

A close-up photograph of a yellow flower, likely a tulip, with several stamens visible. The petals are a vibrant yellow, and the stamens have yellow filaments and reddish-brown anthers. The background is a soft, out-of-focus yellow.

The Ohio State University

*Newsletter*  
Summer 2014

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

## ***Dear Readers:***

Summer greetings to all from Columbus, Ohio! Welcome to another exciting issue of the **MBDNewsletter**! We are addressing a very important topic: natural history collections, what they are good for, who uses them, and why anyone should care. Please enjoy, and feel free to send your comments to the [Editor](#).✿

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  - A Gift of Biodiversity

The **MBDNewsletter** is a 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 <https://mbd.osu.edu/newsletter>.



# Museum of Biological Diversity

Discovery · Documentation · Interpretation · Education

# Newsletter

Editor: L. Musetti

## Editor's Note: A collection is... well, it depends

At the most basic level, the dictionary tells us that a **biological** or **natural history collection** is an assemblage of natural objects (specimens) organized in a systematic way. But that doesn't really tell us very much about why the specimens are assembled and the uses to which they are put. The uses that scientists and educators make of collections is what gives them their special value.

The **Ohio State University** maintains a number of world-class biological collections at the **Museum of Biological Diversity** (right). These are part of a cooperative network of like-minded institutions around the world that are devoted to the study and understanding of biodiversity. The collections not only share specimens with specialists, but the information associated with these materials is shared with everyone through the Internet and data portals like **iDigBio** ([www.idigbio.org](http://www.idigbio.org)). The **MBD** has over a half million records now in iDigBio, and this number grows every day.

In this issue we focus on the value of biological collections, in particular the ones at our Museum. We hope to address two of the most common questions we are asked: *Why do you have so many specimens? What are they used for?*

### Biological Collections @ MBD:

- \* **Acarology** (ticks & mites)
- \* **Borror Lab of Bioacoustics**  
(animal sounds)
- \* **Crustaceans** (shellfish)
- \* **Fishes**
- \* **Herbarium** (plants)
- \* **Molluscs** (mussels & snails)
- \* **Tetrapods** (amphibians, reptiles, birds, mammals)
- \* **Triplehorn Insect Collection**

Visit the Museum website  
[mbd.osu.edu](http://mbd.osu.edu)

## Museum specimens provide evidence for climate patterns

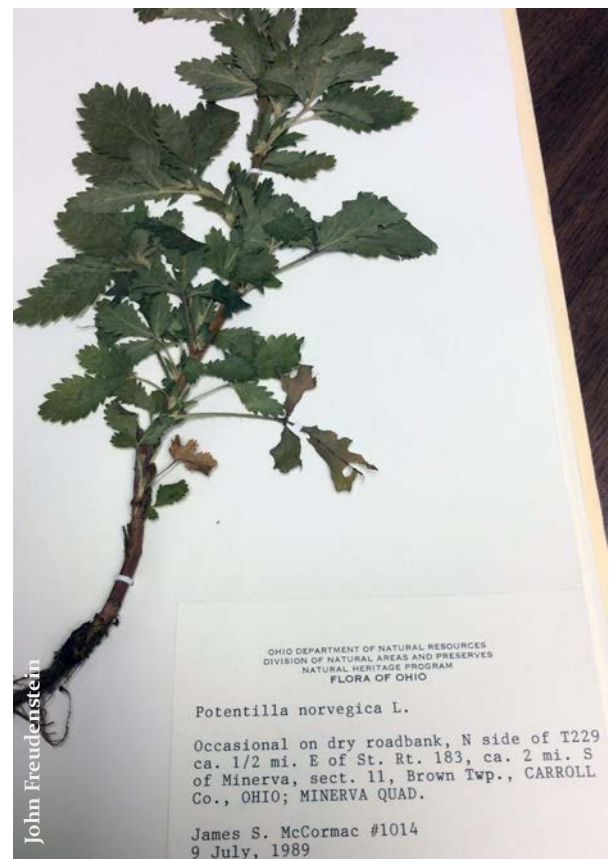
by John Freudenstein

Museum specimens provide a record in time and space for the occurrence of species. Lists of the occurrence of species also exist, but only specimens provide verifiable evidence of the identity of the organism – we can check to see if someone really had what she thought she had. This information is valuable in many ways and one of the ways that people are using it today is to track changes in climate patterns.

A study from 2013 published by *Kellen Calinger*, a graduate student in our department (EEOB), along with Peter Curtis, her advisor, and Simon Queenborough, another professor in EEOB, analyzed data from specimens in the **OSU Herbarium** to draw conclusions about climate change.

They looked at the flowering times for 141 species from Ohio over the past 115 years. They found that these plants exhibited an average change in flowering of 2.4 days earlier/°C, although it varied among species. It mattered whether the species was native or introduced, wind or animal pollinated, and in what part of the season it flowered in terms of the magnitude of the change. Notably, spring flowering wind-pollinated species had a particularly strong advance in flowering time (4.3 days/°C). Introduced species were almost twice as responsive as native species to temperature change, suggesting that non-natives may have an advantage over native species in the race to produce seeds as the climate warms. Similar studies based on herbarium collections have now been conducted in the Philadelphia and Boston areas, as well as in Europe.

It would be nearly impossible to conduct such a study without carefully labeled and preserved museum specimens. Today, much of the effort to make specimen data available online is being driven by the promise of being able to perform analyses such as this one on a broad scale and with greater efficiency. Having the data electronically available means that the specimens will receive less handling, travel to collections can be reduced, and the scope of such studies can be greatly increased, making possible studies that could not have been conceived of previously. ♣



Herbarium specimen.

# Training a new generation of acarologists

by Hans Klompen

The **Ohio State Acarology Collection** (OSAL) may be the only biological collection at this university developed primarily for teaching. Specifically, for teaching the *Acarology Summer Program*. This year, June 9-27, we had iteration number 63 with workshops on Medical-Veterinary Acarology and Soil Acarology. The program is currently the pre-eminent training program in identification of mites in the world, as demonstrated once again by the high percentage of foreign participants (19/34) representing 11 countries. Even though the OSAL collection has developed a strong research component, its use in teaching is still significant, with 10-20% of all slide boxes of the main collection pulled for study by program participants. Such use has consequences, as specimens get damaged. One goal of collecting efforts is to replace damaged material and expand the range of mite species available for study. The focus of collecting at the OSAL is therefore diversity, not specialization.

Collecting mites is obviously rather different than collecting vertebrates or higher plants. For “large” organisms we often have relatively good data on distribution, species status etc. With small organisms such as mites, we do not have that luxury. An added complication is that mites are small; for many it requires making microscope slides to determine specimens even to family. To remedy this poor state of knowledge, added collecting is needed, preferentially to obtain multiple records. Single records are often misleading, even more so for mites than for larger organisms. For example, one mite species was described from a snake in Africa, until multiple subsequent collections showed this species to be a litter mite. Similarly, host records in many older descriptions have been proven to be wrong or accidental.



Collecting microarthropods from treehole samples using Berlese funnels.

Not all mites and microarthropods collected are studied by OSAL personnel, but we preserve material of all microarthropods collected and post all records on-line. This in principle allows researchers everywhere to have access to these specimens and/or data, maximizing their utility.♣

## Trawling for treasure: how collecting fish supports their conservation

by Marc Kibbey & Meg Daly

Although they are familiar to most casual visitors to aquatic habitats and important economically as food and fodder, fish are an imperiled group. The threat comes not from direct exploitation (including collecting for food or for science), but indirectly, through demands on the habitat: pollutants, dams, and invasive species that threaten ecosystems and their native inhabitants. Because most fish produce many offspring each time they spawn, and each individual fish uses relatively few resources, the success of a species is usually determined by the availability of habitat.

Fish are usually collected through non-specific means like seining, trawling, or electrofishing. These techniques capture all of the fish living in a small stretch of a river or at a certain depth in the water column. These tools provide a snapshot of the community and allow scientists to standardize and compare effort across habitats and years. Although the non-selective nature of these methods might seem especially prone to exploitative collecting, not every animal caught is killed, and records of trawls and seines provide critical information about abundance and population structure and thus act as tools for species conservation rather than an agent of extinction. Based on the field notes and vouchers associated with these sampling events, one can infer relative abundance and the age or size distribution of populations. We can see the conservation ethic in the material retained as



Acarology Summer Program 2014.



vouchers: common species were preserved early in the history of the collection, probably to build scientifically useful samples for anatomical and comparative studies, whereas rarer species known are represented by single individuals. Although this doubtless reflects abundance in the field, field notes highlight that the collectors were concerned with conserving the species even in areas where they were more abundant.

Modern collecting is constrained not only by this conservation ethic but also by institutional and legal controls. The state and federal government regulate the number and identity of specimens that can be legally caught by any individual, including those individuals who are conducting scientific research. The ways in which captive animals, including fish captured by trawls or seines, can be killed are regulated by state and federal law, and monitored by the University's Institutional Care and Animal Use Committee (IACUC). Current researchers are constrained not only by ethical and legal concerns but by practical concerns, including space. A sample set of 6-30 specimens from a collecting event at one locality is sufficient for virtually all research in the natural sciences. Repeated sets of vouchers from one locality add nothing to the collection but do represent a cost in terms of the opportunity, the cost of space, and the actual cost of containers, preservatives, and curatorial effort. Photographic or DNA vouchers (small pieces of tissue samples without killing the specimen) are effective substitutes in many cases. The **OSUM Fish Division** has worked to build a tissue collection as part of our collaboration with the Ohio Division of Wildlife with the expectation that analysis of these samples can address questions not answerable by our fluid-preserved whole specimens of skeletal collection, including questions about the genetic stocks from which gamefish originated, the connectivity across dams, and the effective population size of rare species.

Museum collections are vital to the conservation of species. Beyond serving as a record of the former distribution and diversity of species, museum specimens are critical to the training of regulatory and research staff. Expert identification upon collection usually precludes the need for vouchers and is sufficient as record of a species' occurrence. Expertise facilitates identification and reduces mortality and stress on the captured animals. Expertise also facilitates the recognition of new species in the field and the effective and conscientious collection of appropriate numbers of individuals. Furthermore, for fish, many of the newly identified species are recognized on the basis of genetic differences hinted at by differences in the habitat, field color, or locality. ♣



*This State threatened paddlefish observed in Alum Creek under SR 161 (north Columbus) will be cataloged as a photo voucher in our database. The paddlefish is just one of several fish species that the Fish Division has documented as making a comeback in Ohio's waterways.*

## ***The value of herbarium specimens from a teaching perspective***

*by Cynthia Dassler*

The **Ohio State University Herbarium** is used by scientists and students worldwide and locally to investigate plant variation, plant relationships, plant lifecycles, and changes in plant distributions. To research these issues, access to numerous specimens, i.e., a herbarium, is required. Herbaria facilitate research, by acting as plant libraries, loaning specimens to other herbaria for researchers across the world to examine and borrowing specimens for local researchers to investigate. One of the most recent studies, published this year in the journal *Systematic Botany*, using specimens in The Ohio State University Herbarium and specimens borrowed from other herbaria was performed by Ryan Folk, graduate student, and John Freudenstein, professor, both in the Department of Evolution, Ecology and Organismal Biology. Their study on alum roots from the mountains of northern Mexico resulted in two new species, two new varieties, and several other taxonomic updates, as well as extensive notes on their morphology and means of identification. The Mexican species were some of the least-studied of this commonly cultivated plant genus, and were sitting in



*Students in **Ohio Plants** learn to press the plants they collect.*

museum collections for up to 70 years before their significance was recognized. Ryan incorporated information from specimens borrowed from the New York Botanical Garden, the Missouri Botanical Garden, and the Smithsonian, as well as, other major institutions.

A herbarium is not only invaluable to researchers and students as a library of plants that provides access to plants for research, it is also used by students to learn about the characters of different plant taxa. At The Ohio State University, students in the *Ohio Plants* course use the herbarium to learn how to identify plants. Using herbarium specimens, students observe distinguishing characters of plant families and species.

A common activity in *Ohio Plants* is for students to define the conserved characters of a plant family by observing specimens of several different taxa in a family. In contrast, students explore variation within species by examining different specimens of the same species. The herbarium also provides students with a source of pre-identified plants to help students learn the identity of unknown plants from the field. Students in *Ohio Plants* learn the process of plant identification, which starts by keying a plant using a scientific key, and ends with comparing the field collected plant with a plant from the herbarium with the proposed identification.

Each student in *Ohio Plants* collects a plant to identify and then creates an archival herbarium specimen with correct label information. In addition to learning the identification process, creating an archival specimen helps the students internalize the functions of a herbarium, learn how to find the location of a specimen, recognize the importance of correct location information, learn about the plants surrounding the specimen when describing the specimen habitat, and understand the archival process that allows their specimens to endure into the future. The students know that their specimens will either be deposited in The Ohio State University Herbarium or sent to other herbaria around the world as gifts. In the end, the students leave the course with their own concepts about the value of plants specimens and a herbarium. ✱

## ***The specimen in hand in education and teaching***

*by Angelika Nelson*

How do you learn to identify an animal in the field? You can look at photos or drawings of the animal in question in your field-guide, read about its habits and learn about its vocalizations, but once you have an animal in hand you will notice that the real thing is very different! You may encounter variation in color or other features that were never mentioned in your book. So what if you could learn by looking at many individuals of one species and study variation among individuals as well as listen to a repertoire of vocalizations? That's exactly what museum collections allow you to do.

Here in the **OSU mammal collection** we have many bat specimens that were collected in Ohio and other parts of North America over the years (the oldest specimen, a Hoary bat, was collected in Columbus in 1899). Recently *Sarah Elliott* and *Jennifer Norris* from the ODNR Division of Wildlife borrowed specimens of all 11 Ohio native bat species (47 species of bats live in the United States; the eleven in Ohio include: Big brown, Little brown, Indiana, Hoary, Northern long-eared, Silver-haired, Eastern red, Evening, Tri-colored, Rafinesque's big-eared, and the rare Eastern small footed bat) to teach bat biology and identification to Division of Wildlife employees.

*"A bird in the hand is worth two in the bush".* If you have ever gone bird-watching and looked for small songbirds in woodland with healthy understory, I am sure you can sympathize with this saying. Birds hide in the tree tops or dense underbrush and bushes. If you are lucky, you get a brief glimpse of the bird which has to be enough to identify it. Wouldn't it be nice to have this bird in hand and be able to look at it for as long as you like and from all angles? This is what attendees of the monthly **Columbus Audubon** ([www.columbusaudubon.org](http://www.columbusaudubon.org)) meetings can do. As the curator of the **Tetrapod Collection** I bring bird study skins to these meetings. Most of them are safely packed in see-through plastic tubes so that they can be picked up and turned in every possible direction. This way you can look for and try to identify all the features that your field guide lists. Ever wondered where the Red-bellied Woodpecker got its name from? It sure has a red head, but a red belly? Indeed, close-up this species has some red feathers on its belly, a feature that the naturalists who collected the first individuals of this kind noted when they had the bird in hand but did not realize that it would be hard to see with binoculars in the field. The meetings will start again in September, as always free to anyone.

But wait! We don't have to see songbirds, many of them sing the most beautiful tunes and this is how we can identify them! That's correct but it takes a lot of practice to be able to correctly identify a bird based on its vocalizations only. Birds don't only



*Eleven species of bats are native to Ohio.*





*Campers on Hog Island recording birdsong at 4:30 am (!)*

sing to defend a territory and attract a mate but also give calls to stay in contact with their mate, to warn others of potential predators in the area and when feeding. All these songs and calls are part of an individual's repertoire and are similar but never identical among members of the same species. The best way to learn species-specific vocalizations is by listening to recordings of correctly identified bird songs. The **Borror Laboratory of Bioacoustics** has many such recordings and has produced some CDs that can help you learn ([blb.osu.edu/audio-cds](http://blb.osu.edu/audio-cds)). Our newest production is of birds commonly heard on and around Hog Island, Maine. Why this location? I was recently invited to join two of the Audubon summer programs ([hogisland.audubon.org/hog-island-programs](http://hogisland.audubon.org/hog-island-programs)) on this island in the Muscongus Bay in Maine and taught participants about the art of birding by ear as well as how to make audio recordings of bird sounds. To

aid my instruction I put together a CD of recordings of species that we were likely to encounter. Each track starts with the common song of the species, followed by the identification and some more, often less commonly heard sounds. It can be tempting to listen to all recordings in one session, but this is definitely a case where pacing yourself, maybe listening to 3-5 species in one session, will pay off eventually!♣

## ***Museum Specimens Inspire Local Kids' Love of Biology***

*by Kellen Calinger*

Inner-city school children often grow up far from nature and learn about living animals in textbooks only. We, a husband-and-wife team of PhD candidates in the department of EEOBiology at OSU, partnered with local schools, the Museum of Biological Diversity, and the Ohio State's Insectary to bring the excitement of zoology to inner-city school children. We worked with Columbus' After School All-Stars program and the Columbus City School's Exceptional Science Fair for special needs students.

After School All-Stars (ASAS) is a national program providing at-risk inner city school kids with academic and athletic enrichment activities. In Columbus, ASAS is run through Champion Middle School where most of the kids are from low-income neighborhoods with significant gang-related violence. Educational opportunities are limited for the kids of Champion and many have a 2nd-3rd grade reading level. The education programs of ASAS supplement school curriculum and expose students to new ideas and information.

Working with ASAS, we designed and taught two zoology classes, an ecology class, and a conservation biology class. Using a diverse set of specimens from OSU's Museum of Biological Diversity and the Insectary, students were able to use real animals to explore diversity, form and function, and adaptations. For example, a common misconception among students was that snakes were invertebrates like worms. After students learned what a vertebrate is, they compared the exoskeleton of insects from the Insectary with the endoskeleton of a snake specimen from the museum and could describe the functional difference between the two. The students used specimens of hellbenders and wood frogs compared with a live hognose snake to compare and contrast amphibian and reptile skin and make predictions about each animal's habitat. Barn owl, red-tailed hawk, and ruby-throated hummingbird specimens helped students examine hunting and feeding adaptations.

Museum and Insectary specimens also engaged students at the Columbus City Schools Exceptional Science Fair. Organized by Paul Lasker of the Beechcroft High School Special Education Department, the fair gives special needs kids throughout the Columbus public school system the chance to interact with scientists from the community and present their own science projects. Among others, students investigated a polar bear head, a pangolin, a manatee skull, and got to hold Madagascar hissing cockroaches (pictured).

For us it is particularly rewarding to know that outreach efforts are improving the lives of the students they target. One of the ASAS students, David, said that after taking the zoology and ecology classes, he realized he needed to study hard in math and science in high school so he could apply to college and pursue his new dream of working with animals. As scientists and educators with the amazing resources at the museum and OSU in general, we are perfectly positioned to make a significant positive change in our community.♣



*Kellen Calinger showing students a Madagascar hissing cockroach at the Columbus City Schools Exceptional Science Fair*

# Do you have stink bugs in your house?

by Norman Johnson



*Trissolcus* wasps parasitize eggs of stink bugs; by doing so these wasps help control the population of stink bugs. The female wasp injects her eggs inside stink bug eggs, one wasp egg per host egg. The young wasps devour the inside of the host eggs and only come out as adult wasps.

This question has generated the most resounding responses from visitors during the past couple of tours we have hosted in the **Triplehorn Insect Collection**. The brown marmorated stink bug (BMSB), an alien invader from northeast Asia, is not only an agricultural pest, but is also a household nuisance. This bug attacks at least 170 different plant species, and its feeding threatens an estimated \$21 billion of crops in the United States. For the homeowner, finding one or two bugs flying about indoors on a warm day in winter may be a bit of a surprise, but finding tens of thousands of them overwintering in the attic is a real shock! Entomologists are hard at work trying to find ways to stem the tide of stink bugs – they've been recorded in 40 U.S. states as well as in Canada. One particularly promising avenue of control is a great illustration of the value of research collections to society.

Like all plants and animals, stink bugs have natural enemies. The most effective are those predators and parasites that make a specialty out of it. The problem is that when the brown marmorated stink bug was introduced into North America, the natural enemies that attack it in Asia were all left behind. To fill this gap, the obvious solution would be to bring those species to the U.S. as well, and this is precisely the work now being conducted by the USDA at their Newark, Delaware facility. But we don't want to solve one crisis and generate another in turn: we have over 250 species of native stink bugs in North America. Some of these are plant feeders and have their own cohort of native enemies. Others are predators, important for the control of insect populations, in particular of caterpillars. So we don't want to import a foreign parasite of the brown marmorated stink bug and then discover that it also attacks our beneficial stink bugs or that it disrupts the existing relationship between our native stink bugs and their own natural enemies.

The USDA is looking to introduce one or perhaps two species of tiny wasps that attack and destroy stink bug eggs. To do this safely requires that we understand what natural enemies already exist and their current impact on the brown marmorated stink bug. We also need to know which native stink bugs the introduced species are likely to attack. To do any of this we have to be able to recognize and distinguish the different species of these wasps. This is basic science, called *alpha taxonomy*: 'what species are there' and 'how can you tell them apart'. This fundamental work, the underpinning of everything that follows, is based on the specimens that are preserved in natural history collections.

The basic taxonomic research that is now being used to develop means of biological control of the brown marmorated stink bug was originally published by me in a series of papers in the 1980's. The fact that I had already studied the species of these egg parasites – in the genus *Trissolcus* (right) – for both North and South America, Australia, and southeast Asia, has made it possible for scientists to identify the native species of stink bug parasites as well as to rapidly assess the species to be introduced from Asia. The taxonomic work, in turn, was built upon the study of specimens collected over many years, mounted and labeled, and stored for posterity in collections, including OSU's **Triplehorn Insect Collection**.

Collection specimens are the starting point for us to understand the diversity of the natural world, and these specimens, many of them collected decades ago, are relevant to resolving modern problems. ♣



*Trissolcus mitsukurii*, parasitoid wasp of brown marmorated stink bug (BMSB) in Asia. Photo by Steve Valley, Oregon Department of Agriculture.



# From our museum to your table: collection data moves imported and exported food worldwide

by Steven Passoa

Data from museum collections are important for both basic and applied research. However, it is often not appreciated that these collections directly affect the food we eat on a daily basis.



Agricultural Quarantine Inspectors at work.

Agricultural quarantine inspection (AQI) is the term used to describe the process of examining food items imported into the United States from other countries. Officials at every port of entry have to decide if imports can pass through customs or must be rejected. To decide this, they evaluate the status of the pest, usually asking if it is already in the United States or not. Because this is based on voucher kept in museum collections, the quality of our museum collections helps determine the food we import. A good example is a moth called *Copitarsia* (below). It is present in Mexico and parts of Latin America. Continued surveys in the United States show this genus to be absent in our country because no museum has specimens with a United States locality. Thus, we reject any crop infested with this moth.

"pest free zone". If a particular area is known to be free of a pest, produce can leave the area and be accepted more widely abroad. An example of this is the exports of apples and cherries from the Pacific Northwest. Even one or two key moth pests would cause China or Japan to reject our exports. Museum collections with accurate distribution data allow exporters to avoid costly rejections and often destruction of their shipments.

Obviously, politics can enter into these negotiations. Two countries may not agree on a pest distribution or identification. In this case, specimens from museums are the ultimate deciding factor and they are always trusted over local pest lists or identifications made by only one country at a port. In fact, before any produce is allowed entry into the United States, a pest risk assessment (PRA) is done that involves a review of the literature to see if there is a danger of importing invasive species. This usually involves consulting taxonomic literature based on museum collections. Telling a country that a pest is absent, then finding out the commodity is infested because the distribution is wrong or the expertise to make accurate identifications is absent, has long term negative results for any nation's balance of trade.

The Museum of Biological Diversity at Ohio State houses a large caterpillar collection used to make quarantine identifications of material intercepted at United States ports of entry. Next time you pass our building on the way to the supermarket you will know what you buy for your table is partially determined by the work we do here. We do not grow the produce but we house and mine the data that moves it. ♣



Larva of *Copitarsia* (Lepidoptera: Noctuidae).

## News & Updates

▪ **Borror Laboratory of Bioacoustics (BLB) & Tetrapod Division.** **COLLABORATIONS** – This year marks 100 years since the last Passenger Pigeon died in the Cincinnati Zoo. Nationwide events are organized to remind us that a bird with an estimated population size of 3-5 billion at the time Europeans discovered America, became extinct because of human activities. In its latest exhibit, "Going Going Gone? Endangered and Extinct Species", the **Ohio History Center** ([www.ohiohistory.org/museums/ohc](http://www.ohiohistory.org/museums/ohc)) explores how species can go from enormously large numbers to the brink of extinction and what we can do to prevent future extinctions. Some of the artefacts on display are on loan from the OSU bird collection. The exhibit runs July 2, 2014 - Jan. 4, 2015 at 800 E. 17th Ave. Columbus, OH 43211.

**MEETINGS & WORKSHOPS** – **Angelika Nelson** attended *Eco-weekend*, *Columbus Audubon's* annual spring retreat in the Hocking Hills (May 2-4, 2014) and gave an evening program on "How birds fly". **Angelika Nelson** was invited as an instructor to the

**Audubon camps Joy of Birding and Field Ornithology on Hog Island, Maine** (June 8-20, 2014). She gave workshops on “How to make audio recordings of bird sounds” and “Birding by Ear” – [hogisland.audubon.org/hog-island-programs](http://hogisland.audubon.org/hog-island-programs). **Stephanie Wright**, Ph.D. candidate in EEOB, attended the Annual meeting of the Wilson Ornithological Society in Newport, Rhode Island.

**STUDENT “TURN-OVER”** – **Stephanie Malinich**, long-term undergraduate curatorial assistant in the tetrapod collection, graduated from OSU this spring. She now gains experience as a field research assistant on various bird projects throughout the USA. We miss her in the collection since she had taken the lead on various projects, including moving and re-organizing bird specimens as well as preparing bird study skins. Good luck with your new endeavors, Stephanie! **Elyse Togliatti**, undergraduate assistant in the Borrer lab, also graduated from OSU this spring and moved to Colorado to pursue a career in a biology-related field. We wish Elyse all the best. Welcome **Rebecca Price** as a new volunteer in the tetrapod collection! Rebecca has already helped immensely with measuring bird eggs and sorting through bird egg labels.

**VISITORS** – **Jim Kerr** and **Bob Lane**, volunteers at the *Beaver Creek Wildlife Education Center*, East Liverpool, OH, have visited our bird collection several times over the last months. They are involved with helping to re-identify 895 sets of bird eggs that have become separated from their labels. Jim carefully measured the length and width of each egg and Bob took a photo of each egg set so that now we can identify the eggs electronically, without having to touch them over and over again. The identification process will take a long time but among the first results were eggs of Common

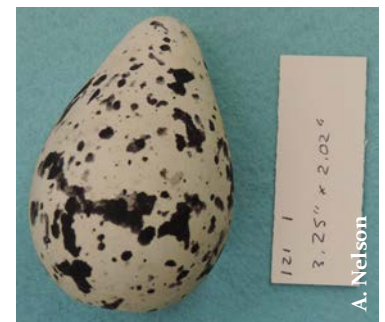


*Jim Kerr measuring one of 895 bird eggs in the collection.*



*Wood warbler specimens seen by an artist. Clockwise, left to right, male & female: Common Yellowthroat, Chestnut-sided Warbler, American Redstart, Blackburnian Warbler, Yellow-rumped Warbler, Cape May Warbler, Connecticut Warbler, Blue-winged Warbler, Canada Warbler.*

Murre (right), Tufted Puffin and a Magnificent Frigatebird as well as Whooping Crane and Mute Swan. Eventually the eggs will be accessioned into our teaching bird collection and will inspire future students and visitors by their diversity in shapes, colors and patterns.



*A re-identified egg of Common Murre, a seabird.*

**Hannah Walsh**, an artist at OSU and post-MFA fellow in the Department of Photography and Film, visited the bird collection to photograph bird specimens (left). **Deb Scott**, instructor at the Department of Art/Department of Design, used the collection as a unique environment with specimens as objects for students to engage in drawing. (A. Nelson)♣

▪ **Herbarium.** Since the time of the open house in February, 2014, the herbarium was **visited** by staff and graduate students of *Brigham Young University, University of Wisconsin, Juniata College (Pennsylvania), Cornell University, University of North Carolina, and Mississippi State University*. The *Ohio Moss and Lichen Association* continued to use the collections in its study and identification of cryptogams from Ohio. A **tour** of the facilities was conducted for students of EEOB taking **Ohio Flora** courses and also for members of the President’s Club of OSU. We are also very grateful to have **Mrs. Dawn Allen**, a visitor during the Open House in February, join the Herbarium as a volunteer. Mrs. Allen works with us one morning per week. **Rebecca Horejsei**, a long-time undergraduate part-time student worker, graduated with a B. Sc. in Microbiology at the end of the Spring Semester. She worked in the herbarium until the end of June, by which time she found a full-time employment as a laboratory technician in Columbus, Ohio. We wish Rebecca all the best in her new job. **Evan McCafferty**, who recently graduated with a BA, is currently employed on part-time basis, to work in the herbarium. Evan is helping in reducing the backlog in the herbarium by putting in long hours each day. We are grateful for his contributions. (Mesfin Tadesse)♣

▪ **Triplehorn Insect Collection.** There has been a lot of activity at the insect collection in the past few months, and the summer is turning out even busier than we expected. In addition to our continued effort in the curation and databasing of collection’s specimens (we are now updating our *darkling beetles* – family Tenebrionidae), we also hosted several tours of our facilities, welcomed academic visitors, attended to new loan requests, took care of loan returns, and the list goes on. Here we present some of the highlights of what’s happening at the insect collection. *Visit us online for more information and photos!*



**NEW PEOPLE** – A big welcome to undergraduate students **Zach Hunt, Jared Palazza, Vinh Peters, Carina Thiemann, and Tyler Zeller** who have recently joined the staff of the insect collection. With the exception of Tyler, who is working with Joe Cora in the development of new biodiversity informatics tools, our new student assistants are working in the various aspects of curation, databasing, and imaging of our specimens holdings. Look for reports on their progress in the next issue of the newsletter.

**ACADEMIC VISITORS** – **Katlin Campbell** (PhD program), **Anita Schaefer** (Undergraduate Student Assistant), and **Michael Minnick** (PhD program), from Dr. Thomas Crist Lab at Miami University, OH, spent two days working in the collection (March 25-26). Kaitlin and Anita came to collect ladybug historic records, and Michael wanted to study our bees, in particular the genus *Lasioglossum*. **Dr. Harvey Ballard** from Ohio University, Athens, OH, stopped by the insect collection to look at our spittlebugs. He will be back in the next few months for a more extended visit (June 30).

**INVITED SCIENTIST** – We had the honor to host **Dr. Doug Yanega**, Senior Scientist & Collection Manager of the Entomological Research Museum at the University of California, Riverside, and well-known *bee taxonomy specialist*, for a solid week of work on our bee collection (May 26-31). Doug started by checking the identification of thousands of our bee specimens in various families. In the process he *identified 773 specimens of bees to species level and updated the determination of 504 specimens*. He also identified to genus level the vast majority of our unsorted bee specimens. His work *added 46 new bee names to the collection's catalog!* No bee specimen in the collection was left untouched. The material that Doug examined and identified is being processed, and we expect to have all the bee specimen information updated in our database soon. We are grateful to Doug for taking the time to come and help us with the curation of our bee collection. He provided an invaluable service to the collection, the scientists and the students who regularly use the collection either by borrowing material or by coming for a research visit. Dr. Doug Yanega's visit was made possible by the 'Knoll Endowment Funds for Systematic Entomology Research and Triplehorn Insect Collection Curation'.



*Dr. Doug Yanega examining bee specimens at the Triplehorn Insect Collection in May 2014.*

**TOURS OF THE COLLECTION** – Participants of the **2014 Acarology Summer Program** toured the insect collection on June 11-12. The group included people from as close as Canada, and as far away as Pakistan, Serbia, Brazil, and Costa Rica. Some of the workshop participants were graduate students, others were established researchers and/or faculty in their country of origin.

A group of twenty five students from the Ohio State University **Young Scholars Program Samuel Dubois Cook 2014 Summer Academy** accompanied by **Dr. Tina Pierce** (photo), Assistant Director of OSU's Young Scholars Program, visited the insect collection on July 11. The visit was part of the course '*Insects, Science, and World Cultures*' taught to the young scholars by **Dr. Carol Anelli**, Department of Entomology. The annual two-week program of the *OSU Young Scholars summer academy* ([odi.osu.edu/centers/ysp/ysp-for-scholars/ysp-summer-academy.html](http://odi.osu.edu/centers/ysp/ysp-for-scholars/ysp-summer-academy.html)) provides opportunities for the scholars to engage in workshops focused on 'academic enrichment, personal development and career exploration'.



*Dr. Tina Pierce and students from Ohio State's Young Scholars summer academy visiting the Triplehorn Insect Collection on July 11.*

The group was welcomed at the Museum lobby by **Sara Hemly**, Curatorial Technician in the insect collection, and given a brief overview about the Museum before moving to the insect collection, where they were greeted by **Zach Hurley, Josh Gibson, and Dr. Steve Passoa**. As usual, we had many of our insect display drawers distributed around the room, and as the students walked in they went straight to the displays and started talking and asking questions. Most of them were interested, and a few were very enthusiastic about entomology as a potential career. The guests took a lot of pics with their phones. **Elizabeth Alvarez** talked to the group about our insect imaging projects. We also had some collecting gear and special plastic bags with bulk insect samples out of the freezer for the students to see. Everyone seemed very interested in what was in the plastic bags! The group spent around 40 minutes in the collection, and some of the young scholars would probably have spent more time here if they did not have other activities to attend to. We hope that the visit to the insect collection helped this group of young scholars to develop an appreciation for insects, for the science of entomology, and for scientific research.

**DONATIONS RECEIVED – Asher Treat Voucher Specimen Collection.** We recently received a small, but valuable collection of moths and butterfly specimens. The specimens are vouchers of the mite-insect associations recorded by the late *Asher E. Treat*, author of 'Mites of Moths and Butterflies'. The mite specimens associated with the insect specimens are deposited at the OSU Acarology Lab. We also received **200 wet insect samples**, some containing hundreds of specimens, mostly beetles, collected during OSU aquatic ecology classes & surveys. The specimens are being dried and prepared to be incorporated into the collection.

**UNDERGRADUATE STUDENTS ABROAD** – Two of the insect collection's undergraduate student assistants traveled abroad in May. **Josh Gibson** (Entomology Major) went to Panama on a study abroad program. He took EEOB 4440H: Tropical Ecology in Panama through OSU (May 12 – 24). During the class he learned about fundamental questions underlying tropical ecology research (*i.e.* why are the tropics so species rich?) and got to experience tropical wildlife first hand, as well as conduct two mini research projects: one on Colombian leafcutter ant foraging preference and another on oviposition site choice in red-eyed tree frogs. **Victor Zeinner** (Molecular Genetics Major) worked with Volunteer Economic Students Abroad in Khula village, South Africa, to build new classrooms, assist primary school teachers, and improve wildlife conservation centers (May 8 – 21). Victor is also a recipient of an Undergraduate Education Summer Research Fellowship from University Research Office, which allows him to conduct 10 weeks of independent research this summer in the area he is interested in, which in his case is cancer research. **More photos of the insect collection on our Facebook page** ([www.facebook.com/TriplehornInsectCollection](http://www.facebook.com/TriplehornInsectCollection)). (L. Musetti)♣

▪ **Limnology Lab News.** We continue to analyze plankton samples in order to perform research on changes in water quality in Lake Erie particularly as it applies to fish reproduction and survival (recruitment) and the factors associated with producing Harmful Algal Blooms. Because young-of-year fish depend on zooplankton for their initial food, the Lake Erie Plankton Abundance Study (LEPAS) was initiated in our lab in 1995 under the sponsorship of the Ohio Division of Wildlife and is coordinated with their study on variation in recruitment of walleye and yellow perch in the lake. Recent work has also focused on the impact of Harmful Algal Blooms, particularly those of the photosynthetic bacterium *Microcystis* because of its impact on light penetration, oxygen concentrations in the deep waters of the lake, and its ability to produce toxins that attack the liver. Recent blooms of this bacterium required some public beach closures in the lake.

In a related project, recent removal of two dams from the Cuyahoga River has provided improved habitat for walleye spawning in the river and has improved living conditions for riverine fish, insects, and plankton. Our Cuyahoga River research project (2011-2016) is monitoring changes in plankton associated with habitat improvement work in the river, based on phytoplankton and zooplankton samples collected from the rapidly flowing regions, through the portions dredged for large ships, to the mouth of the river, and into the open waters of the lake. The research is a collaborative project sponsored by the federal Great Lakes Restoration Initiative and is coordinated by the US EPA, with sampling being performed by the Ohio Division of Wildlife's staff at the Fairport Fisheries Biological Station. Recent work involves expanding the sampling to stations in the nearby Grand River, which serves as a control for a river that has not received the habitat improvements performed on the Cuyahoga River. This work will be sponsored in 2016 by the Cuyahoga County Planning Commission. (D. Culver)♣



*Limnology Lab staff at work.*

## Recent Publications

- Folk, Ryan A. & John V. Freudenstein. 2014. Revision of *Heuchera* Section Rhodoheuchera Subsections Hemsleyanae and Rosendahliae Subsection Nova (Saxifragaceae). *Systematic Botany* 3: 850-874.
- Mao, M., A.D. Austin, N.F. Johnson and M. Dowton. 2014. Coexistence of minicircular and a highly rearranged mtDNA molecule suggests that recombination shapes mitochondrial genome organization. *Molecular Biology and Evolution* 31: 636-644.
- Matsuo, K., Y. Hirose and N.F. Johnson. 2014. A taxonomic issue of two species of *Trissolcus* (Hymenoptera: Platygasteridae) parasitic on eggs of the brown-winged green bug, *Plautia stali* (Hemiptera: Pentatomidae): resurrection of *T. plautiae*, a cryptic species of *T. japonicus* revealed by morphology, reproductive isolation and molecular evidence. *Applied Entomology and Zoology*. doi:10.1007/s13355-014-0260-4.
- van Noort, S., L. Masner, O. Popovici, A.A. Valerio, C. Taekul, N.F. Johnson, N.P. Murphy and A.D. Austin. 2014. Systematics and biology of the aberrant intertidal parasitoid wasp *Echthrodesis lamoralis* Masner (Hymenoptera, Platygasteridae s.l.): a parasitoid of spider eggs. *Invertebrate Systematics* 28: 1-16.
- Yoder, M.J., A.A. Valerio, A. Polaszek, S. van Noort, L. Masner and N.F. Johnson. 2014. Monograph of the Afrotropical species of *Scelio* Latreille (Hymenoptera: Platygasteridae), egg parasitoids of acridid grasshoppers

(Orthoptera: Acrididae). *ZooKeys* 380: 1-188.♣

## Recent Presentations

Poesel, A. "Audio recordings of birdsong." Workshop. Audubon summer camp, Hog Island, Maine.♣

## Fellowships & Current Grants

- 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. **\$153,100.** 2013-2014.
- OSU Herbarium.** "National Science Foundation, "Digitization TCN Collaborative Research: North American Lichens and Bryophytes: Sensitive Indicators of Environmental Quality and Change". Collaborative with multiple Pls. Total funding: **\$4,198,841.** 2011-2015.
- Poesel, A. "Arts and Sciences Staff Professional Development Grant". The Ohio State University. \$343. 2013-2014.
- Youngs A., Gehrt S., Hawkins T., Lewis M., Livingston R., Nelson A., Rinaldo K. "BioPresence: Bringing (Other) Animals into the Framework". OSU framework grant. \$9,940. May 1, 2014 – April 30, 2015.♣



# Animal sounds at the Florida Museum of Natural History are now digital

by Doug Nelson

In collaboration with the Bird Collection at the Florida Museum of Natural History (FLMNH), the **Borror Laboratory of Bioacoustics** completed its effort to digitize the recorded animal sounds housed at the FLMNH. This collection of recorded sounds was founded by the late Bill Hardy, the Museum's curator of ornithology and bioacoustics from 1973 to 1995 and is one of the largest in the western hemisphere. It is third largest in number of recordings (after the Macaulay Library at Cornell and our own library at OSU) and second largest in number of species and total duration of recordings.

Over 120 of the world's 174 avian families are represented. The collection is particularly strong in Neotropical birds, with tinamous, trogons, woodpeckers, antbirds, flycatchers, wrens, wood warblers, and corvids being especially well represented. Geographical strengths include North America, especially Florida, and the Neotropics, with smaller but notable numbers of recordings from Africa, Australia, and Southeast Asia. The National Science Foundation funded project resulted in the creation of over 27,500 digital recordings, saved in both high-resolution .wav and .mp3 formats. Data associated with recordings can be searched at: [www.flmnh.ufl.edu/bird-sounds/](http://www.flmnh.ufl.edu/bird-sounds/) with links to mp3 versions of each cut, and will be available at **VertNet**, an NSF-funded collaborative project that makes biodiversity data free and available on the web ([www.vertnet.org](http://www.vertnet.org)). In addition to preserving this priceless collection, the staff, undergraduate and graduate students participating in the project received financial support and training in museum methods. You can read a more detailed report about the project at [www.flmnh.ufl.edu/science-stories/2014/06/13/bird-calls-on-demand-digitization-of-sound-collection-nearly-complete/](http://www.flmnh.ufl.edu/science-stories/2014/06/13/bird-calls-on-demand-digitization-of-sound-collection-nearly-complete/) ♣

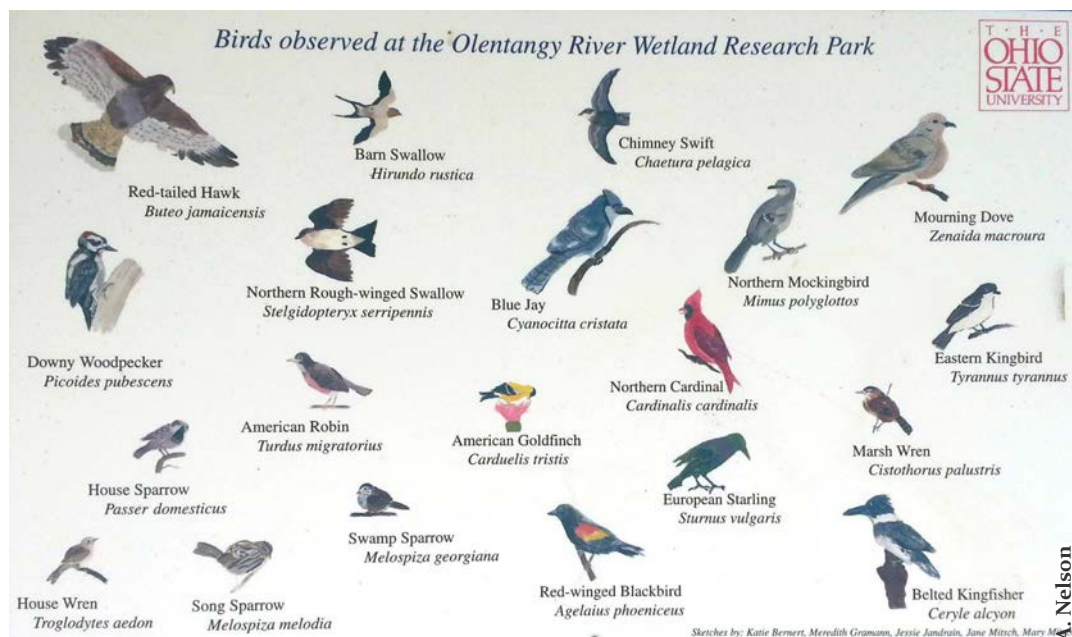


One of the OSU graduate students digitizing sounds from the Florida Museum of Natural History in the **Borror Lab**.

## BioPresence: Bringing (Other) Animals into the Framework

by Angelika Nelson

A team of professors and staff across departments have started the 'BioPresence' project to find out about (secret) animal life on the Ohio State University campus ([www.facebook.com/pages/BioPresence-Animalosu](http://www.facebook.com/pages/BioPresence-Animalosu)). The goal of our project is to raise awareness of animal life on the OSU campus and to broaden appreciation of the diversity of our local ecological community.



An information board with birds seen at the Olentangy River Wetland Research Park.

To participate, whenever you observe an animal on campus – a fly, a beetle, a bird, a mammal – every animal counts – take a photo, video clip, write a story, or find a story and post it somewhere online with the hashtag #AnimalOSU. We have created an AnimalOSU stream at [twitter.com/AnimalOSU](https://twitter.com/AnimalOSU) where you can check all recent postings and comment on them. You can also e-mail your contributions to Amy Youngs ([Youngs.6@osu.edu](mailto:Youngs.6@osu.edu)) as well as to find out details about the project.

So, go ahead and discover animals on campus – where are they, what are they, which ones used to be here, but are not here

right now or any longer? Share your observations via one of our social media sites, and spread the word about this project. Have fun discovering animals that share spaces with us in ways you may not anticipate. Find us on **Facebook** at [www.facebook.com/pages/BioPresence-Animalosu](http://www.facebook.com/pages/BioPresence-Animalosu) ♣

# Touring the Museum with the President's Club

by Luciana Musetti

*"Thanks to all involved in the recent tour of the Museum of Biological Diversity. It was a most interesting visit and I am confident that everyone who attended came away with a much better understanding of what's involved than we had beforehand. Keep up your great work of educating us."* Guest comment.

Members of the **OSU President's Club** toured the Museum on two occasions this spring (June 3 and June 24). The President's Club recognizes individuals who provide continued philanthropic support for academics, health sciences, and the arts at the Ohio State University. As a special 'thank you', the Club offers 'members only' activities, including tours of university facilities. At the suggestion of some of the Club members, the Director of Services for the President's Club, **Cheryl Sefchick**, contacted the Museum to arrange a behind-the-scenes visit. I volunteered to coordinate the event on our end. **Steve Smith**, our trusted museum office manager, **Sara Hemly**, **Zach Hurley**, and **Josh Gibson** (part of the amazing technical staff of the **Triplehorn Insect Collection**), provided support and helped with everything from organization to set up to clean up.

On tour days, Steve and I greeted the group in the lobby of the Museum and, after a brief introduction, took them on a guided tour of the facility. Since we have limited space in our labs and collections spaces, group size was limited to 20 guests. We stopped at each of the collections and in the Limnology lab. Guests heard from faculty and curators about the history and importance of the collections, current curatorial activities, as well as ongoing research projects. The 15-minute stops went by fast!

Guests were impressed with the Museum facilities, with the size and scope of the collections, and manifested true appreciation for being able to meet some of the scientists who work in the building. Most of the people in both tours had never been at the MBD before and they were excited to be here. At the end of the 2-hour long tour everyone was tired, but happy. The majority of the guests mentioned that they now were eager to come to the Museum Open House in 2015. The two scheduled tours were very well attended, on the first tour date we had 16 visitors, and on the second, 20. Check out the **Museum Facebook page** ([www.facebook.com/MBDatOSU](http://www.facebook.com/MBDatOSU)) for more photos of the tours.



Dr. Mesfin Tadesse, Curator of the **OSU Herbarium**, shows guests a preserved plant specimen.

*"A special thank you to Luciana and her team for being great tour guides and showing us all the creepy crawlies that live in the museum! It is amazing to see such an assortment among the different species housed at this wonderful resource."* Guest comment. ♣

## Impressions from Hog Island, ME

by Angelika Nelson

This June, for the first time I rounded the final bend at the end of Keene Neck Road and looked down upon Hog Island in the distance, a view that some have termed one of the most marvelous views along the entire Maine coast. I had heard about the magic of Hog Island before and it sure seemed to live up to it right away. We took the short boat ride across the Muscongus Bay and as I set my foot on the island I felt like stepping back in history. Nestled among tall pines are several traditional early-20th-century wooden buildings that provide accommodations for campers and instructors, a large dining hall and a meeting room. The same evening I looked at photos of previous instructors at the camp and came across many names well known to birders: Carl W. Buchheister, the Camp's first director and later president of National Audubon, Allan Cruickshank, a pioneering bird photographer, Roger Tory Peterson, inventor of the modern field guide, Kenn Kaufman, international birding authority, author, and educator. The next day when the campers arrived Steve Kress, also known as "the Puffin Man", founder of Project Puffin (<http://projectpuffin.audubon.org/>) – a successful seabird-restoration project that through decoys and playbacks brought back Atlantic puffins to islands off the Maine coast – gave an introduction and brief history of Hog Island.

Throughout the week, my part was to teach audio recordings of bird sounds and how to distinguish bird sounds in the field. Campers made for an enthusiastic audience; they were eager to learn about the natural environment and did not come short of questions. By the end of the day I felt that I had learned so much from being out with them, more than I could possibly have planned to teach them. The daily birding trips to islands in the bay or mainland locations, some of them following traditions reaching back to the first years of camp in the mid 1930s, provided an exciting field experience and sparked campers' interests to



share their love for nature with others back home.

No visit to the camp would be complete without a visit to Eastern Egg rock, a small island in outer Muscongus Bay, which this year held close to 250 breeding pairs of Atlantic Puffins, one of the successfully restored breeding colonies along the Maine coast. And we were not disappointed: the puffins put on a show with their brightly colored beaks. We watched them dive, fly, perform courtship dances, and learned from the interns on the island that some puffins had been seen carrying fish, indicating that the first chicks of the year had hatched and are being fed by their parents. Hopefully another successful breeding year for the birds on the island!

The last day of camp came far too soon, campers and instructors said their good-byes, many promises were made to come back soon as a friend of Hog Island ([fohi.org](http://fohi.org)). I myself hope to enjoy the view of Hog Island from the hill at the end of Keene Neck Road again soon. ♣



*The praised view of Hog Island when approaching from mainland.*

## ***The Role of Groucho Marx in the Division of Molluscs Collection***

*by G. Tom Watters*

The freshwater **Mollusc Collection** at the OSU Museum of Biological Diversity is the largest of its kind in the world with over one million accessioned specimens and perhaps another half million awaiting curation. It occupies a precariously large footprint in the Museum, but is rapidly running out of space. Visitors often comment that it is the best curated mollusc collection they have ever seen. As some of you Olde Timers may remember from a 1960s era TV western starring Walter Brennan: “No brag, just fact.” But I can’t take any credit – that must go to my predecessors Dr. David Stansbery and Dr. Carol Stein, who set out from the start to make such a collection and put in place the exacting standards that our staff continues to this day. But why should you, non-Museum folks, care about that? Outside of the usual eccentrics who work on these animals, of what possible use are a million dead molluscs? And what about extinction? Are collections contributing to that by collecting so many individuals of a group?



*White Catspaw Mussel, possibly extinct. Female, left. Male, right. Collected at Fish Creek, Williams Co., OH, 1963.*

The answers are simple and complex. The freshwater mollusc collection, and freshwater “mussels” in particular, have a

special place in the Museum because of a single piece of legislation: the Endangered Species Act (ESA). Two out of every ten mussel species in North America are federally endangered, meaning they are at the verge of extinction, and many more are listed at the state level. By law, we are mandated to try and save these animals. The U.S. Fish and Wildlife Service has gone a step further by declaring that freshwater mussels are the most imperiled group of animals in North America.

I often tell my audience that if I were a mussel I would want to live in Ohio – the state has perhaps the strictest laws of any state protecting these animals and actively supports their conservation in both mind and deed. What does this mean in terms of the use of the collection? It means that anyone wanting to do work in a stream, river, pond, or lake (pipeline crossing, bridge replacement, etc.) must first take into account the possibility that listed species of mussels might occur there. How do they determine this? Well, they come to us. Our entire database of half a million mussel specimens is available on-line, can be queried seven days from Sunday, with Google maps. It is the first step any consultant, agency, conservation group – anyone – will take in Ohio. Depending on the results returned by our database, the Ohio Department of Natural Resources (ODNR) Division of Wildlife



will decide the next course of action – new surveys, translocation, mitigation, etc. And as of this year a new policy has been implemented as well. Anyone applying for a permit to work with mussels must pass a freshwater mussel identification test that is designed, conducted, and graded by us. The logic seemed simple: if you are going to work with some the planet's rarest animals you probably should be able to identify them. So that deals with 'why should we care' question.

The second question, on the potential role of research collections in the demise of species in the wild, reminds me of Voltaire's words: "*Common sense is not so common.*" To state what should be obvious: freshwater mussels live buried in the substrate in rivers, creeks, and lakes. They are very, very good at digging and hiding. The most intense modern surveys conducted using SCUBA (left), GPS, and Passive Integrated Transponders (photo), by numerous personnel trained in finding mussels using multiple methods, have not been able to find every mussel in even a few hundred meters of the smallest river, let alone the hundreds of kilometers that comprise rivers such as the Coosa, the Cumberland, the Tennessee, and the Ohio. And guess what, the vast majority of extinct mussels that once lived in these and other Ohio rivers, became extinct over one hundred years before the invention of SCUBA, GPS, etc. All of the curators in the world could not have collected all these mussel species to extinction, even if they wanted to. Today we can't even re-find all the mussels we tag and release in a few square meters of shallow stream. As much as I like Voltaire, Groucho Marx said it best: "*A child of five would understand this. Send someone to fetch a child of five.*"

I would like to think that our million specimens actually help conserve these animals. They are a testimony to the way things used to be before pollution, habitat loss, and climate change. Consultants and agency personnel can determine the best methods and techniques to save these imperiled organisms and still allow humans to construct bridges, pipelines, and dams. People working with endangered species can identify them based on these specimens.

As a post-script, in the late 1980s I was contracted by USFWS to look for one of the rarest animals on the planet, the White Catspaw Mussel (photo), believed to have been reduced from its once great range into a single tiny creek in the hinterlands of northwest Ohio. I found two, and only two, alive in two summers of collecting. The species has never been seen again. And I put both of those individuals back! ♣



*SCUBA diving equipment is used by researchers to survey fresh water mussel population.*



*Passive Integrated Transponder tags affixed to endangered freshwater mussels prior to re-introduction in an Ohio stream. The tags are used to monitor populations in the wild.*



*At work on fresh water mussel reintroduction and conservation.*



## Age of (species) discovery?! Very much so!!

By Norman Johnson & Luciana Musetti

When I go birdwatching, I always pack along my trusty field guides both the hard copy version as well as my mobile phone app. While I enjoy the activity, I'm far from an expert, and having a compilation of all the species of the area I'm in, along with pictures and sound recordings, is a great help. Every year a few new species of birds are discovered, but generally we know the world's avifauna so well that there are even field guides to such remote places like Borneo and New Guinea. This enviable situation is

### Some PlatyPBI #s:

- ✿ 39 new scientific publications
- ✿ 430 new species described
- ✿ 7 new genera described
- ✿ 142,366 specimens examined



*Scelio masneri*, one of the hundreds of egg parasitoid wasp species described as part of the **PlatyPBI**.

most definitely not the case when it comes to insects, particularly the smallest ones. Even in this modern day and age over *10,000 new species of insects are discovered, described and named every year*. And this trend doesn't show any sign of slowing down any time soon!

Because insects are generally small, distinguishing and discovering new species involves two critical but separate activities: **1) collecting the insect specimens in the field**, and then **2) processing and studying those specimens in the laboratory**. Natural history collections provide the essential fuel for new species discovery.

We at the **Triplehorn Insect Collection** are currently winding up a mega-project, the **PlatyPBI**. Our goal was to document and describe the species diversity in a major group of parasitic wasps (Order Hymenoptera, family Platygastridae.) These are not the kind of wasps one is used to seeing, like paper wasps or yellow jackets, these are tiny, many of them not bigger than 5 mm. But as it can be seen in the photo (*left*), despite of their minute size, these are magnificent creatures.

Over the course of this project our worldwide team of collaborators studied and documented 735 species, of which 430 were new to science! Yes, that's not a typo: **our team has discovered and documented 430 new species of these wasps!** The results of our studies have been published in 39 scientific papers (over 2,000 pages; average of about 53 pages per publication). The essential basis of the work was the study of preserved insect specimens from natural history collections, and study we did! So far, **142,366 specimens** from **89 collections** around the world were **examined and databased!** And even though the project is officially over, we still have many studies directly resulting from it that will be published in the next 1-2 years.

If we are to ever know who our fellow travelers are on the planet, we need to continue to look closely and study the richness of species that surrounds us. Society depends upon and takes advantage of biodiversity, and proper management and conservation of this resource is critical. In this light, our collections and the specimens they house are a vital ingredient for our future well-being.

The Platygastroidea Planetary Biodiversity Inventory (PlatyPBI) was funded in part by a grant from the U.S. National Science Foundation to Dr. Norman F. Johnson (Ohio State University) and Dr. Andrew Austin (University of Adelaide, Australia.) Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. ✿



***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.

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- MaryMegan Daly, EEOB, Associate Professor, Director, Fish Division.
- Cynthia Dassler, EEOB, Program Coordinator, Curator, Non-Vascular Plants, Herbarium.
- John Freudenstein, EEOB, Professor, Director, Herbarium.
- Norman Johnson, EEOB, Professor, Director, Triplehorn Insect Collection.
- Hans Klompen, EEOB, Professor, Director, Acarology Laboratory
- Doug Nelson, EEOB, Professor, Director, Borror Laboratory of Bioacoustics.
- Steven Passoa, USDA/APHIS/PPQ.

✱ ✱ ✱ ✱ ✱ ✱ ✱ ✱ ✱ ✱ ✱ ✱ ✱

**Next issue of the MBDNewsletter coming up Fall 2014**

**We greatly enjoy hearing from our readers!**

Please send your feedback to the Editor  
at [osuc-curator@osu.edu](mailto:osuc-curator@osu.edu)

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# A Gift of Biodiversity

Please consider giving to the Museum of Biological Diversity at Ohio State. Your gift will help support the preservation of the collections, training of undergraduate and graduate students, community outreach, and more. To join our community of supporters, please contact: Samara Preisler, Associate Director of Development ([preisler.7@osu.edu](mailto:preisler.7@osu.edu)), (614) 292-6059 **OR**

**Give online:** [www.osu.edu/giving/collegeofartsandsciences.html](http://www.osu.edu/giving/collegeofartsandsciences.html).



## Funds Associated with the Museum of Biological Diversity:

- ◆ **George and Mildred Wharton Endowment for Acarology Fund** (607675): Supports the Acarology Laboratory.
- ◆ **The Hoogstraal Memorial Acarology Student Fund** (603280): Supports Acarology students at the OSU Acarology Summer Program.
- ◆ **Donald J. Borror Fund for Bioacoustical Studies** (600654): Supports bioacoustical research, teaching and service programs.
- ◆ **D.J. and J.N. Knull Fund in Entomology** (603756): Supports systematic Entomology research and curatorial work in Entomology.
- ◆ **The Josef N. Knull Memorial Fund in Entomology** (603759): Supports systematic Entomology research and curatorial work in Entomology.
- ◆ **The Ichthyology Research Endowment Fund** (603357): Supports research and publication in the Fish Collection.
- ◆ **Friends of the Herbarium Fund** (305104): Supports the OSU Herbarium.
- ◆ **The David H. Stansbery Bivalves Endowment Fund** (606910): For the enrichment and maintenance of the Bivalve Mollusc Collection, including expeditions, purchase of collections, and related expenses.
- ◆ **The Museum of Zoology Fund** (607989): Supports expeditions, purchase of collections and related expenses of the Museum of Zoology.
- ◆ **Tetrapod Collection Support Fund** (314614): Supports students, specimen acquisition and maintenance in the Tetrapod collection.



# Mission

The **OSU Museum of Biological Diversity** houses all the university's biological collections, except fossils. We are part of the Department of Evolution, Ecology and Organismal Biology in the College of Arts and Sciences.

We are dedicated to the ***Preservation, Documentation, Scientific Study*** and ***Interpretation*** of the biological diversity of Ohio, the nation and the world.

We fulfill that mission by:

- building and maintaining extensive collections of specimens and information for future generations;
- creating and disseminating knowledge on evolution and biological diversity through the publication of cutting-edge collections-based research, books, online databases and websites;
- providing service to the broader scientific community through loans of specimens to qualified users for study and identification;
- training the next generation of biodiversity scientists.



## Museum Units:

### Acarology Laboratory

[www.biosci.ohio-state.edu/~acarolog/collection](http://www.biosci.ohio-state.edu/~acarolog/collection)

### Borror Laboratory of Bioacoustics

[blb.osu.edu](http://blb.osu.edu)

### Fish Division

[www.biosci.ohio-state.edu/~paleoich](http://www.biosci.ohio-state.edu/~paleoich)

### Herbarium

[herbarium.osu.edu](http://herbarium.osu.edu)

### Mollusc Division

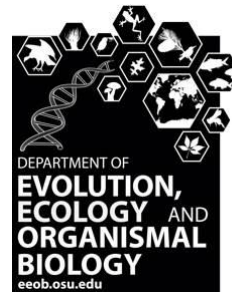
[www.biosci.ohio-state.edu/~molluscs/OSUM2](http://www.biosci.ohio-state.edu/~molluscs/OSUM2)

### Tetrapod Division

[tetrapods.osu.edu](http://tetrapods.osu.edu)

### Triplehorn Insect Collection

[osuc.osu.edu](http://osuc.osu.edu)



### Museum of Biological Diversity

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