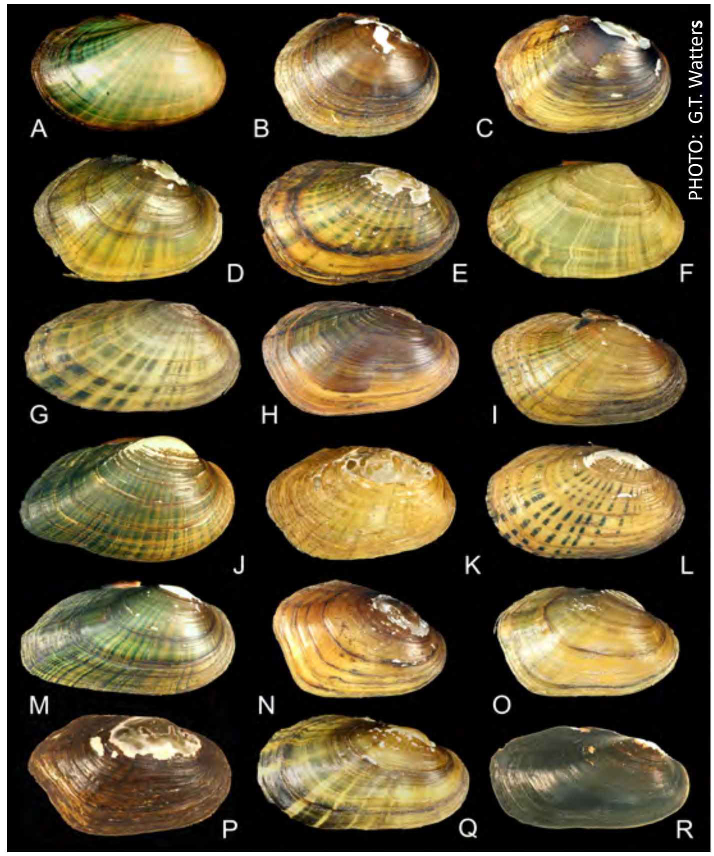
About forty years ago, while acting as unofficial curator following his retirement, Milton Trautman assayed the MBD bird collection in an unpublished document. He called it the most complete assemblage of Ohio avian specimens extant anywhere. The egg collection was of national stature. The skeletal holdings, while helpful, needed more material. The collection of skins was especially broad, with specimens of all the orders, and 115 of the world's 168 bird families, making them especially valuable as a teaching resource. Among other riches in the collection, he cited round skins of over half the world's hummingbird species, specimens of most of the state's earliest and unique occurrences of rare birds, and a complete set of the Anseriformes and Galliformes of North America. He had himself published over sixty ornithological articles and two book-length treatments on Ohio's avifauna based on his familiarity with the **MBD Bird Collection**. Most importantly, a complete catalog, which he and his wife began with retagging of specimens and a handwritten registry of their data has been completed in electronic form. An unmeasured benefit has been that I and others have been inspired and enlightened by many visits to MBD, and passed on to others what we learned there. I hope many more seekers of knowledge will enjoy that opportunity.☘

Division of Molluscs: fostering research in malacology.

Kody Kuehnl, Chair, Department of Social and Natural Sciences, Franklin University, Columbus, OH

I have been the beneficiary of OSU's **Mollusc collection** for the past 10 years and during this time the collection has served me in many capacities. In my malacological infancy, the collection provided approximately 500,000 specimens that formed the basis for understanding how to identify North American unionids, a seemingly futile exercise, but one that has proven fruitful, nonetheless. In so doing the collection introduced me to the plight of freshwater mussels, a group that remains unrivaled in North America (from a conservation standpoint) and gave me numerous opportunities and platforms to share this story with local elementary and middle school students, state and federal agencies, and researchers around the world. Having an opportunity to hold species that no longer exist in nature is both humbling and motivating.

As one of the premier collections of unionids in the world, the MBD's Division of Molluscs is a hub of malacological activity. As such, the collections have provided me with the opportunity to meet and network with malacological researchers (and a few legends) from all over the world. Such opportunities have allowed me to gain valuable research experience and to assist in research endeavors that I would not likely have encountered otherwise.



Freshwater mussel species of the genus *Villosa*.

Perhaps most importantly, spending time in the collection helped me to understand the taxonomic difficulties and recognize the tremendous variability (and at times the lack thereof) which helped to formulate the hypotheses of unionid relationships and phylogeography that proved the basis for my research as a graduate student. Arguably, the most significant contributions of this research included the molecular identification of 7 new cryptic taxa of freshwater mussel that were previously treated as a single taxon (*Villosa iris*) and the restructuring of the entire genus in a new systematic arrangement.

Even though I have moved on from Ohio State, I continue to use the Mollusc collection as the basis for multiple research and education projects aimed at the conservation and preservation of freshwater mussels.

Triplehorn Insect Collection: an essential resource for insect enthusiasts.

Dave Horn, Professor Emeritus, Entomology; President, The Ohio Lepidopterists; Database Adviser, The Ohio Coleopterists

The Ohio Lepidopterists (TOL) and the Ohio Coleopterists are two organizations that make ongoing use of the **Triplehorn Insect Collection**, and I have the personal fortune of working with both. The Ohio Lepidopterists is a not-for-profit organization founded in 1979, with about 300 current members. The purpose of TOL is to promote interest in butterflies and moths of Ohio and neighboring states, with activities designed to increase knowledge and dissemination of scientific information on Lepidoptera, to encourage conservation and appreciation of Lepidoptera, and to facilitate closer cooperation among amateur and professional lepidopterists. TOL has also taken leadership in increasing awareness and appreciation of Lepidoptera among the general public.

The Triplehorn Insect Collection has occupied a central role in TOL activities from the beginning. Early on TOL undertook a statewide survey of Lepidoptera including a review of all Ohio records in collections. The Triplehorn collection allowed access to TOL databasing volunteers working on this effort from which two books emanated, “Butterflies and Skippers of Ohio” and “Owlet Moths of Ohio” in 1992. Two irreplaceable resources particularly valuable for TOL’s survey efforts in the Triplehorn collection have been the W.N. Tallant collection from Columbus over a century ago, and Homer Price’s 20th century material from northwest Ohio.

TOL maintains its own comprehensive reference collection of more than 90% of Ohio Lepidoptera housed in six 24-drawer cabinets within the Triplehorn Collection range. Until the TOL collection was moved to its present location in 1992, it was in a facility with no climate control, subjected to wide temperature and humidity fluctuations that would have eventually destroyed the material. The TOL collection is managed by curators (currently Steve Passoa and Dave Horn) and is accessible by prior arrangement. TOL holds an annual membership and business meeting with up to 100 members and guests in attendance. In addition, TOL holds “I.D. Day”, during which the reference collection and professional expertise are available to assist TOL members and friends with troublesome identification issues. Both events take place at the OSU Museum of Biological Diversity.


PHOTO: D. Horn

The Ohio Lepidopterists is recognized nationally as the outstanding state-centered organization of lepidopterists and has served as a model and inspiration for development of similar organizations elsewhere. This would not have happened without our close and continuing relationship with the Triplehorn Insect Collection and the OSU Museum of Biological Diversity.

Ohio Coleopterists is a more recent (1994) and (to date) smaller group that has also initiated the ambitious task of databasing Ohio beetles and making this information available electronically. The staff of Triplehorn collection has encouraged this effort by allowing access to the collection so that data from Ohio specimens can be recorded, and data on several beetle families have been extracted for a pilot project currently underway.☘

The two –legged treasures of the museum.

Steven Passoa, Lepidoptera Specialist, USDA

Although most museum newsletters correctly tout the physical attributes of their collections, the human resources are too frequently neglected. As a user of collections, I too have been guilty of this by focusing on the economic or scientific value of the publications and specimens. Nevertheless, there is another side to the Museum of Biological Diversity (MBD), the research scientists and staff. It is particularly important for new EEOB students to come to the museum and get familiar with what the collections and the people here have to offer.

Museum scientists can play a major role in ecological studies. A few buckeyes with a University of Illinois entomology pedigree might remember with horror the merging of morphology and physiology into a single giant nightmare course. Yes, many survived, and the legend of those brave souls still lives on. However, the point was well taken. Morphology needs to be combined with physiology and ecology to best understand a particular adaptation. For this reason, the MBD fits perfectly into an ecology and evolution oriented department. Specialists at our museum know the morphology and distribution of their organisms of interest. They can access obscure publications and, in many cases, have databases to help select the best possible study site. Systematics is a small world and our experts can help put a student in contact with other scientists, even outside Ohio or the USA.

Another role of museum scientists is in identification and vouchering of study organisms. As an example from my realm of interest, even common butterflies present a challenge. The black swallowtail and tiger swallowtail are now considered to have related sibling species. Same applies to plants. Common plants such as goldenrod may require expert attention to get a correct species name. Even if the work is done with a lab culture, it is still a good idea to voucher a synoptic collection of any organism used in a thesis or formal publication. Museum scientists can help with preservation that prevents future workers from guessing what organism was actually studied. DNA samples are sometimes useful to preserve even if the identification may not be an issue.

A final example is the role of phylogenetic studies in ecological theory. Nearly all researchers at the MBD have some experience in using or building phylogenetic trees. These studies can help answer questions in evolution of behavior, community structure, coevolution or biogeography. Plants or animals are both suitable. MBD scientists work in any ecosystem: land, rivers and lakes or the ocean. So, if as part of your studies, you heard a bird and are not sure what it was, saw an unknown insect or snail eating a plant, found a really cool amphibian or reptile, need to test water or identify a plankton sample or have a question on a marine invertebrates, the MBD collections staff can help. Museum collections are definitely more than just "stuff".☘

News & Updates

▪ ***Acarology.*** This summer the Acarology lab had two long-term visitors, **Leopoldo Ferreira de Oliveira Bernardi** and **Grazielle Furtado Moreira**, both PhD students from Brazil. They are here thanks to some of the quite generous programs for foreign exchange initiated by the Brazilian government. Grazielle is a student at Univ. Estadual Paulista (UNESP), Jabotical with Gilberto de Moraes as her advisor. She has been working on a catalog of the non-parasitic members of the family Laelapidae, getting some good use out of the Acarology Lab's extensive reprint library. She is also working on descriptions of a number of laelapid species. Sadly, Grazielle will be leaving mid-October. Leopoldo is a student at Univ. Federal de Lavras, Minas Gerais, with Rodrigo Ferreira. Leopoldo is here for a year working on revision of Opilioacaridae in Brazil. In the process he is upsetting several of my ideas on that group, but that keeps it interesting. As a result of their visits, Portuguese has been at least the second language in the lab.(*H. Klompen*)☘

▪ ***Borror Laboratory of Bioacoustics (BLB) & Tetrapod Division*. Thesis defense. Erica Szeyller-Macolley** successfully defended her thesis "Transmission and Reception of Structurally Distinct Song Phrases in the White-Crowned Sparrow (*Zonotrichia leucophrys pugetensis*)" on August 2nd. She now teaches at the OSU Center for Life Sciences Education.

New students. Lisa Miller, zoology major, started working on the NSF-REU funded project "Genetic analysis of song dialects in White Crowned Sparrows". She will be analyzing DNA samples from white-crowned sparrows along the Pacific Northwest coast with 15 microsatellite loci and test for a correlation between genetic and cultural (song dialect) divergence.

Bird specimens at Columbus Audubon meetings. The bird collection provided bird specimens for an ID-quiz at the monthly meeting of the Columbus Audubon society on September 25th. Attendants were challenged to identify species that have recently been seen in Franklin county: several wood warbler species in their fall plumage (Tennessee warbler, Blackpoll warbler, Magnolia warbler, Northern Parula, and Yellow-rumped warbler), a Rough-legged hawk, Red-breasted Nuthatch, and two sparrow species (Nelson's sparrow and Swamp Sparrow). Participants (*right*) enjoyed the quiz and were busy discussing plumage features that helped identify the specimens .

Graham Webb, **wood carver** in Ohio and member of the Patriot Guard Riders, initiated a project to carve one eagle feather for every fallen soldier in Afghanistan. Wood carvers from Ohio and other Eastern states of the USA will participate. As a model they will use photographs of feathers on bald eagle specimens taken in the bird collection. All carved feathers will be on display at the Columbus downtown Memorial Day celebrations in 2013.

The **Columbus Lights Out** project has entered fall season and volunteers are patrolling the downtown Columbus area to check for bird window strikes. Any birds found dead are donated to the bird collection and will be prepared into museum study skins. Migrating birds are on the move through Ohio and in particular several Tennessee warblers have hit buildings. This project was recently featured in the Columbus Dispatch, Science section(16-Sept).

A swift night out – Chimney swifts roosting at Indian Springs Elementary School in Clintonville. The bird collection provided a study skin and a nest of a chimney swift and a study skin of a Common nighthawk (*left*) for the Columbus Audubon event a "Swift night out". This program of watching chimney swifts enter a roost at sunset was in collaboration with the Ohio Young Birders Club; one of the club's members, Jack Roy, remembers the event as follows: "*Early on, there were only a few Swifts circling, then flying away. A guest speaker, Dick Tuttle, helped us learn all about the Chimney Swift and related species. One thing I learned is that the birds have barbs on their tails to help them cling to the chimney! Dick had samples (study skins) of the birds and a nest. Later, more and more Chimney Swifts gathered until the sky was filled with flying "cigars," swirling and circling around the chimney. Their sound was a faint chirping. Near dark, Swifts by the handfuls dived into the chimney until exactly at 8:19 pm, when there were none left in the sky. Members counted over 600 birds! This event was awesome! It makes me want to go to all events!*"(*A. Nelson*)☘

This summer the **Fifth North American Ornithological Conference** was held on the campus of the University of British Columbia in Vancouver, Canada, from 14-18 August. Convened only every 4-5 years, the NAOC is the largest meeting of ornithologists in the western hemisphere and is a joint endeavor of nine professional ornithology societies from North and Central America. With almost 1,500 attendees from 25 countries, this summer's meeting was the second largest gathering of avian scientists ever held in the Americas, providing ample opportunity for conversation, collaboration, and a whole lot of fun (the Bird

Band Jam at the Biltmore Cabaret and the US v. Canada softball game were particular highlights). Doug and Angelika Nelson, Jackie Augustine, Stephanie Wright, and Jennifer Hale were all in attendance: Angelika gave an oral presentation about her and Doug's ongoing work with White-crowned Sparrows, Stephanie talked about some of her Ph.D. research on Black-capped and Carolina chickadees, Jenny presented a poster about her M.Sc. research on Greater Prairie Chickens in Kansas, and Jackie presented data on House Wrens gathered over the past three years by undergraduates she has supervised on OSU's Lima campus. (*Stephanie Wright, EEOB graduate student*)☘

▪ ***Fish Division.*** Last month, 13-16 September, Brian Zimmerman, Justin Baker and Marc Kibbey hosted the **17th Annual Convention of the North American Native Fishes Association (NANFA)**. This is a meeting of a diverse group of native fish enthusiasts, ranging from aquarium enthusiasts and nature photographers to fishery professionals and university professors.

Seventy members and their guests attended the convention at the Salt Fork State Park Lodge, during which several informative talks were given on topics including one on propagation of rare and endangered fish species by personnel from the Tennessee Aquarium, a talk on renovation of degraded streams by ODNR personnel, and a presentation on Evolutionary Conservation Genetics of the Tongue-tied Minnow. Especially poignant was a lecture given by Mr. Don Gartman, former associate of longtime curator (1940 to 1986) of fishes and author of Fishes of Ohio Milton Trautman. Don related some of his own experiences with Milton and with anecdotes gleaned from speaking to family and associates. Brian and Justin gave a talk on some of the results of the ODNR sponsored project Inventory of Ohio Stream Fishes to survey rare species and undersampled areas that has kept them so busy working with the Fish Division the past year-and-a-half. One impressive attraction at this year's convention was provided when the Ohio River Valley Water Sanitation Commission trailered in their "Life Below the Waterline" 2200 gallon Mobile Aquarium which they loaded up with numerous big fishes caught in the Muskingum River.

But the most anticipated aspect of the event is of course the stream fish sampling trips (*above*). On one such trip to Salt Creek of the Scioto River drainage at least 44 species were caught. Other trips included forays to streams like the Walhonding and Muskingum Rivers where participants were treated to demonstrations by the OSUM Fish Division's stream trawling boat and the Ohio Environmental Protection Agency's electrofishing boat, and then participated in seining and releasing fishes including state listed species such as Spotted darter, *Etheostoma maculatum*, Eastern sand darter, *Ammocrypta pellucida*, and Bigeye shiner, *Notropis boops*. Some convention attendees went to great extremes to find other fauna, like University of Alabama Post-Doctoral associate Mike Sandel (*left*) searching burrows for salamanders. *(M. Kibbey)*☘

▪ ***Herbarium.*** **Visitors**. John Baird and his students from ODOT spent a day touring the facilities; Emilie Regnier and Ramarao Venkath from OSU-HCS spent time discussing acquisition of databased specimens of OS and the Ambrosia species with Mesfin Tadesse; Roger Troutman, a specialist on the genus *Liatris* (Asteraceae) spent 3 days to update and complete a revision of the genus. The Ohio State University Herbarium facilitated the loan of specimens from the University of Minnesota for this study. **Tours of the facilities** of The Ohio State University Herbarium were given to students taking the local flora class, EEOB 210.

Updates. Mitchell Robbins, who graduated recently from EEOB, continued to work in the herbarium. She will be working until the end of the semester. She is a very valuable resource in training new recruits.

New People. Flanery Stephens, an intern from The Graham School (Columbus), started working two days a week in the herbarium. John (Jake) Peer, a fifth year student, was employed to mount backlogged specimens. *(Mesfin Tadesse)*☘

▪ ***Molluscs.*** The Division of Molluscs welcomes **Kaylene Woods**, new undergraduate student intern.

▪ ***Triplehorn Insect Collection.*** **Thesis defense.** On August 10th **Elijah Talamas** defended his Ph.D. dissertation. The afternoon started with his seminar entitled "Revision and systematics of three genera of parasitoid wasps: *Paridris*, *Oreiscelio*, and *Trichoteleia* (Hymenoptera: Platygastroidea) and Exploration of Chemoreceptor Genes in *Trissolcus basalis* (Wollaston)". As part of his research, Elijah described and published sixty nine (69) new species of parasitic wasps, with more yet to be published. We had a nice celebration after his defense, with cake and drinks, courtesy of Elijah's Mom and sister, who came to Columbus especially for the event. At the moment Elijah is taking some time off before he starts on a postdoctoral fellowship.

Departure. At the end of August, we bid farewell to **Roger Burks** (*right*), who has been working as a postdoctoral researcher in Norman Johnson's lab for the past couple of years. During his time at Ohio State, Roger completed revisions of two parasitic wasp genera - *Bracalba*, a small group of some 14 species endemic to Australia, and the much bigger and complicated genus, *Oxyscelio.* Roger has worked up over 180 species of *Oxyscelio* found from Fiji and Vanuatu to Côte d'Ivoire. The latter work will be published in three papers dealing with the tropical Asian, Australian/Oceanian, and African species separately. Roger is now back in Riverside, California.

New People. On the second week of October, **Jessica Albright** & **Victor Zeinner** have joined the Triplehorn collection in the capacity of undergraduate curatorial assistants. Welcome! (*L. Musetti*)

Exotic pest: European Grapevine Moth, *Lobesia botrana*

Todd Gilligan, former OSU Entomology student (*M.Sc.* 2007), was part of a United States Department of Agriculture (USDA) expert panel that evaluated exotic plant pest and disease threats to US agriculture from foreign countries. The effort won the **2011 Safeguarding Award** from the Deputy Administrator that includes induction in the USDA's "Hall of Fame". Two other MBD collaborators were also included in the award: **Ron Ochoa** (who lectures every year at the Acarology Summer course) and **Steven Passoa** (MBD associate who worked with Todd on the Lepidoptera portion of the work.)

For the purpose of this work, the Triplehorn Insect Collection was consulted for distributional data of moth species. Todd is currently in the last stages of his Ph.D. at Colorado State University. (*S. Passoa*)

The XXIV International Congress of Entomology, ICE (19-25 August, Daegu, South Korea) was held at the fine EXCO Convention Center (*right*) in the historical city of Daegu, about an hour-long plane or train ride from Seoul. The **ICE** is the premier forum for entomologists from around the world to meet, to share their expertise, to present their work and to discuss the latest scientific and technological advances in the various fields of entomology. This year an estimated 2,500 professionals attended the meetings. Attending from Ohio State were **Norman Johnson** and **Elijah Talamas**. Our Korean hosts were superbly hospitable and made all delegates feel very welcome. While there was one hotel connected to the convention center, the other hotels at which people were staying were spread all over the city. Some delegates had to travel for over an hour each way to get to and from the meetings! Typical of such meetings there were numerous concomitant sessions, so we were constantly shuttling between rooms in order to hear the talks of special interest. We both gave presentations and attended very interesting symposia on the future of taxonomy, on our group of interest, the Hymenoptera (*wasps, bees and ants*) and on biogeography.

As a final note on the Congress, the weather on arrival was very hot and humid. Even though that part of the city seemed to be almost entirely concrete and asphalt, the cicadas were singing loudly in all the trees around. The sweltering weather gave way to a couple of days of almost constant rain: nothing too serious however, just inconvenient. It cleared up later in the week as the Congress drew to a close, and we had a window of approximately 48 hours to take our leave of the country before typhoon Bolaven blew in. The next ICE will be held in Orlando, Florida in 2016. It is expected to be the largest gathering of entomologists in the history of the science, with over 6,000 delegates expected to attend.(*N. Johnson*)☘

A moth image says a thousand words! There has been a gradual increase in public viewing and study of Lepidoptera, the scientific name of moths and butterflies. This interest has actually resulted in terms analogous to the ones used by bird

enthusiasts: there are now "moth-ers" and "happy mothing" is a common well wish on park trails. Indeed, many of birders are turning their binoculars to butterflies in addition to birds. Butterfly and moth field guides, aimed at the general public, are now commonplace. Ohio has a strong community of moth and butterfly students and enthusiasts.

The Ohio Departmenf of Natural Resources (ODNR) Division of Wildlife, as part of its educational efforts, has produced a fully illustrated booklet, "Common Butterflies and Skipper of Ohio" (http://www.dnr.state.oh.us/Portals/9/pdf/pub204.pdf), which covers the most common species found in Ohio. Many of the dorsal images of butterflies and skippers featured in that publication are of specimens from the **Triplehorn Insect Collection**.

More recently, the Ohio Division of Wildlife was interested in producing a poster on selected caterpillars of Ohio that included the adult moths (*left, right*). For some species, the moths are much harder to find than the caterpillars, especially if you need one right away. The Triplehorn collection had representatives of the needed species and those were made available to Jim McCormac, who photographed the moth specimens for the poster. Such efforts help the public appreciate the beauty of insects and might even inspire a lepidopterist or two down the road. (*S. Passoa*)☘

Poster detail

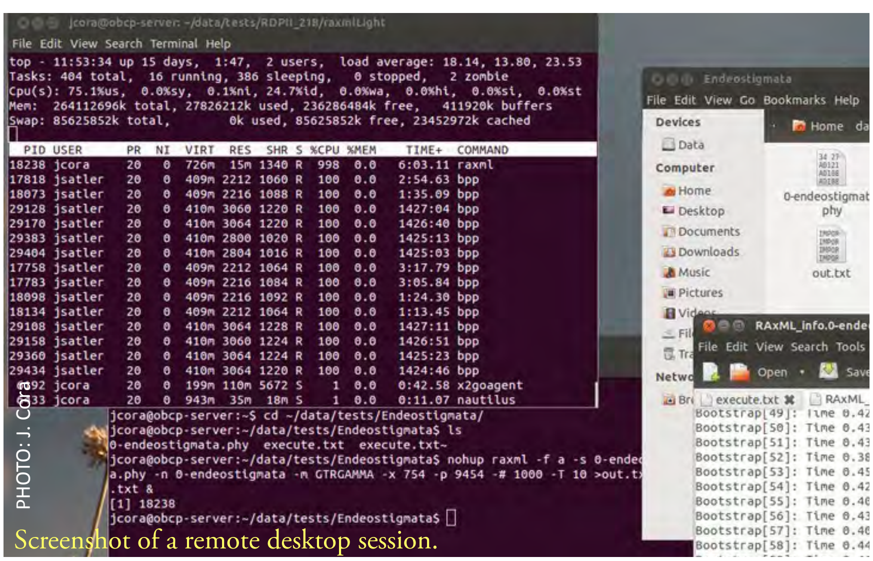
Got a large data set? We've got a cluster for that!

Joe Cora, Biodiversity Informatics Manager, MBD

Bio- and biodiversity informatics are fast evolving fields that demand more powerful and flexible computing resources in order to stay relevant. We at the Museum of Biological Diversity (MBD), in association with the Ohio Biodiversity Conservation Partnership (OBCP) and the Aquatic Ecology Laboratory (AEL), now have the equipment to perform cutting-edge analyses with a fresh, new computing cluster.

The OBCP cluster, whose namesake is a product of its largest contributor, is a Linux cluster running the most recent version of the Ubuntu operating system and built on the latest Intel product line for servers, Sandy Bridge. Designed to handle large parallelized computing jobs, the cluster can run 64 simultaneous threads – or processes – without impeding the performance of another thread. In order to accommodate these potentially massive parallel analyses, 256GB of random access memory (RAM) and 6TB of hard disk space are available within the cluster which is upgradable to 768GB and 30TB respectively. Also, the unit which houses the hard disks can compensate for two concurrent disk failures without compromising the integrity of the data making storage within the cluster safe. All of the cluster equipment is housed within the Insect Collection server rack (*right*) that is run through two 3750W uninterruptible power supplies (UPSs). The UPSs provide a stable, clean voltage source to each unit within the rack as well as a minimum of 45 minutes of battery power.

Rack housing the cluster – rear view.



Screenshot of a remote desktop session.

To give a relevant example, the authors in a recent Bioinformatics journal article (Stamatakis et.al., 2012) used a cluster whose configuration is very similar to the OBCP cluster (48 cores/ 256 GB RAM/ AVX optimizations) on a real world dataset, the iPlant Tree of Life (iPToL). A maximum likelihood (ML) analysis was performed on this dataset, which included over 100,000 species, and a tree was successfully produced within only six days. Although most of the datasets that we plan to use will not reach this level of data richness, the example within this paper demonstrates the raw potential of the OBCP cluster. If you are a member of the MBD, OBCP, or AEL please contact Dr. Lisle Gibbs (*gibbs.128@osu.edu*), OBCP director, regarding the availability of the OBCP cluster resources for your use. Please contact me (*cora.1@osu.edu*), cluster administrator, to setup a new user account, request software to install, or ask a question about the configuration. For additional information and a list of the currently installed software packages, visit the **cluster wiki:** *http://osuc.osu.edu/osucWiki/OBCP_Informatics_Portal*. You shouldn't use your laptop to run an analysis when your task can be completed in a faster, safer manner with this new cluster – my parting words of wisdom.☘

Stamatakis, A., A.J. Aberer, C. Goll, S.A. Smith, S.A. Berger & F. Izquierdo-Carrasco. 2012. RAxML-Light: a tool for computing terabyte phylogenies. *Bioinformatics* 28(15): 2064-2066. doi:10.1093/bioinformatics/bts309.

Recent Publications

Farfan, M. & **Klompen, H**. (2012) Phoretic mite associates of millipedes (Diplopoda: Julidae) in the northern Atlantic region (North America, Europe). International Journal of Myriapodology, 7, 69-91. doi: 10.3897/ijm.7.3064.

Looney, C., E. LaGasa and **S. Passoa**. 2012. First records of the dogwood borer, *Synanthedon scitula* (Harris)(Sesidae), in the Pacific Northwest: a potential threat to ornamental and fruit tree growers. **Journal of the Lepidopterists Society**. 66(3):171-174

Paredes-León, R., **Klompen, H.** & Pérez, T.M. (2012) Systematic revision of the genera *Geckobiella* Hirst, 1917 and *Hirstiella* Berlese, 1920 (Acari: Prostigmata: Pterygosomatidae) with description of a new genus for American species parasitic on geckos formerly placed in *Hirstiella*. **Zootaxa**, 3510, 1-40.

Popovici, O.A. & **N.F. Johnson**. 2012. Gross anatomy of the Malpighian tubules and internal male genitalia of Scelioninae (Hymenoptera; Platygastroidea; Platygastridae) with phylogenetic implications. **Proceedings of the Entomological Society of Washington**. 114: 372-397.☘

Recent Presentations

Hale, J. & **Augustine, J.** "Role of vocal characteristics in individual recognition among male Greater Prairie-chickens, *Tympanuchus cupido*." *Poster Presentation*. Fifth North American Ornithological Conference. Vancouver, Canada. 14-18 August.

Johnson, N.F. "vSysLab: A platform for development of monographs for the digital future of taxonomy." *Oral Presentation*. Symposium: Globalized insect taxonomy in the 21st century: Current accomplishments, future prospects. ICE 2012. Daegu, South Korea, 20 August.

Poesel, A. & **Nelson, D.A.** "Delayed song maturation and territorial aggression in a songbird." *Oral Presentation*. Fifth North American Ornithological Conference. Vancouver, Canada. 16-August.

Talamas,E. & **N.F. Johnson**. "Olfactory and gustatory receptor genes in *Trissolcus basalis*." *Oral Presentation*. ICE 2012. Daegu, South Korea, 23 August, 2012.

Thoma, R. "Crayfish Diversity" Oral Presentation. 2012 National Convention, North American Native Fishes Association , Salt Fork State Park, OH, 14 September.

Watters, G.T. "Reintroducing the federal endangered Northern Riffleshell mussel to Ohio." *Oral presentation*. 2012 National Convention, North American Native Fishes Association, Salt Fork State Park, OH, 14 September.

Watters, G.T. "Mitigating mussel loss to Leading Creek." *Oral presentation*. Meigs County Soil & Water Conservation District, Pomeroy, OH. 25 September.

Watters, G.T. "Strategies for saving imperiled native freshwater mussels." *Oral presentation*. EcoSummit 2012, Columbus, OH. 2 October.

Watters, G.T. "Reintroducing the federal endangered Northern Riffleshell mussel to Ohio." *Oral presentation*. St. Francis University, Ft. Wayne, IN. 6 October.

Watters, G.T. "Phylogenetics and zoogeography of the Caribbean land snail family Annulariidae." *Oral presentation*. St. Francis University, Ft. Wayne, IN. 6 October.

Wright, S. & **Nelson, D.A.** "Song learning preferences differ between two closely related Chickadee species." Oral Presentation. Fifth North American Ornithological Conference. Vancouver, Canada. 16 August.☘

Fellowships & Current Grants

Beati, L, **H Klompen**, L Durden & **NF Johnson**. "REVSYS: Exploiting a large existing resource for biogeographical and host-parasite data: linking immature and adult amblyommine ticks. National Science Foundation DEB, ***$298,865***. (OSU Subcontract). 2010-2013.

Fish Division. "Freshwater Fish Inventory and Distribution project." Under the *Ohio Biodiversity Conservation Partnership*. We will synthesize existing records from the Fish Division with records from the ODOW, OEPA and other sources. The results will guide new collection efforts to generate an accurate, current record of freshwater fish distributions in Ohio, which will be used to help direct future research and management efforts. ***$83,356***. 2011-2012.

Freudenstein, J.V. "Systematics of Monotropoideae and Pyroloideae (Ericaceae)." National Science Foundation, 2009-2012.

Freudenstein, J.V & **M. Tadesse**. "Databasing of the Ohio Flora at The Ohio State University", National Science Foundation, 2009-2012.

Johnson, N.F. & A.D. Austin. "**PBI**: Diversity and the parasitoid life-history strategy — the superfamily Platygastroidea (Hymenoptera)", National Science Foundation DEB, ***$2,600,000.*** 2006–2011.

Johnson, N.F. "Fine-grained semantic markup of descriptive data for knowledge applications in biodiversity domains". National Science Foundation, ***$50,490***. (OSU Subcontract). 2010–2012.

Molluscs Division. Aquatic Mollusks Inventory and Distribution, ODNR ODW, ***$47,517***. 2012-2013.

Molluscs Division. Freshwater Mussel Health Assessment, ODNR ODW, ***$32,087***, 2012-2013.

Molluscs Division. Aquatic Mollusks Conservation, Research & Surveys, ODNR ODW, ***$61,838***, 2012-2013.

Molluscs Division. Freshwater Mussel Health Assessment using Metabolomics, Columbus Zoo - OSU Cooperative Grant, ***$5,000***.

Nelson, D.A., A. Nelson, D.W. Steadman & T. Webber. Digitization of recorded sounds in the Florida Museum of Natural History, NSF, $***466,000.*** 2009-2012.

Nelson, D.A., A. Nelson, H.L. Gibbs & J.W. Olesik. Co-Principal Investigators. "Digitization of recorded sounds in the Florida Museum of Natural History," National Science Foundation, DBI-0846354, REU Supplement. ***$5,998***. 2010-2012.

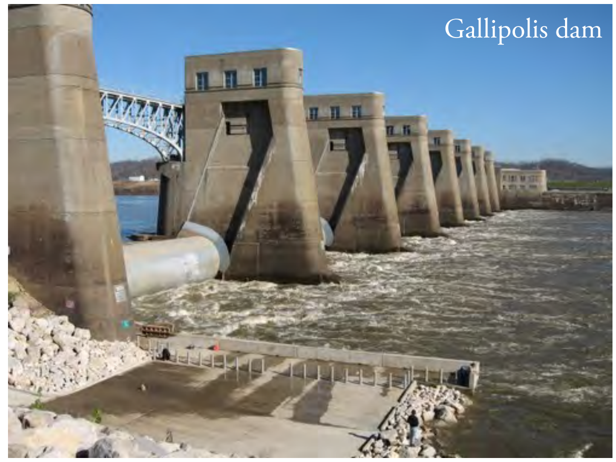
OSU Herbarium. "Digitization TCN Collaborative Research: North American Lichens and Bryophytes: Sensitive Indicators of Environmental Quality and Change", collaborative with multiple institutions, National Science Foundation, 2011-2015.

Wright, S.G. "Innate predispositions in the song learning of Black-capped and Carolina chickadees." American Ornithologists' Union, ***$2,411***, 2011-2012.☘

Field Work & Research Travel

▪ ***Fish Division.*** **Ohio Stream Fish Inventory Update:** Brian and Justin continue making amazing discoveries with their fish sampling efforts. Currently they have added a relatively new method to their suite of sampling techniques: the Missouri stream trawling method employs a trawl drawn backwards from the front of the 22 foot john boat. This method enables researchers to capture species normally missed by more commonly used techniques like seining and electrofishing which, while effective, are only able to sample to a maximum of about 6 feet or so. The stream trawl enables the investigators to sample benthic areas of rivers to a depth of at least 10 feet.

The crew has found Tippecanoe darter, *Etheostoma tippecanoe*, in the Greenup Pool of the Ohio River, another new downstream record albeit the species has been found recently in several localities by the Fish Division Crew in the Ohio River upstream. This species has been showing up in the Ohio River and tributaries on the Ohio side in astounding numbers in recent years, and may have reinvaded from more pristine streams in Pennsylvania. Presence of the Gilt darter, *Percina evides*, was confirmed by finding several specimens below the RC Byrd Lock and Dam at Gallipolis, Ohio and new records established for further downstream. The Gilt darter was thought to be extirpated from Ohio, but will now be elevated to Endangered status in the state due to the reappearance of the population in the Ohio River. This was discovered downstream of the **Gallipolis Dam** (*right*) in 2010 by an ecological monitoring group, EA Engineering and Science. The previous record for the species was only one specimen in the Ohio River near the City of Gallipolis in 1890! Eastern sand darter, *Ammocrypta pellucida,* was found in the Greenup Pool. This is a new record for that locale and further bolsters the idea that improved water quality has enabled several locally rare fish species to reinvade former distributions or extend their ranges. One more capture confirming rediscovery of a species previously thought to have been extirpated from Ohio is the Shoal chub, *Macrhybopsis hyostoma*, found by Brian and Justin in the Greenup Pool. The last record for this species in Ohio had been a 1987 capture in the Hocking River by ODNR.


Gallipolis dam

Both the Shoal chub and the Gilt darter have maintained populations in refugia in streams in Kentucky and West Virginia that may have re-invaded the Ohio River when the water quality improved mainly as a result of pollution controls. The stream trawling will continue as Brian and Justin make their way down the Ohio River below the locks and dams through the Fall. They will then retrace their route to more thoroughly investigate the areas with seines, and finally trawl and seine in the lower reaches of larger Ohio River tributaries like the Muskingum, Scioto, Hocking and Great Miami Rivers, where some of the above mentioned species historically existed, but were thought to be extirpated.(*M. Kibbey*)☘

▪ ***Herbarium.*** Mesfin Tadesse was invited by the Royal Botanic Gardens, Kew, London, in September 2012, to attend a "Symposium on the completion of the Flora of Tropical East Africa". He also spent a day at that institution examining members of the genera *Bidens* and *Coreopsis* from South America and selecting specimens to be sent on loan to OS. Since 1980, Mesfin has an ongoing working relationship with the Royal Botanic Gardens at Kew. He also wrote accounts of several plant families for the floras of Ethiopia and Somalia and accounts of the genus *Bidens* for the Flora of Tropical East Africa (Kenya, Uganda and Tanzania) and Flora Zambesiaca (Botswana, Malawi, Mozambique, Zambia and Zimbabwe).(*M. Tadesse*)☘

Differentiation of Eastern and Western Meadowlark based on plumage and song using two collections at the MBD

Sarah Focht, EEOB undergraduate student and curatorial assistant 2012-2013

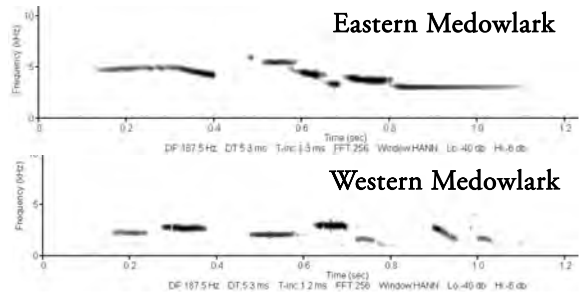
If you visit any grassland area in the United States, you are likely to see a chunky bird with prominent, bright yellow plumage and hear its beautiful flute-like song wafting in the wind. These striking birds are an abundant and widely distributed presence in open habitats across North America. They also serve as an example of how the definition of a species can change over time.

Eastern (*left*) and Western (*right*) meadowlark specimens; the specimen under question, no. 13729 (*middle*).

Prior to 1908, these yellow birds were considered one species: the Meadowlark (*Sturnella magna*), with great geographic variation and numerous subspecies. This classification was primarily based on the morphological similarities between the meadowlarks found in the Eastern United States and the meadowlarks found in the Western United States. However a closer look at their breeding habits revealed that there were in fact 2 separate species, that while morphologically similar, were reproductively distinct. Based on this new information, the American Ornithologist's Union (AOU) recognized 2 distinct species in their checklist: the Eastern Meadowlark (*Sturnella magna*) and Western Meadowlark (*Sturnella neglecta*). As the names suggest, the Eastern Meadowlark ranges from the east coast west through southeast Texas and western Oklahoma, while the Weastern Meadowlark can be found from the west coast east until southeast Kansas and central Illinois. However, the 2 species are not completely geographically distinct from each other and the ranges overlap in the central United States. The best tool for telling these species apart when their ranges overlap is hearing their distinct songs. So what happens if an individual sings both an Eastern Meadowlark and a Western Meadowlark song? How do you identify the species? Then the identification must be based on very subtle morphological differences between the species. A museum collection that houses both Eastern Meadowlark and Western Meadowlark specimens, such as the OSU bird collection, can be a great tool in correctly identifying an individual.

Recently, I found type-written charts associated with the museum's Eastern and Western Meadowlark specimens. Upon further investigation, it was found the charts were associated with specimen number 13729, which was a meadowlark collected right here in Franklin County in May 1968. Typically the only species of meadowlark found in this part of Ohio is the Eastern Meadowlark. However the collector of this specimen, M.B. Trautman, was surprised to observe that the individual was singing both Eastern and Western Meadowlark songs (*see sonograms below*). The bird was observed singing 70 Eastern Meadowlark songs and 20 Western Meadowlark songs. A recording of the bird singing the various songs was taken and put into the museum's sound collection in the **Borror Laboratory of Bioacoustics**. Since the bird was singing both types of song, the collector was not able to identify the specimen in the field. Instead, an innovative method of identifying the specimen using museum resources was implemented. The determiner laid out the museum collection's Eastern and Western Meadowlark specimens and created charts comparing the unknown specimens to each species using subtle morphological identifiers, such as color of rump, color and shape of secondaries, and shape of flanks. After a thorough and meticulous comparison, it was determined that the specimen was a Western Meadowlark, a rare find in Ohio.

Specimen no. 13729, which sang a mix of songs.



This discovery is an excellent example of the numerous ways a museum collection can aid in scientific pursuits. It would have been difficult to identify the specimen with a written field guide because the pictures and descriptions are often vague on subtle morphological features. The collection of already identified specimens was able to show more visual and concrete variation in species. Whether the collection of specimens is used for identifying a difficult specimen, teaching, or contributing data to scientific research, it is a vital source of information on the biological world.☘

Progress in curation of the spider (Araneae) collection.

Richard Bradley, Emeritus, EEOB

As part of the Ohio Spider Survey (1994-2011), a large collection of spiders has accumulated. To date, 16,464 records representing 39,786 specimens have been identified to species and databased. At the moment the data are recorded in a BIOTA relational database. Until recently, most of the specimens have been housed at OSU's Marion Campus. Upon my retirement from teaching at OSU Marion, Michael Lester and I transferred the spider survey collections here to Columbus. They will eventually be integrated into the historical "William Morton Barrows spider collection" within the chelicerates collection housed in the Acarology Range under the care of Hans Klompen.

Specimen storage in the Spider collection

Spider specimens are stored in alcohol in individual lots (glass vials). Each lot, representing one record in the database and includes the individuals of one species from a particular collection event. Specimen lots are gathered into larger alcohol-filled bottles for permanent storage (*left*). To date about 4/5 of the individual vials have been sorted and bottled. My assistants (William Hickman, Michael Lester) and I have been sorting and re-bottling the specimens for the past three years. Some work remains to be done, but most of the initial sorting has been completed. Recently Curtis Abell has been volunteering to continue with identification work.

The historical spider collection was made in the late 19th and early 20th centuries by William Morton Barrows of the old Department Zoology and Entomology. His collections were summarized in several publications between 1919 and 1942. After his death in 1946 the collection was housed with the entomology collection. In the years between 1946 and 1994 additional specimens have gradually accumulated, mostly unidentified lots. The historical spider collection has never been databased, however there were several attempts to create 3x5 card file systems. I estimate that there are approximately 10-15,000 lots in the historical collection, about 80% have been identified. The collection includes specimens from around the world, with emphasis on Ohio, Appalachia, and Florida. I have also donated my personal collections from throughout North America and Australia. In 2002, I published a summary of the type specimens housed in the collection (26 holotypes, 14 allotypes, 113 paratypes) (*Bradley, 2002*).

There is still much work to be done, but my goals for the next few years include: 1) completion of the curation of the Ohio spider survey collection; 2) databasing of the historical spider collection; 3) identification and databasing of the backlog of specimens (~5,000 lots); 4) publishing the database online. When completed, the organized collection has the potential to become one of the major spider collections in North America.☘

Bradley, R.A. 2002. Type Specimens of Araneae held in the William Morton Barrows Spider Collection. Ohio J. Sci. 102 (2): 11-14.

A heartfelt thank you to all our contributors!

Frequent Contributors: (in alphabetical order, by last name)

- Marc Kibbey, Associate Curator, Fish Division.
- Luciana Musetti, Curator, Triplehorn Insect Collection.
- Angelika Nelson, Curator, Borror Lab & Tetrapod Division.
- Mesfin Tadesse, Curator, Herbarium.
- G. Tom Watters, Curator, Division of Molluscs.

Other contributors in this issue: (in alphabetical order, by last name)

- Samuel Bolton, Graduate Research Assistant, Acarology, EEOB.
- Rich Bradley, Emeritus, Spider Collection.
- Joe Cora, Biodiversity Informatics Manager, MBD.
- Adrienne Earley, Office of Environmental Services, Ohio Department of Transportation.
- Sara Focht, Undergraduate Student Assistant, Bird Collection.
- Dave Horn, Professor Emeritus, OSU; President, The Ohio Lepidopterists; Database Adviser, The Ohio Coleopterists.
- Norman Johnson, Director, Triplehorn Insect Collection.
- Hans Klompen, Director, Acarology.
- Kody Kuehnl, Chair, Department of Social and Natural Sciences, Franklin University, Columbus, OH.
- Jim McCormac, Ohio Division of Wildlife.
- Steven Passoa, Lepidoptera Specialists, USDA.
- Brian Riley, Envirnmental Manager, Camp Ravenna Joint Military Training Center, Newton Falls, OH.
- Bill Whan, Researcher and Former Editor of the "Ohio Cardinal" Magazine.
- Stephanie Wright, Graduate Research Assistant, EEOB.

Next issue of the MBDNewsletter coming up Winter 2013

We want to hear from our readers!
Please send feedback to the Editor
at *osuc-curator@osu.edu*

ABOUT US

The **Museum of Biological Diversity** (MBD) is a research facility in the *Department of Evolution, Ecology and Organismal Biology, College Arts & Sciences, The Ohio State University*. The Museum houses all of the OSU's biological collections, except fossils. The main focus of the collections is the discovery, documentation and interpretation of biodiversity. The collections are an irreplaceable repository of specimens and information on the biodiversity of Ohio, the USA and the world. We provide extensive information about our holdings to the scientific community and to the general public through publications, websites and online databases.

The Museum is not regularly open to the public. Once a year, during our Annual Open House, we invite the community to tour our facilities and to interact with the faculty, staff and students. We host visits from classes taught at OSU and the individual units also welcome local school and community groups for guided tours by appointment. Links to the collections websites are available on the Museum website at ***mbd.osu.edu***.

Museum Address: 1315 Kinnear Road, Columbus, OH 43212-1157.

The **MBDNewsletter** is a quarterly publication featuring news and information on the collections at the **Museum of Biological Diversity**. The newsletter is produced by the Curators of the collections, with contributions from faculty, staff, students and associates of the collections. The **MBDNewsletter** is available **online** at ***mbd.odu.edu/newsletter***.