Digitizing Archival Data: Ecoinformatics in the Alcohol House

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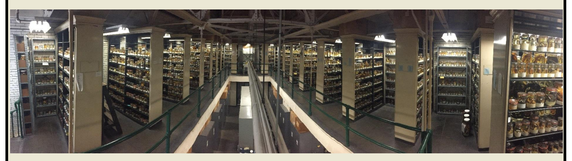
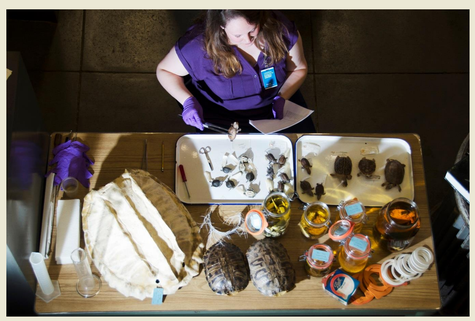
Alcohol House



We are prioritizing data digitization to increase the utility of our collection to herpetology researchers around the world.

The Alcohol House is the ninth largest herpetology collection in the United States and the most complete collection of Pennsylvanian amphibians and reptiles in existence. The Alcohol House is named for the 70% ethyl alcohol that is used to preserve specimens and prevent degradation and the formation of bacteria.

A NSF-CSBR grant has enabled Collection Manager, Stephen Rogers, and Curatorial Assistant, Kaylin Martin, to purchase new equipment, such as jars, gaskets, tanks, photography equipment, shelving inserts, and specialized cabinets, to update the storage facilities.

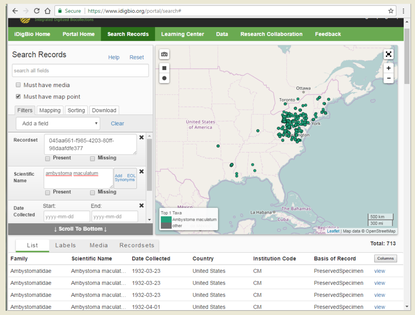


Pictured above: Kaylin Martin, Curatorial Assistant of Amphibians and Reptiles. 2017.

Locality data

- Using MaNIS/HerpNET/ORNIS Georeferencing Guidelines to determine locality
- Georeferenced localities allow for studies on:
  - Comparison of historic vs. current population distribution
  - Site re-visitation
  - Track invasive species spread
  - Conservation of species with limited range
- Changing geography and names of locations present a challenge.
- Error radius can be large if detailed locality data was not taken upon time of collection.

Ambystoma maculatum
Yellow spotted salamander

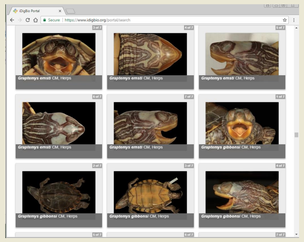


79.258% of our collection is georeferenced to date

Imaging specimens

- Specimens are submerged in ethanol in order to reduce glare.
- Digital images of specimens allow for scientists to:
  - Compare morphological variation across individuals and species
  - Access to specimens with loan restrictions (i.e. holotypes)
- Rigidity of preserved specimens limits visibility of structures.
- Dimensionality of specimens makes focusing on specimen difficult

Our photography set up and example of specimen image by Martin



147 of our **154** holotypes are imaged and on iDigBio!
That = **1,047** images + *many more* to come!

Ecoinformatics

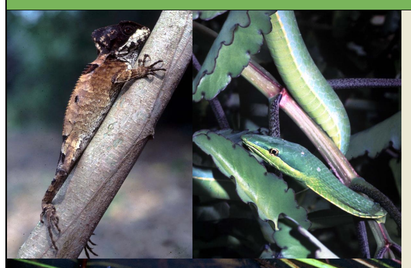
Ecoinformatics seeks "to integrate and increase the accessibility of multiple lines of environmental data"* to advance the usefulness of natural history collections.

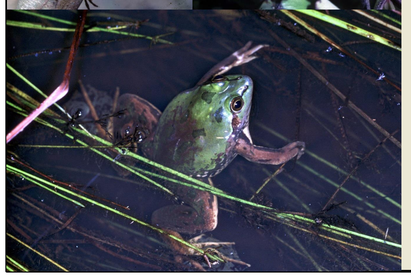
In the Alcohol House, we are digitizing supplementary environmental data that includes, but is not limited to, photos from 35mm slides, new specimen images, and locality information; All digitized data is uploaded to iDigBio.

Upcoming project

We are working to catalogue the extensive Michael A. Ewert turtle collection. This collection is from an in-depth study of temperature-dependent sex determination (TSD) in 11,000 turtle hatchlings across species**. With the onset of climate change, turtles, and other cold-blooded species with TSD, may not be able to compensate behaviorally for warming conditions. Thus, this collection is of increasing importance for current TSD research.

Archival slides of specimens in habitat





Advantages

- Depicts the color the specimen was when it was alive. When specimens are stored in ethanol, they lose their color or change entirely. In fact, green specimens will turn blue when preserved!
- Potential site re-visitation
- Compare habitat changes across time
- Morphological research

Challenges

- One must understand the context in which the photo was taken.
- The image to the right was a staged glamour shot.
- This four-toed salamander, *Hemidactylium scutatum*, would never be found sitting atop a mushroom.
- The image does not provide an accurate picture of the salamander's behavior.

Search 'CM Herps' on iDigBio.org!

Conclusions

- Herpetological collections are important to environmental research:
  - They are highly susceptible to environmental change due to their permeable skin and widely distributed quality of living aquatically as well as terrestrially.
- Our museum collection is a wealth of information:
  - Temporal and geographical information on fitness of herpetofauna in a changing climate due to anthropogenic effects.
- We are digitizing the Alcohol House's archives of herpetological data because of its importance for current scientific research.

Acknowledgements

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References

* Holmes *et al.* 2016. *Natural history collections as windows on evolutionary processes.* Molecular Ecology 25: 864-881.
**Ewert and Nelson. 1991. *Sex determination in turtles: diverse patterns and some possible adaptive values*. Copeia 1991: 50-69.