

DIGITIZATION OF THE UNIVERSITY OF MICHIGAN MUSEUM OF ZOOLOGY (UMMZ)

MOLLUSK DIVISION COLLECTIONS



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UMMZ Mollusk Collection

The University of Michigan began building a collection of mollusks before the first half of the 19th century. The Mollusk Division now incorporates approximately 5 million specimens and has long ranked amongst the most important freshwater and terrestrial mollusk collections in North America.

- **Organization**
 - Two half-time curators, one full-time collection manager, and a graduate student curatorial assistant
 - Varying numbers of graduate students, post-docs, and visiting scholars
- **Facilities**
 - Two large collection rooms (wet and dry areas) shared with other divisions:
 - Dry Collection: 191 cabinets, 9,050 trays (19"x19") on compactors
 - Wet Collection: 1,700 linear feet shelves on compactors
 - Library, preparatory laboratories, research space (including molecular and imaging labs) and offices
 - A demonstration room for teaching and public programs
- **Collections**
 - ~ 250,000 catalogued lots including 406 holotypes and 1638 paratype lots
 - Excellent non-marine taxonomic, geographic and historical coverage
 - Significant subcollections:
 - Bryant Walker Collection: one of the world's largest private mollusk collections with >100,000 lots, ~2 million specimens
 - Royal Ontario Museum Collection: North American, mainly Canadian, freshwater/land mollusks
 - F. C. Baker Wisconsin Freshwater Mollusk Collection
 - Stelfox Sphaeriid Collection: important reference collection of a cosmopolitan bivalve family
 - J. B. Burch Lyophilized Tahitian Land Snails: ~1600 freeze-dried tissues of a largely extinct snail family



Fig. 1. Ruthven Museums Building. UMMZ moved into this building in 1928

Fig. 2. Newly renovated Research Museums Center (RMC)

A New Century for the UMMZ (Research Museums Center)

UM decided to create a hub for cross-disciplinary interactions in the biodiversity and cultural sciences by cohabiting UMMZ, Herbarium, Museum of Anthropological Archaeology (UMMAA), and Museum of Paleontology (UMMP).

- **Phase I (Relocating "Wet" Collections)**
 - 2009: A project initiated to address storage limitations and safety issues for the ethanol-preserved collection
 - 2011: Construction of a new state-of-the-art ethanol collection facility was completed
 - 2012: Five million wet specimens were successfully relocated
- **Phase II (Relocating LSA research Collections)**
 - 2015: Renovation of space was completed
 - 2018: Relocation will be completed



Fig. 3. Mollusk dry collection range at RMC



Fig. 4. Mollusk wet collection range at RMC

Digitizing Molluscan Biodiversity at UMMZ

To facilitate the research utility of the collection's historical biodiversity data, personnel in the UMMZ Mollusk Division have digitized ~140,000 catalogued lots, imaged >10,000 lots and georeferenced 39% of localities through the help of three National Science Foundation awards.

I. Computerization of the University of Michigan Museum of Zoology's Mollusk Collection (2005-2010)

The primary goal of this project was to develop a searchable computerized database and to enter as many catalogued lots as possible.

- Implementation of a fully functional *Specify* database on a SQL server
- Development of a searchable online database on the UMMZ website
- Input of information from more than 63,000 lots into the *Specify* database
 - Digitization of entire freshwater mussel and pleurocerid snail collections
- 4.5 full-time collection staffs were hired over the four year life of the project
- Re-housing of all digitized specimens in vials with polyethylene tops or polyethylene ziplock bags

II. Great Lakes Invasives TCN:

Documenting the occurrence of invasive molluscs threatening the Great Lakes basin (2014-2017)



This **Thematic Collections Network** of >25 institutions from eight states and Canada is targeting the digitization of non-indigenous species and their congeneric taxa of vascular plants, fish, green algae, and mollusks documented to be present in the Great Lakes Basin.

As part of a collaborative effort, the UMMZ Mollusk Division has completed:

- Data entry of all 13 target genera (~25,000 catalogued lots, ~390,000 specimens)
- Imaging of >10,000 lots
- Extension of taxonomic coverage to incorporate potential threats
- Upload of 23,978 UMMZ specimen records and 7,214 images to portals and made searchable
- 21 undergraduate students have been hired and trained for data entry (molluscan taxonomy, georeferencing, museum curation)

III. InvertEBase TCN: Reaching back to see the future: species-rich invertebrate faunas document causes and consequences of biodiversity shifts (2014-2018)



The shared goal of all **InvertEBase** participants is rapid data entry of georeferenced locality data to form a solid foundation for distribution mapping and to examine change over time due to large scale perturbations.

So far, the UMMZ Mollusk Division has conducted:

- Data entry: freshwater snail collection has been completed and land snail collection (Succinidae, Zonitoidae, Endodontidae, Discidae, Carychiidae, Helicinidae) has been initiated
- Upload: 104,372 specimen records (7% with images) representing 85 families and 844 species to portals and made searchable
- 17 students (1 master and 16 undergraduates) have been hired and trained for data entry



Fig. 5. Student workers image specimens and enter associated data into the local *Specify* database. Generated images and extracted data are uploaded to Symbiota and iDigBio portals where they can be accessed by the general public.

Acknowledgments: These awards are made as part of the National Resource for Digitization of Biological Collections through the Advancing Digitization of Biological Collections program (EF 14-05302 and EF 14-04964) and all data resulting from this award will be available through the national resource (iDigBio.org).

