

# Entomological Collection



NOVEMBER 12 & 13, 2011  
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*Anastrepha castanea*  
Image by George L. Venable

ENTOMOLOGICAL COLLECTIONS NETWORK - ANNUAL MEETING  
NOVEMBER 12 & 13, 2011  
RENO-SPARKS CONVENTION CENTER - RENO, NV

PROGRAM OF EVENTS  
Saturday, November 12, 2011  
Sparks Convention Center Room E1-E3 (1st Floor)

7:00 am Registration and Coffee

8:00 am Welcome and Introduction



SESSION 1

ARTHROPOD COLLECTION DATABASES  
Moderator: Derek Sikes (University of Alaska)



8:15 am "Is it time to reach for the cloud(s)? A service provider approach to collection databasing."

**Norman F. Johnson**, Professor, Department of Evolution, Ecology & Organismal Biology, Director, C.A. Triplehorn Insect Collection, The Ohio State University, 1315 Kinnear Road, Columbus, OH 43212

The database application in use at the Triplehorn Insect Collection is built upon an Oracle implementation of the ASC Information Model. Over the past 15+ years this application has grown from a dedicated workstation tool to one in which all interactions are mediated by the Web. As a result, it is perfectly feasible to make the underlying database structure, generally used data, the data management application, and all the presentation and dissemination tools that have been developed accessible to the community at large. A custom interface can provide personalized access for specific users.

8:35 am Manage Biodiversity Surveys and Taxonomic Research with Mandala

**Gail E. Kampmeier**, Illinois Natural History Survey, Prairie Research

Institute, University of Illinois, 1816 So. Oak St., Champaign, IL 61820.

The Mandala database system was originally begun in 1995 to support taxonomic research on the fly family, Therevidae, for the NSF PEET program (National Science Foundation's Partnerships for Enhancing Expertise in Taxonomy, DEB-95-21925 and 99-77958, with additional funding from the Schlinger Foundation). The database structure, whose underlying engine is the cross-platform FileMaker™ Pro, tracks specimen-based biodiversity data, manages loans from a variety of collections, details complex nomenclatural histories, catalogues and compares images, and links all of the information to published sources. The Fiji Arthropod Survey (NSF DEB-04-25790) expanded Mandala's capabilities to include tracking subsamples sorted from Malaise traps and sent to specialists as loans. The Tabanid PEET project (DEB 07-31528) added the ability to track the progress of molecular studies of specimens (extractions, PCR products, sequences). See <http://www.inhs.illinois.edu/research/mandala/> for more details.

8:55 am The SilverCollection Web Portal for Specimen Data at the Mississippi Entomological Museum

**Sangmi Lee and Richard Brown**, Mississippi State University  
Michael Giddens, Baton Rouge, LA

Mississippi Entomological Museum uses the SilverCollection web portal to provide research and visualization tools for specimen data. This application uses various filters to allow easy access, searching, browsing, reporting, and downloading of data. Data for about 59,500 specimens have been converted from a Comma Separated Value (CSV) file into a Darwin Core Archive with data provided to GBIF. The standardized DwC-A format is then imported into SilverCollection on the Mississippi State University server. Details of the use of digitized data associated with SilverCollection will be presented.

9:15 am Biota: putting real specimen identifiers at the center

**John T. (Jack) Longino**, Department of Biology, 257 S 1400 E, University of Utah, Salt Lake City, UT 84112

Biota is specimen database management software that evolved from an arthropod biodiversity survey project. It is inexpensive, simple to install, easy to use. It comes with a comprehensive and comprehensible manual. It has a limited set of basic fields and is not highly customizable. Its great strength is a core reliance on unique specimen identifiers. There are no restrictions on size or format of specimen identifiers so that specimens from multiple institutions or collectors can be incorporated. Batch processing of specimens is easy: importing new specimen records, modifying existing records, rapidly selecting record sets based on search criteria, exporting data for sets of records, entering identifications, and processing loans. Biota was designed with entomologists in mind: enormous numbers of specimens, most with sparse and simple data.

**9:35 am Evaluation of a Scratchpad Template as an Online Database for the University of Guam Insect Collection**

**Aubrey Moore**, Extension Entomologist Western Pacific Tropical Research Center, University of Guam

Biota (© Sinauer Assoc.) and BioLink (© CSIRO) were used in initial attempts at cataloging the University of Guam Insect Collection at the specimen level (about 30,000 specimens). The Biota database was irretrievably lost following hardware failures coupled with inadequate backup. BioLink worked very well on a LAN, but relied on proprietary software (Microsoft Server). A few years ago, I started searching for a web based replacement with the following features: Free and open source, Reliable backup, Flexible data security, Web browser used for information delivery and data entry, Specimen records compliant with Darwin Core, Storage for images, bibliographic data, informal notes, etc. I settled on a Drupal template developed by the Natural History Museum (NHM) in London. The free, open source template is called Scratchpad. NHM even hosts and maintains Scratchpad sites on their servers for free. In my talk, I will outline Scratchpad's features which I find useful for building and maintaining an online catalog for the University of Guam Insect Collection. I will also present a critical evaluation of Scratchpad for my specific application.

9:55 am – 10:15 am Coffee Break

**10:15 am Mantis – a stand-alone database manager for a lone taxonomist**

**Piotr Naskrecki**, Museum of Comparative Zoology, Harvard University, 26 Oxford Street, Cambridge, MA 02138

There exists many excellent, networked database managers designed for biological collections, but there are few applications that can be used by practicing taxonomists/field biologists outside of a networked environment. Networked database managers also tend to focus on the data retrieval process, rather than data entry. Mantis is a stand-alone database manager with rapid data entry and retrieval capabilities, designed for taxonomists who need to access the full complement of their data in situations where networked data access is impossible or impractical.

**10:35 am Arctos at the University of Alaska Museum Insect Collection**

**Derek S. Sikes<sup>1</sup>, Gordon Jarrell<sup>2</sup>, Dusty McDonald<sup>1</sup>**

<sup>1</sup>University of Alaska Museum, 907 Yukon Drive, Fairbanks, AK 99775-6960

<sup>2</sup>Museum of Southwestern Biology, University of New Mexico, Albuquerque, NM 87131-0001

Arctos is an entirely Web-based collection management system (ColdFusion over Oracle) serving ~1.3 million specimen records from 40 collections, including six important collections in U. S. museums. Arctos is the result of two decades of NSF support to the three institutions that share its operational costs. As a centralized web application, it is intended to integrate other Internet resources, call appropriate web services such as GeoLocate and BerkeleyMapper, and it is indefinitely scalable with per-unit costs decreasing as participation increases. Beginning in 2012, Arctos will be hosted by the Texas Advanced Computing Center, a member of the NSF sponsored TeraGrid network of supercomputing centers. With exception of sensitive data electively encumbered by individual collections, all data are accessible in real time to the public and to various confederated portals, such as GBIF. While both data standards and a substantial portion of common data are shared among collections, operators are restricted to their own collections by Oracle's Virtual Private Database (VPD) features. Operator access is customized at many levels.

Daily backups are stored in three locations, each on a separate tectonic plate, including one so secure its location is secret. Arctos is under continuous development by a multi-institutional team of collections based-biologists. The University of Alaska Museum Insect Collection is in the process of moving all their data from a FileMakerPro solution to Arctos.

**10:55 am      EMu@FMNH - A Three-Year Update**

**Margaret K. Thayer**, Associate Curator, Zoology and Head, Division of Insects, Field Museum of Natural History, 1400 South Lake Shore Drive, Chicago IL 60605 [mthayer@fieldmuseum.org](mailto:mthayer@fieldmuseum.org)

Since 2002 the Field Museum of Natural History has been converting its collection databases to KE Software's EMu collection management system across all four collection-based departments. Botany, Zoology, and Anthropology are now fully migrated; part of Geology is now starting. Integrated web-serving of data and images has been a key part of the project from the start, but we are now embarking on a transitional phase of converting our original "EMuWeb" into a new version in the museum's new Drupal-based web site. This will tremendously increase flexibility in the ways we can present our collection data and images to various user communities.

**11:15 am      An Introduction to Specify 6 for Entomological Collections**

**Jennifer Thomas**, Assistant Collections Manager, Division of Entomology, 1501 Crestline Dr. suite 140, University of Kansas, Lawrence, KS 66045

SEMC recently completed a final migration of our database (~800,000 specimen records) from Specify 5 to the new and improved Specify 6 database platform for Natural History Collections. This new platform allows us to quickly capture new specimen data using a batch processing function, capture/analyze historical data, associate various forms of ancillary data (images, PDFs, doc files, etc.), georeference localities on the fly with GEOLocate, NASA's World Wind, and GoogleEarth, import/export datasets through the Specify 6 Workbench software, and create custom queries for any combination of fields in the data model. Specify 6 also has a complete set of museum management tools that run the

gamut from loans, accessions, and information requests to label and report generation. Specify 6 database records can be formatted and exported for delivery to GBIF's IPT client and served through GBIF. Specify runs on Windows, Mac OSX, and Linux computers, it is free and open source licensed.

11:35 – 12:45 pm      Lunch Break



NSF: ADVANCING DIGITIZATION IN BIOLOGICAL COLLECTIONS (ADBC) & RELATED PROGRAMS

Moderator: Andrew Short (University of Kansas)

**12: 50 pm      The ADBC/TCN program**

**Anne Maglia**, Program Director, NSF Division of Biological Infrastructure, 4201 Wilson Boulevard, Arlington, Virginia 22230, USA  
(Via Skype)

**1:10 pm      Documenting a tri-trophic association using web-based software: Bugs, plants, and parasitoids**

**Randall T. Schuh**, Curator of Hemiptera & Minor Orders, American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024-5192

Data for the North American Hemiptera, their parasitoids, and their predominant host-plant lineages will be captured from 18 entomological and 13 botanical collections. Label data for most entomological collections will be captured to a single database through web-based software, thereby reducing the need for data integration while at the same time simplifying the georeferencing process. Representative images for each species will be captured. Botanical data will be captured as images of herbarium sheets from which label data will be digitized in alphanumeric



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form via automated methods. Botanical data will then be amalgamated in a single database. Data integration allowing for the investigation of taxon relationships in this tritrophic association will take place through the use of [www.discoverlife.org](http://www.discoverlife.org).

### 1:30 pm **InvertNet: A New Platform for Biodiversity Research and Outreach**

**Chris Dietrich**, Systematic Entomologist, Illinois Natural History Survey, 1816 South Oak Street, MC 652 Champaign, IL 61820

The InvertNet project aims to build an online virtual museum providing access to images and label data for >50 million arthropod (primarily insect) specimens in 22 Midwestern institutions. InvertNet will use innovative workflows and networking technologies to capture and display 2D and 3D images of specimens and labels and incorporate them into a searchable, Internet-accessible database. InvertNet will provide universal access to collections previously restricted to researchers and will facilitate many aspects of biological research and education including species discovery and identification, pest management, ecology and biogeography.

### 1:50 pm **iDigBio, the HUB for ADBC**

**Larry M. Page**, Curator of Fishes, Florida Museum of Natural History, Dickinson Hall, Newell Dr. and Museum Rd., Gainesville, FL 32611  
**Greg Riccardi**, Director, Institute for Digital Information and Scientific Communication, The Florida State University, 142 Collegiate Loop Tallahassee, FL 32306-2100

iDigBio is working to build the teams and infrastructure that are required to successfully digitize information in biological collections throughout the U.S. iDigBio will provide core resources and coordination for the national digitization effort, oversee implementation of standards and best practices for digitization, provide a cloud computing environment for collections data, and plan for long-term sustainability of the national digitization effort. As the national repository grows, iDigBio will work to improve the understanding and appreciation of biodiversity, and of the collections that document biodiversity, by demonstrating the connection

between biodiversity and scientific and societal benefits.

**2:10 pm            Calbug: Digitization of California's Terrestrial  
Arthropods**

**Kipling W. Will**, Associate Professor, Associate Director of Essig Museum of Entomology, University of California, Berkeley, 137 Mulford Hall, Berkeley CA 94720-3114

Calbug is an NSF funded collaborative of the eight major entomology collections in California that intends to capture 1.1 million specimen-level data records from our combined holdings. We will then use these data with geospatial technology and analyses to understand the relationship between changes in the distribution and the precise nature and extent of habitat modification. Given that successfully capturing the 1.1 million records as proposed would only account for a small fraction of our combined holdings, development of time-saving methods and technology for getting data from labels into databases is paramount. In the initial stage of the project we have focused on developing and testing methods and workflow to try to find ways to radically increase the rate of data capture, while maximizing data quality and providing appropriate data for the biotic change analyses. Of the various data-capture routines implemented, those that involve digital imaging of data labels and subsequent entry of data from image files into databases using manual entry, crowd-sourcing and OCR are the most promising. Specimen handling, both in terms of time and risk to specimens, remains a significant obstacle to retrospective data capture from entomological collections. Georeferencing is also a challenge, but like the initial data capture a number of strategies that combine computer and human data handling are being used

**2:30 pm            GigaPan megapixel imaging and best practices for  
digitizing entomological collections**

**Katja C. Seltmann<sup>1</sup>, Babi Hammond<sup>2</sup>, Matthew Bertone<sup>1</sup>, Andrew R. Deans<sup>1</sup>**, <sup>1</sup>North Carolina State University, Department of Entomology, Campus Box 7613, Raleigh, NC, USA; <sup>2</sup>Department of Information Science, University of North Carolina, Chapel Hill, NC, USA  
The North Carolina State University Insect Museum is working to image

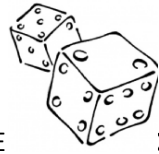
every drawer in the 1.5 million specimen collection and disseminate these data through the Web. The effort is worthwhile in that we expose the "research only" collection to the public, allow for remote curation of specimens, and enable more informed loan requests. The details and process for creating GigaPan (zoomable, mega-pixel images of entire drawers of specimens) images are outlined in the talk. Secondly, as part of a CollectionsWeb Research Coordination Network (RCN) funded internship awarded to Babi Hammond, preliminary results of a survey is presented looking at the use of online entomological collection data. Survey participants are asked to review and rate the utility of multiple online presentations of collection data; specimen information without images, GigaPan images, and detailed images with specimen data. The results will help institutions with entomological collections and the Advancing Digitization of Biological Collections (ADBC) program participants better understand how to apply their resources and digitization efforts.

2:50 – 3:15 pm            **"Collection Digitization in the ECN community:  
Current directions and future opportunities"**  
Panel Discussion

3:15 – 3:30 pm    Coffee Break



## SESSION 3



THE "INS & OUTS" OF SPECIMEN LOANS: ARE CURRENT LOAN POLICIES ADEQUATELY SERVING THE SYSTEMATIC COMMUNITY?  
Moderator: Victoria Bayless (Louisiana State University)

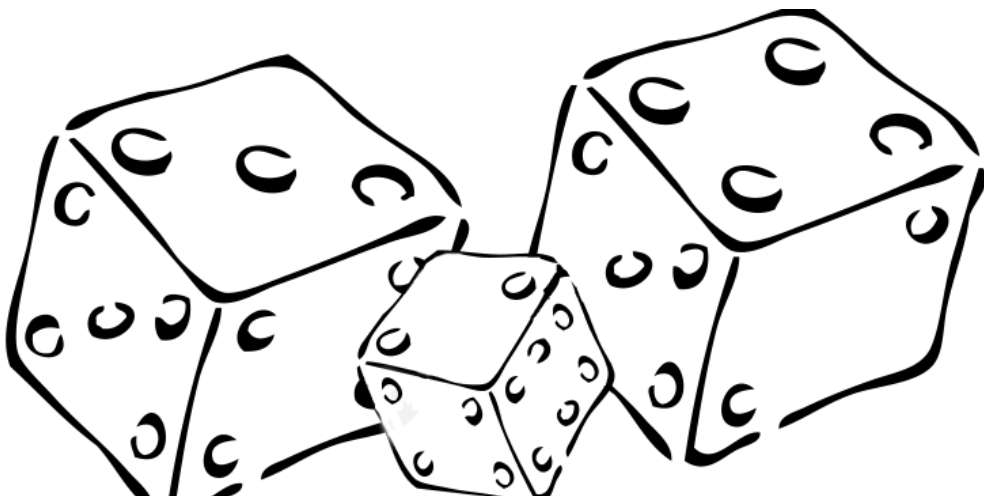
**3:35 pm**      **The "ins & outs" of Specimen Loans: Are current loan policies adequately serving the Systematic Community?**

**Victoria Bayless and Mike Ferro**, Louisiana State Arthropod Museum, Louisiana State University, Baton Rouge, LA

**3:55 pm**      **Policies and best practices for molecular analysis of museum specimens**

**Peter T Oboyski**, PhD candidate, University of California, 137 Mulford Hall #3114, Berkeley CA 94720-3114

Increasingly often collections managers must decide whether destructive sampling of their specimens for molecular analyses is warranted. Policies on when and how this is allowed should be based on whether a study legitimately requires museum specimens, that the researcher demonstrates competents in molecular techniques, and that the techniques are appropriate. A portion of the extracted DNA should be returned with the specimen if the loaning institution is capable of managing it.



**4:15 pm**      **Tales of a loan scofflaw, or, what the hell am I thinking?!**

**Zack Falin**, Collection Manager, University of Kansas, Entomology, Public Safety Building, 1501 Crestline Drive, Suite 140, Lawrence, KS, 66045-4401 USA

We have all encountered individuals who appear to believe loan term policies do not apply to them. I am one such individual. While I cannot speak for all loan scofflaws, an examination of my situation within the collection community may increase understanding of (if not empathy for) various combinations of personality and circumstance that result in long overdue loans. It is hoped that this understanding will allow academic advisers, collection staff and responsible individuals to stake steps to mitigate or avoid the problem in the future.

**4:35 pm**      **Left Behind: The problem of not dying first and other nightmares from other people's loans**

**Mike Ivie**, Associate Professor and Curator of Entomology, Montana State University, Bozeman, MT 59717-3150

**4:55 pm**      **Developing a new national museum of natural history at Tel Aviv University**

**David Furth**, Collection Manager, Smithsonian Institution, PO Box 37012, MRC 165, Washington, DC 20013-7012

An introduction to the new Steinhardt National Museum of Natural History based at Tel Aviv University (Israel). It will detail my eight month detail from the Smithsonian Institution to Tel Aviv University to assist in the development of this new museum, including details about the entomological collections as well as generalities about all the other collections and the plans for this first natural history museum in the Middle East.

5:05 – 5:20 pm      Discussion and wrap-up



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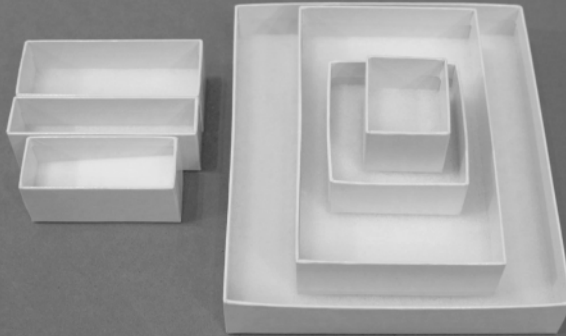
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6:00 – 9:00 pm

### **ECN MIXER**

Sparks Convention Center Room D1/D2 (1st Floor)

Sunday, November 13, 2011

Sparks Convention Center Room E1-E3 (1st Floor)

8:00 am

**Indiana Jones and the Lost Collection: Rediscovering, cataloging, and revitalizing the Recent Invertebrates Collection at the Sam Noble Oklahoma Museum of Natural History**

*Katrina Menard, Janet Braun and Tamaki Yuri*, Sam Noble Oklahoma Museum of Natural History, 2401 Chautauqua Ave. Norman, OK 73072-7029

The Sam Noble Oklahoma Museum of Natural History (SNOMNH) at the University of Oklahoma is well known for its extensive holdings of biological, paleontological, and archaeological collections. What it has not been known for, however, is its Recent Invertebrates (RI) collection, and specifically its entomological holdings. This is changing, however, with two IMLS (Institute of Museum and Library Services) grants. The first, allowed for the databasing, rehousing, and recuration of the ca. 33,000 specimens in the mollusk collection. The current 3-year grant provides funds to catalog and database half of the approximately half-million specimen insect collection. Since the start of the grant last year, over 63,000 individuals and 33,000 records have been cataloged and databased, and efforts continue to revitalize and recurate the collection. Specimen information is being made available via the museum website and GBIF. Notable discoveries include holdings in Coleoptera (Aquatic beetle collection of Dr. Harley Brown, Oklahoma beetles of Karl Stephan, and pre-WWI European Coleoptera), Lepidoptera (Loy Collection of Oklahoma Lepidoptera), and Odonata (R. D. Bird Oklahoma Odonata). Further, the collection represents another important source of Oklahoma's entomological history, including specimens collected from the mid-1800s across the state. Our goal in this presentation is to make the entomological community aware of our efforts and holdings for research purposes, and reveal the hidden gems of our collection.



**8:20 am      Collection Profile: Texas A&M University Insect Collection**

*Ed Riley*, Associate Curator, Texas A&M University Insect Collection, Minnie Belle Heep Building, Room 216B, TAMU 2475, College Station, TX 77843-2475

A profile is presented for the Texas A&M University Insect Collection, the premier regional entomological collection of the south-central United States and adjacent Mexico. The history and recent activities that contributed to the development of its present holdings are reviewed. An overview of the taxonomic and geographic strengths of its physical and digital collections is presented, including recent acquisitions and digitization efforts.

**8:40 am      An Overview of Insect Collections and Database in Korea**

*Dr. Seunghwan Lee, Sunghoon Jung and Hwalran Choi*, Seoul National University

We present a general overview of the insect collections and database constructions in Korea. 1. Historical review of entomological researches in the Korean Peninsula; 2. Insect collections in Korean research institutes, universities, and museums; 3. Construction of the Korean insect specimen database

**9:00 am      Conserving the tremendous arthropod biodiversity of Honduras: The Entomological Collection of the Pan-American Agricultural School of Zamorano**

*Oliver Schlein*, Professor of Entomology and Curator of the Insect Collection, Escuela Agrícola Panamericana – Zamorano, Honduras

The Entomological Collection of the agricultural university of Zamorano includes more than 200,000 specimens, among these 324 type specimens. About 90,000 of the insect specimens are digitized in an own comprehensive database. The specimens were collected in more than 300 different sites, most of them in the territory of Honduras. The collection, surely the most representative and important regard-

ing the insect fauna of Honduras, was founded more than 30 years ago. International entomologists frequently visit the collection to identify their own collected material. Furthermore, the collection hosts international workshops, entomology courses, student education, practices and scholarships. In cooperation with other national or international institutions, the Biodiversity Center of Zamorano supports the coordination, logistics and realization of foreign entomological investigations and projects in Honduras. Also, in cooperation with national foundations, NGOs and governmental institutions for wildlife conservation, Zamorano performs own investigations about the arthropod biodiversity in poorly investigated national parks and nature reserves of Honduras. The results will be important concerning the biogeography of many Central American arthropod species and the knowledge of arthropod diversity of the country in general.

**9:20 am      An overview of the Severin-McDaniel Insect Research Collection**

*Rita I. Velez*, Ph.D. student, Graduate Research Assistant, Collection Manager, Severin-McDaniel Insect Research Collection, Plant Science Department, Ag. Hall, 1010 Rotunda Ln. N., Brookings, SD 57007 USA

Since its rebuilding starting in 1906, the Severin-McDaniel Insect Research Collection (SMIRC) has focused on the documentation of the insects of South Dakota, and sharing the documentation of the fauna of the northern Great Plains with neighboring collections. It presently contains and estimated 1.2 million specimens, we claim the largest collection of insects from the Black Hills, a complete collection of regional butterflies and Orthoptera, and well represented collection of Auchenorrhyncha. Nowadays, growth of the SMIRC has increased with new pollinator inventory and biomass research projects providing upwards of 7000-9000 prepared specimens per year of native bees, ants, and other insects. In 2010, we moved to a new collection room, hired a new part-time collection manager, and obtained funding for selected curatorial renovations. As part of the ADBC digitization project and other grants, the collection is receiving new curatorial efforts, including replacement of aged drawers and cabinets, improved pest and environmental management, updating of nomenclature, and specimen data capture for integration in the Specify Database. The future of the SMIRC looks positive.

**9:40 am Efficiently Profiling and Improving Alcohol Collections: an Evaluation of Current Best Practices**

**Heather Campbell**, MSc. candidate, North Carolina State Insect Museum, Department of Entomology, 4321 Gardner Hall, Box 7613, NC State University, Raleigh, NC 27695-7613 USA

While preparing to develop a profiling system for the alcohol collection at the NC State Insect Museum we reviewed the current literature in an effort to identify the accepted best practices for alcohol collection curation. We observed that current best practices appear to assume unlimited resources and time. What happens when you have a finite amount of each? How best can we improve a collection with limited resources but still ensure the longevity and health of the specimens? We summarize the extent of current best practices, offer some pragmatic adaptations, and solicit your sage advice.

10:00 -10:15 am Coffee Break

**10:15 am High-volume DNA barcoding in the Canadian National Collection of Insects and Arthropods**

**Andrew B. T. Smith**, Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario K1P 6P4, Canada  
Building on earlier small-scale studies, a major DNA barcoding initiative was launched at the Canadian National Collection of Insects and Arthropods (CNC) in May 2011. This initiative involved high-volume sampling of pinned museum specimens within all major insect orders. This presentation provides an overview of specimen selection, sampling techniques, and success rates. Recommendations for future barcoding efforts in museum collections will also be discussed.

**10:35 am Advancing a coordinated national policy agenda for biodiversity science**

**Mary Liz Jameson**, Wichita State University, Wichita, KS (presenter); **Gregory Anderson**, University of Connecticut; **James P. Collins**, President of American Institute of Biological Sciences; **Robert Gropp**, American In-

stitute of Biological Sciences Director of Public Policy; **Robert Guralnick**, University of Colorado; **James Hanken**, American Institute of Biological Sciences Board of Directors; **Pat Herendeen**, Chicago Botanic Garden; **David Hibbett**, Clark University; **Lucinda McDade**, Rancho Santa Ana Botanic Garden

Biodiversity science provides the critical factual basis for addressing societal challenges (e.g., infectious diseases, climate change, species conservation, invasive species) and for essential societal services (e.g., human health, pest management, and species interactions). Biodiversity data empower research and discovery across broad disciplinary spectra. Human dependence on organismal biodiversity is clear. However, much additional research is needed to characterize all species, to discover complex interactions, and to uncover impacts on humans. Further, raising public awareness and the political will to sustain biological diversity into the future require more than science. A short-term, ad-hoc American Institute of Biological Sciences (AIBS) committee is investigating the potential for AIBS to help taxonomic or biodiversity-related scientists develop and advance a national policy voice. Taxonomic communities are organized around taxonomic divisions, methods, concepts or theories, thus fragmenting the influence that biodiversity-related scientists have on national science policy and scientific advancement. The committee seeks your input to help inform consideration of goals and options.

**10:55 am A spectral shift in light trapping with the death of mercury vapor**

**Gavin J Svenson**, Cleveland Museum of Natural History, 1 Wade Oval Drive, University Circle, Cleveland, Ohio 44106-1767, USA

The regulation of mercury vapor ballasts in the United States and Europe has stifled advancements in MVL that other ballasted light types have experienced recently. In addition, MVL components are becoming almost impossible to find and will eventually be available only through custom sources if at all. Recent advances in metal halide lights are primarily focused on the replacement of cumbersome magnetic ballasts with lighter, more energy efficient electronic or digital ballasts, which offer numerous advantages to entomological applications. The driver for these advances appears to originate in markets servicing the horticultural and aquarium industry. Fortunately, there is considerable overlap

between the requirements for attracting insects and the requirements for growing coral, which has also led to advancements in cold temperature metal halide lights that emit ultra-violet wavelengths in addition to a broad spectrum. Subjects presented will include a design for a highly versatile light-trap, a spectral comparison between a tuned metal halide, standard mercury vapor and self-ballasted mercury vapor, and finally the latest advancements in electronic ballasts.

11:15 am – 12:00 pm

Business Meeting

## ACKNOWLEDGEMENTS

### Organizers:

Cara Gibson, Pam Horsley, Jeff Knight, Christopher Marshall, & Katja Seltmann

### Symposium Organizers:

Victoria Bayless, Derek Sikes & Andrew Short

### Booklet:

Katja Seltmann & Atlantean Starseed

### Personal Contributions:

Mrs. Bernice DeMarco

Dr. Terry Erwin

Mr. Jong-Seok Park

Dr. Margaret Thayer

Mr. Michael Ferro

Mr. Chris Fall

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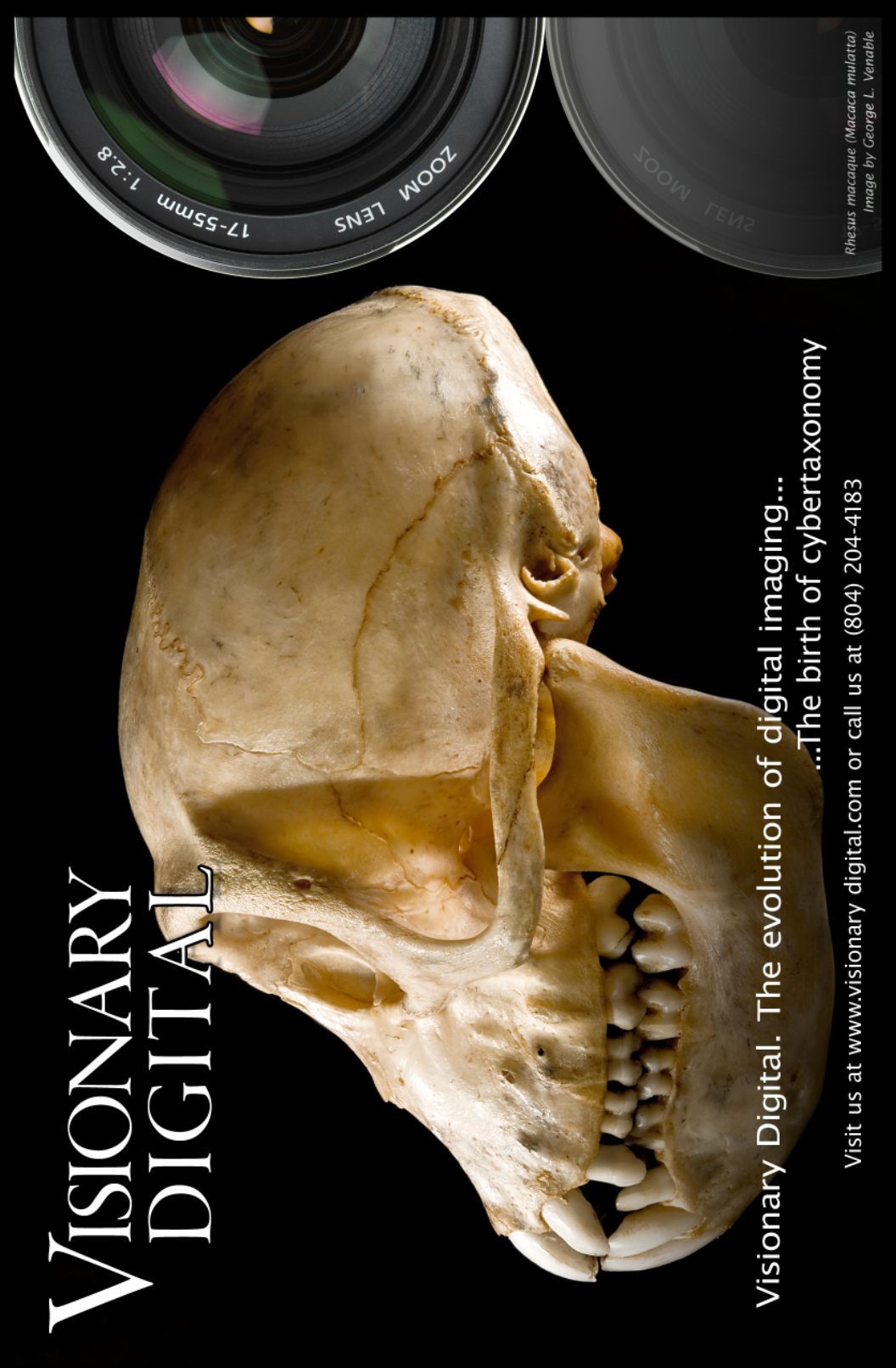


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*Garden spider (Argiope aurantia)  
Image by George L. Venable*

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*Rhesus macaque (Macaca mulatta)  
Image by George L. Venable*