InvertEBase

Reaching Back to See the Future:
Species-rich Invertebrate Faunas Document Causes and Consequences of Biodiversity Shifts in North America

Petra Sierwald, PI
Rüdiger Bieler, Co-PI
Field Museum of Natural History, Chicago
More Digitizing

Petra Sierwald, PI InvertEBase
current PI on new Parasite Tracker TCN:
bat flies, feather lice, fleas, mosquitos

current PI on SCAN PEN, digitizing US specimens of four beetles families:
meal worms or darkling beetles (Tenebrionidae),
featherwing beetles (Ptiliidae),
Pselaphinae (they are really really small)
ironclad beetles (Zopherinae)

Rudiger Bieler, PI InvertEBase
Senior collaborator on new TCN PILS, subaward to FMNH, data to be mirrored on InvertEBase
InvertEBase: North American terrestrial & aquatic invertebrates

- Selected insects (e.g., dragonflies, water beetles); arachnids, myriapods, mollusks
- Digitize, georeference, mobilize up to 3 million specimen data
- Several museums serve data online for the first time (DMNH, AUMNH, CMNH)
  - Arthropod data served on
    - 2019: UMMZ Insects added to SCAN: 285,758 occurrence, 16% georeferenced
  - Invertebrate data served on InvertEBase

InvertEBase Portal moved to Arizona State University in 2019
Eight institutions, 13 collections, 2nd year no-cost extension

EF 14-02667, Petra Sierwald, Rüdiger Bieler, 2nd year no-cost extension

EF 14-00993, Andy Deans, 2nd year no-cost extension

EF 14-02697, Elizabeth Shea, 2nd year no-cost extension

EF 14-01176, Jason Bond, Melissa Callahan, completed, on iDigBio

EF 14-04964, Diarmaid O’Foighil, Taehwan Lee, completed

EF 14-02785, Gavin Svenson, 2nd year no-cost extension

FilteredPush
EF 14-01450, James Hanken, completed

PEN 2016: Chicago Academy of Sciences
EF 16-01700, Dawn Roberts, completed

PEN 2018: Museum of Northern Arizona
EF 17-01842, Lawrence Stevens, Gary Alpert, ongoing
Collections
California Academy of Sciences – Inverts
Invertebrate Collection at the Natural History Collection of Utah
Carnegie Museum of Natural History – Mollusks
Naturalis Biodiversity Center (NL)-Mollusca
Chicago Academy of Sciences – Mollusks
North Carolina Museum of Natural Sciences –Mollusk Collection
Colorado Plateau Biodiversity Center –
Mollusks  Sam Noble Oklahoma Museum of Natural History – Inverts
Mollusks Texas A&M University Biodiversity Research and Teaching Collections
Eastern Kentucky University Mollusk Collection
University of Alaska Museum – Inverts
Florida Museum of Natural History – Mollusks
Yale University Peabody Museum – Inverts
Illinois Natural History Survey- Mollusk Collection

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Lessons learned

Pre-curation, pre-curation, pre-curation

Voice recognition is popular with students, not with data entry staff (works well for field notes)

Collection databases developed during period of grant, slowing down data entry speed

IPT development problems for certain databases

Data entry requires extensive training, long-term personnel increases speed and accuracy

2018-2019: extensive Georeferencing effort:

Outreach: DMNH Exhibit development completed
2019 accomplishments:

2018-2019: extensive Georeferencing effort, monitored trial, time and accuracy assessments

Outreach:
**Completed Digitization Exhibit:** Little creatures, Big Data

**High-throughput pin and vial imaging:** in progress

**Contribution to taxonomic authority files**
Outreach: Elizabeth Shea, DMNH

Completed Digitization Exhibit: Little creatures, Big Data

Six poster panels as retractable banners

Little Creatures, Big Data
Digitizing Natural History Collections

Preserving Nature
For every animal or plant you see at a natural history museum, there are many more behind the scenes.

Fish in jars
Birds in boxes
Insects in drawers
Plants on paper
...and so many more

What are natural history collections?
Examples of animals and plants that are preserved, labeled, and organized in museums so they can be studied like unique books in a giant library of life.

What is the lab coat?
Laboratory animals and plants are sometimes studied to learn more about the natural history of the species or to determine whether they can be used to help understand or solve a problem. This enables the collection to be used as a reference to help answer questions about the organisms.

What do the labels say?
Labels often include a species name along with the date, location, and sometimes even how the animal or plant was collected. This information can be used to help identify the species, determine where it lives, and to study how it has changed over time.

Why are these so important?
Species are often studied to learn more about their natural history, to understand how they interact with their environment, and to determine whether they are threatened or endangered. This information can be used to help protect species and their habitats.

Little Creatures, Big Data
Digitizing Natural History Collections

Big and Small—We Have Them All
There are billions of specimens in natural history collections, all around the world. The variety of specimens in these vast collections is amazing.

Natural history specimens are:

**and Tiny**
- Bugs
- Mites

**and Macy**

**and tray**
- Bees
- Ants

**and crayons**
- Pigeons
- Birds

Natural history specimens come in all shapes and sizes.

Data Connects Collections

Real specimens in drawers are essential, but what if someone far away wants to study a specimen? Or analyze specimen data from hundreds of collections around the world? Scientists can digitize each specimen in its image and data can be shared over the Internet.

Digitization is much more than just taking a picture. There are many steps:

- **ENTER** the specimen
- **LOCATION** where it was collected
- **PHOTOGRAPH** the specimen
- **SKETCH** the specimen
- **DRAW** the scale values

Natural history museums share all these data in a free online catalog called iDigBio (Integrated Digitized Biocollections).

iDigBio has data for more than 200 million specimens, and it's growing every day.

Anyone can search iDigBio and download data—no matter where they are.
Outreach: Elizabeth Shea, DMNH

Completed Digitization Exhibit: Little creatures, Big Data
Six poster panels as retractable banners