Bringing Dark Mammalian Trait Data to Light Through Standardized Digitization

Biodiversity Knowledge Integration Center
Arizona State University

Sophia Koutsogiannis, Nathan Upham, Dakota Rowsey
School of Life Sciences, Arizona State University, Tempe, AZ 85282

Background

- **Dark Data**- data within an organization that are insufficiently accessible and processed to be used by the broader community
- Example: trait data associated with mammal natural history specimen tags and field notes
- RANGES is a 20-institution collaboration to digitize trait data from mammal specimens collected in North America to illuminate their research potential
- We created a digitization workflow incorporating specimen tags and field notes of voucher specimens so that the information contained in them can be used by other scientists worldwide

The objective of our work is to create a mammalian trait database that can be used to answer a broad swath of research questions

Methods

1. Specimens are removed from cabinets and transferred to a scanner
2. Field notes are referenced to ensure all data is correct
3. Tags with trait data are scanned, then saved in a folder
4. All trait data from tag is entered manually into a spreadsheet based on standardized trait definitions consistent across the RANGES Network

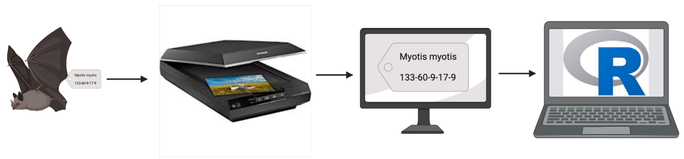

Figure 1. Digitization workflow

Results

- 136 specimens digitized out of ~9300
- 135 specimens with unique data
- 15 total categories assessed for data

Family	Scientific Name	Specimens Digitized
Ochotonidae	Ochotona princeps	2
Leporidae	Lepus alleni	7
Leporidae	Lepus americanus	1
Leporidae	Lepus californicus	51
Sciuridae	Ammospermophilus harrisii	12
Cricetidae	Sigmodon hispidus	1
Mustelidae	Mustela erminea	3
Mustelidae	Mustela frenata	1
Mustelidae	Taxidea taxus	4
Phyllostomidae	Macrotus californicus	1
Molossidae	Tadarida brasiliensis	1
Vespertilionidae	Antrozous pallidus	7
Vespertilionidae	Corynorhinus townsendii	4
Vespertilionidae	Eptesicus fuscus	10
Vespertilionidae	Euderma maculatum	1
Vespertilionidae	Idionycteris phyllotis	2
Vespertilionidae	Lasionycteris noctivagans	3
Vespertilionidae	Lasiurus cinereus	7
Vespertilionidae	Myotis	4
Vespertilionidae	Myotis californicus	1
Vespertilionidae	Myotis lucifugus	2
Vespertilionidae	Myotis occultus	1
Vespertilionidae	Myotis velifer	6
Vespertilionidae	Myotis yumanensis	1
Vespertilionidae	Parastrellus hesperus	3

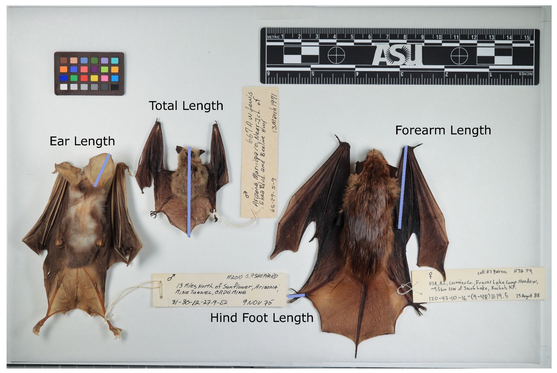

Image 1. *Corynorhinus townsendii*, *Parastrellus hesperus*, and *Eptesicus fuscus* specimens with superimposed forearm, ear, hind claw, and total length measurements

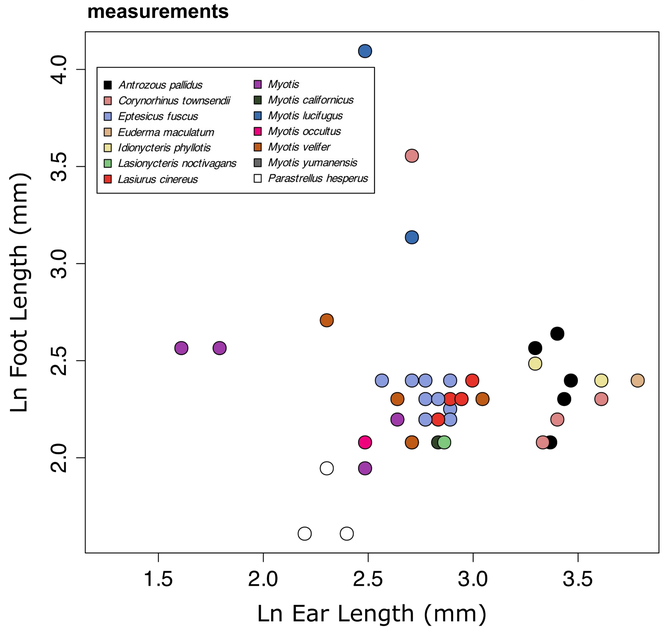

Figure 2. (Above) ASU Mammalogy Collections Vespertilionidae Logarithmic Species Comparison of Ear Length and Hind Foot Length

Table 1. (Left) Number of specimens digitized per family and species

Results Continued

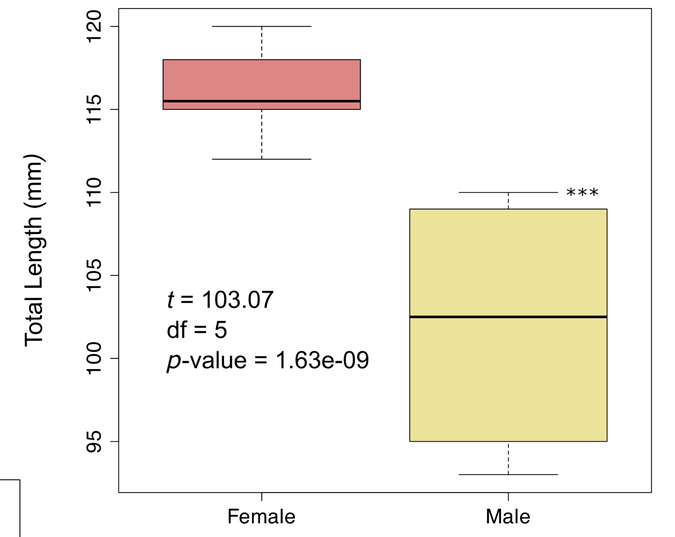

Figure 3. Difference in total length between male and female *Eptesicus fuscus*

Applications

- Change over time
- Temporal and spatial trends
- Interspecific and intraspecific comparisons

These data can be used to answer ecological and evolutionary research questions pertaining to North American mammals

Future Directions

- I plan on continuing to digitize the trait data associated with the remaining ~9188 specimens.

RANGES Digitization Network

Contact Information

Email- skoutsog@asu.edu Linkedin- https://www.linkedin.com/in/sophia-koutsogiannis/ Instagram- @sophiakresearch

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