

WHY AND HOW ARE MUSEUMS USED IN BAT RESEARCH?

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DISCLAIMER

THERE WILL BE PICTURES OF
MUSEUM SPECIMENS AND
DECEASED ANIMALS



Myotis thysanodes; Alexandra Miller

WHAT ARE NATURAL HISTORY MUSEUMS GENERALLY KNOWN FOR?

- PUBLIC EXHIBITS



National Museum of Natural History

WHAT ARE NATURAL HISTORY MUSEUMS GENERALLY KNOWN FOR?

- PUBLIC EXHIBITS
- ARCHIVE



Museum of Southwestern Biology

WHAT ARE NATURAL HISTORY MUSEUMS GENERALLY KNOWN FOR?

- PUBLIC EXHIBITS
- ARCHIVE
- EDUCATION



NATURAL HISTORY MUSEUMS HAVE MANY EXTENDED USES!

- **ARCHIVES** OF HISTORICAL INFORMATION
- CENTERS FOR **COLLABORATIVE RESEARCH**
- **REPOSITORIES** OF UNTAPPED KNOWLEDGE
- RESOURCES FOR **PUBLIC EDUCATION**

- **SPECIMENS!**



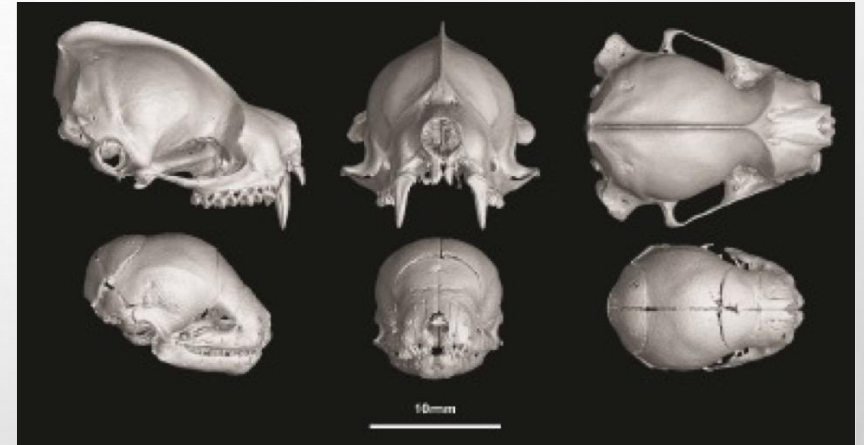
Museum of Southwestern Biology

WHY DO WE COLLECT SPECIMENS?

- SPECIMENS PROVIDE REFERENCE FOR:
 - AN **ORGANISM** AT A **PLACE** AND A **TIME**
- CURRENT USE IN **APPLIED RESEARCH**
- DOCUMENTING **BIODIVERSITY** AND **DISTRIBUTIONS**



Myotis nimbaensis; Bat Conservation International



John Korbin, Museum of Southwestern Biology

HOW ARE SPECIMENS COLLECTED?



<https://batmanagement.com/products/triple-high-mist-net-pole-system>



<https://www.usgs.gov/media/images/pacific-pocket-mouse-sherman-trap>



https://en.wikipedia.org/wiki/Harp_trap



Myotis thysanodes; Alexandra Miller

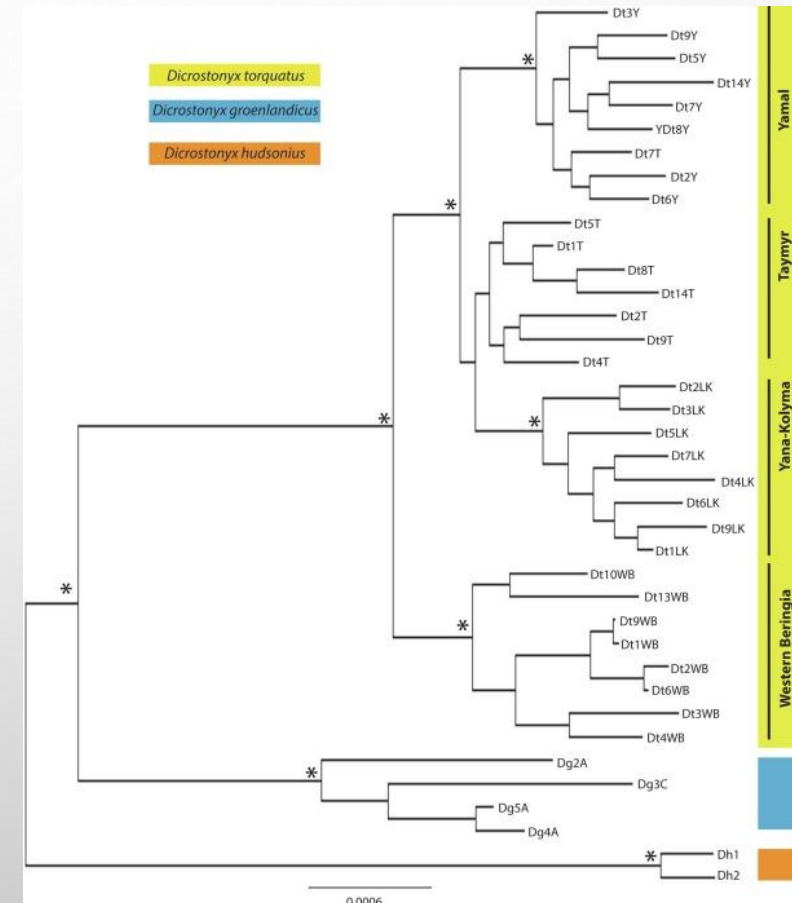
HOLISTIC COLLECTING MINDSET

- SPECIMEN SKIN/SKELETON OR WHOLE ORGANISM
- ASSOCIATED MEASUREMENTS
- LOCALITY INFORMATION
- DATE OF CAPTURE
- PRESERVED TISSUES AND BLOOD
- ENDO- AND ECTOPARASITES
- ETC...



WHY SHOULD WE KEEP COLLECTING?

- LONG TERM **TIME SERIES**
 - **TRACKING CHANGES** AT DIFFERENCE BIOLOGICAL SCALES
- THERE IS STILL A LARGE AMOUNT OF **UNDOCUMENTED BIODIVERSITY**
- FUTURE USE FOR **UNKNOWN APPLICATIONS**



Fedorov et al., 2022

MUSEUM OF SOUTHWESTERN BIOLOGY



SECOND LARGEST SPECIMEN COLLECTION
OF MAMMALS ON EARTH!

(AKA, WHY I LOVE IT HERE)

MUSEUM OF SOUTHWESTERN BIOLOGY



DRY SPECIMEN ARCHIVAL



DIVISION OF GENOMIC RESOURCES



PUBLIC OUTREACH



ETHANOL SPECIMEN ARCHIVAL



PREP LAB SPACE (THE DOOR...)

TISSUE STORAGE, LOANS, AND COLLABORATIONS



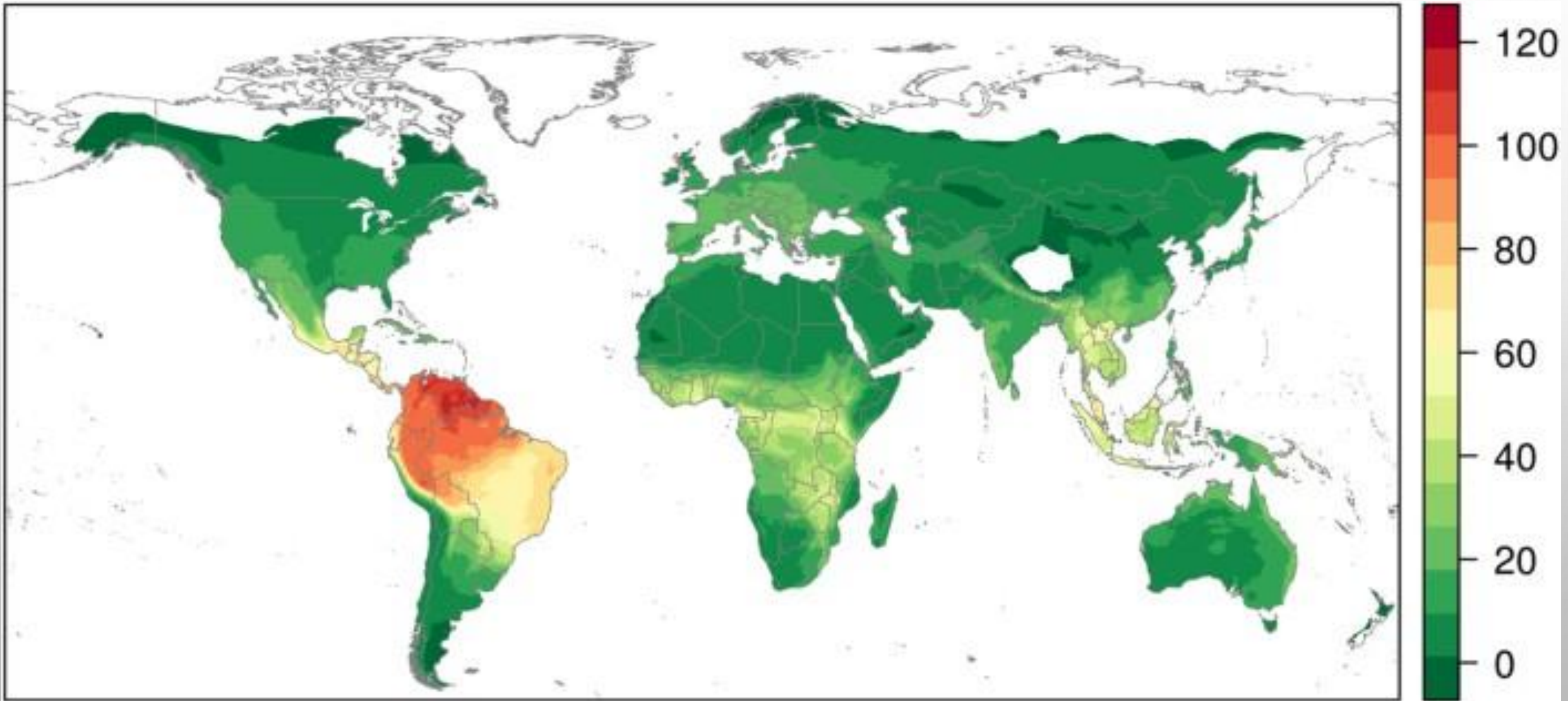
DIVISION OF GENOMIC RESOURCES



<https://www.fieldmuseum.org/birds-policies-loans>

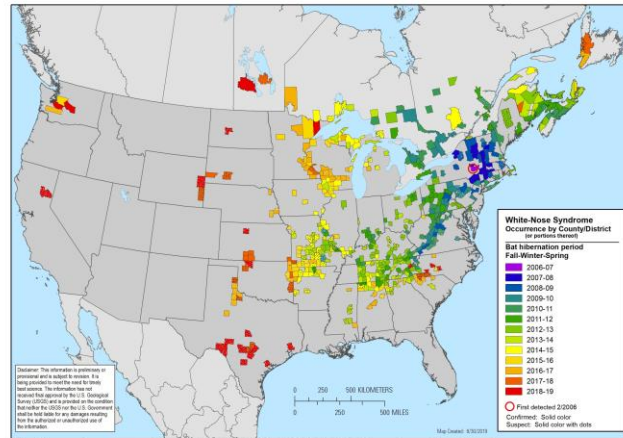


BAT SPECIES RICHNESS



MUSEUMS IN BAT CONSERVATION

- DISEASE DETECTION/TRACKING
 - WHITE-NOSE SYNDROME



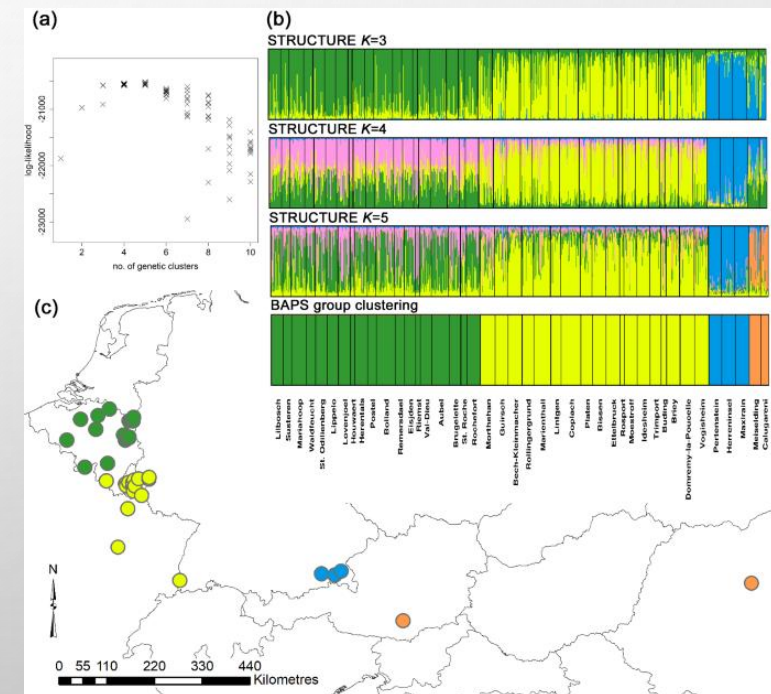
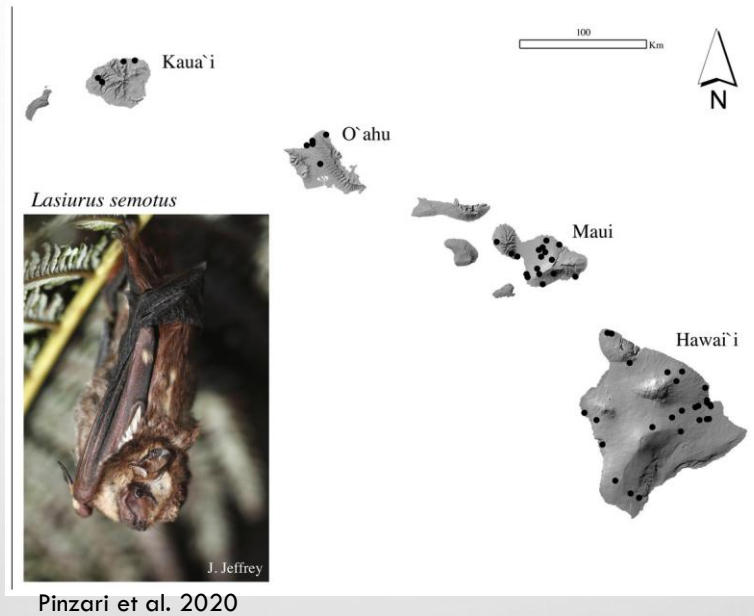
Citation: White-nose syndrome occurrence map - by year (2019). Data Last Updated: 8/30/2019. Available at: <https://www.usgs.gov/media/images/white-nose-syndrome-occurrence-map-year-2019>

<https://www.usgs.gov/media/images/white-nose-syndrome-occurrence-map-year-2019>



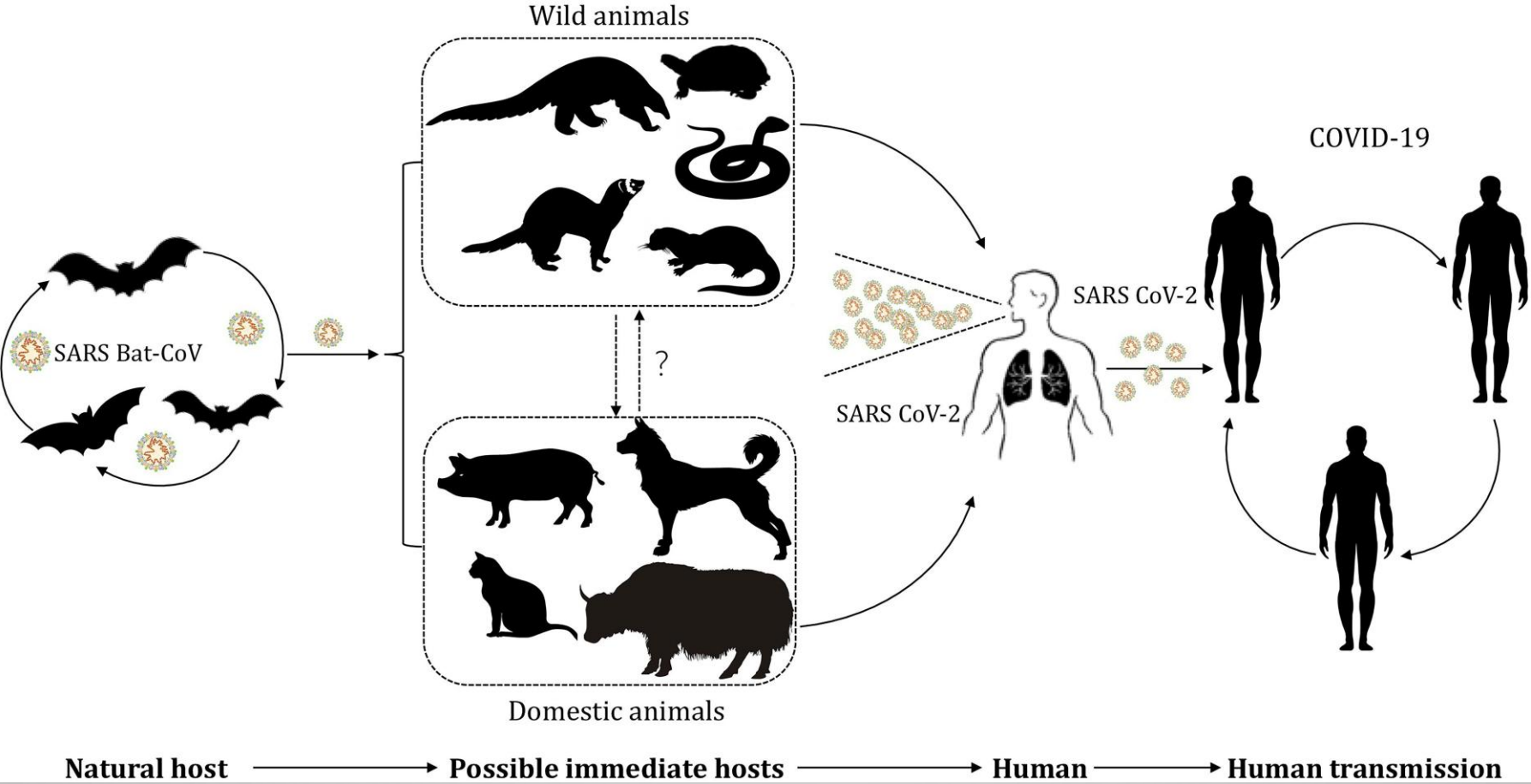
MUSEUMS IN BAT CONSERVATION

- DISEASE DETECTION/TRACKING
 - WHITE-NOSE SYNDROME
- POPULATION STRUCTURE
 - TRACKING DISTRIBUTION CHANGES FROM CLIMATE CHANGE
- POPULATION GENETIC HEALTH

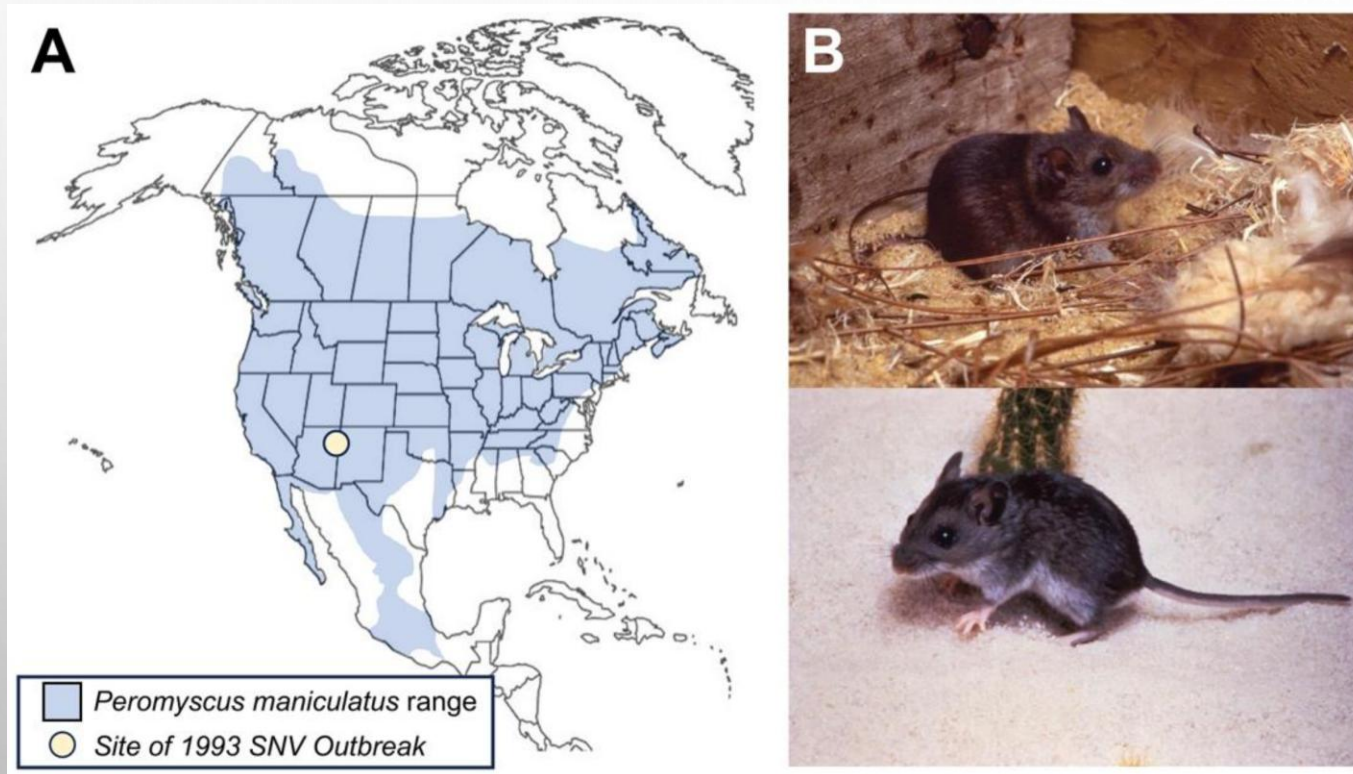


Frantz et al. 2022

ZOOONOTIC DISEASE DETECTION AND PREVENTION



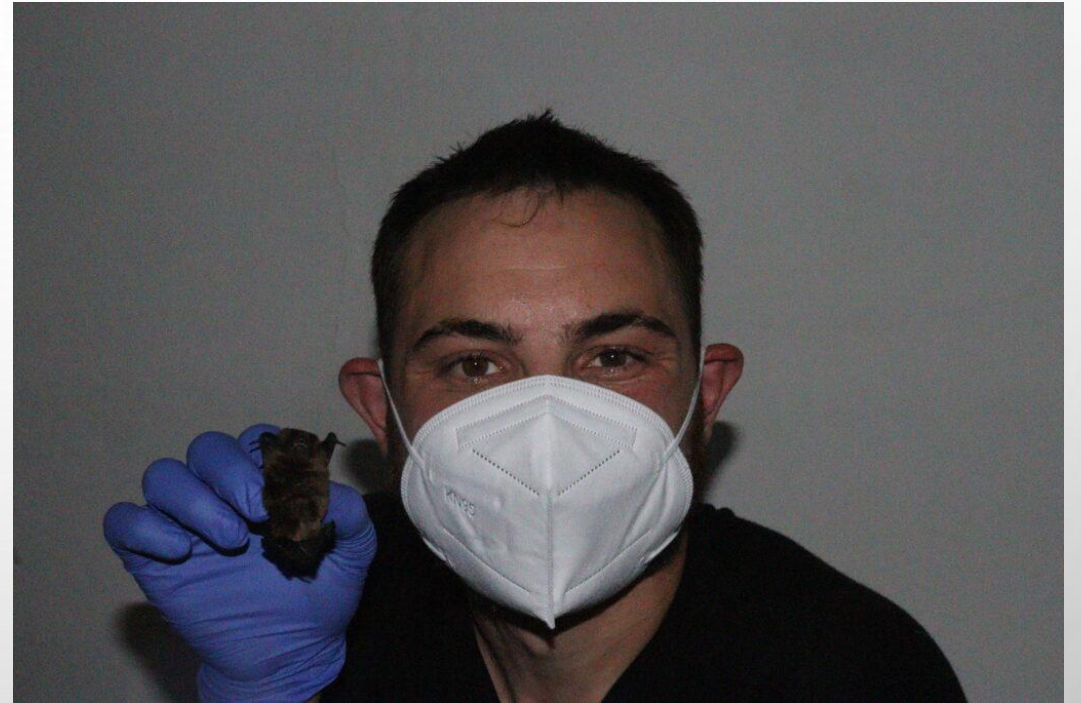
ZOONOTIC DISEASE DETECTION AND PREVENTION



SYSTEMATIC RESEARCH



The recently described African bat species Myotis nimbaensis;
Bat Conservation International

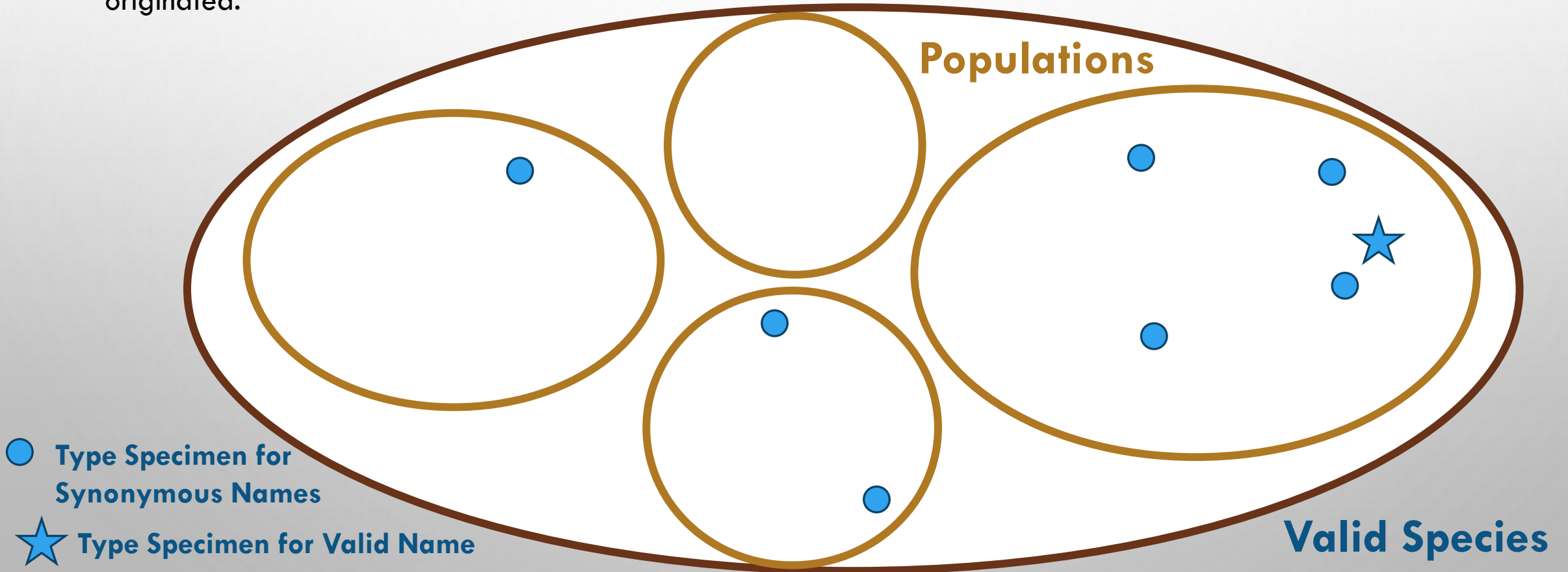


Pedro Monico from last weeks My Field for Dummies on Biogeography and Bats

TAXONOMY

Type Specimen(s): a **biological entity** permanently attached to a scientific name, acting as a **reference to identify** which taxonomic group a **scientific name, population, or individual** belongs to.

Type Locality: the **geographic locality** from which the **type material** for a scientific name originated.

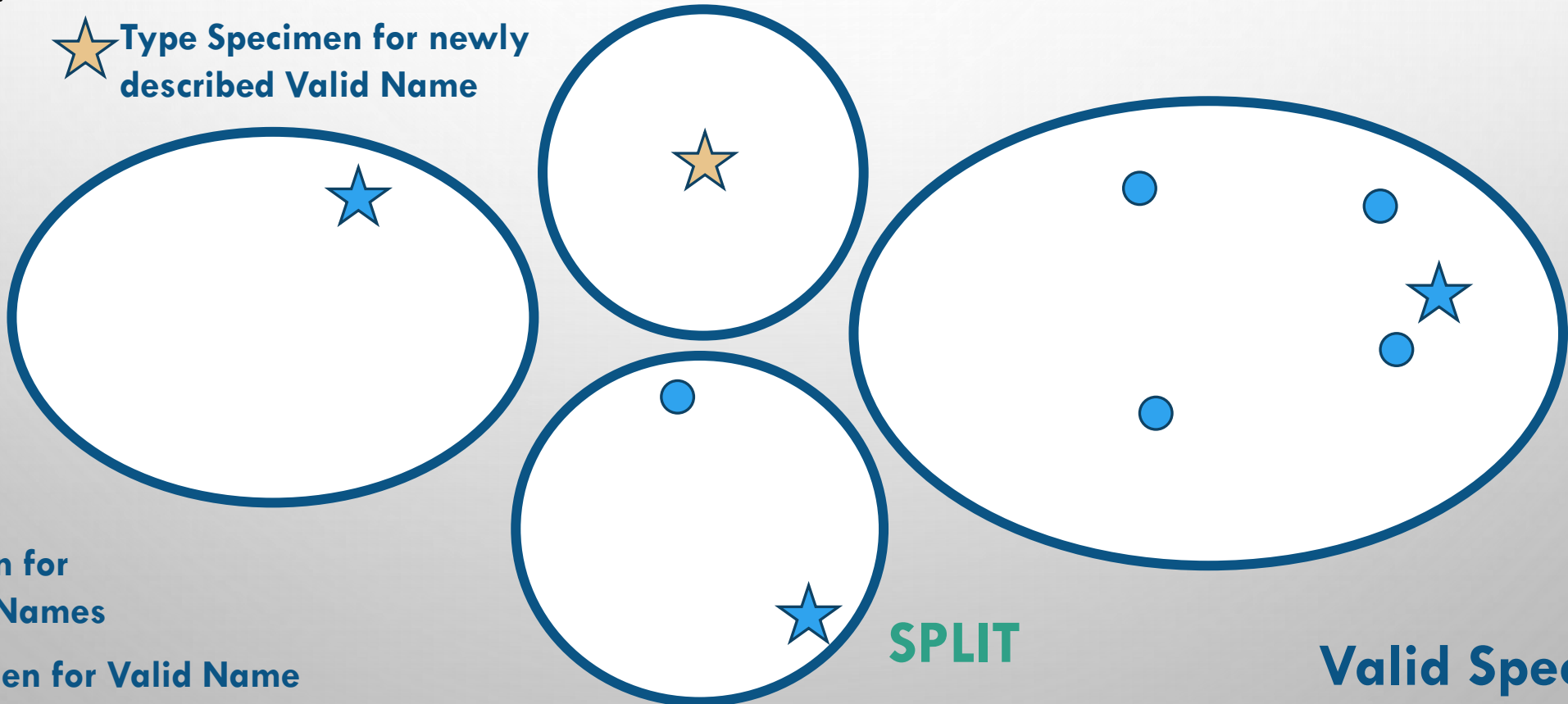


TAXONOMY

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★ Type Specimen for newly described Valid Name



● Type Specimen for
Synonymous Names

★ Type Specimen for Valid Name

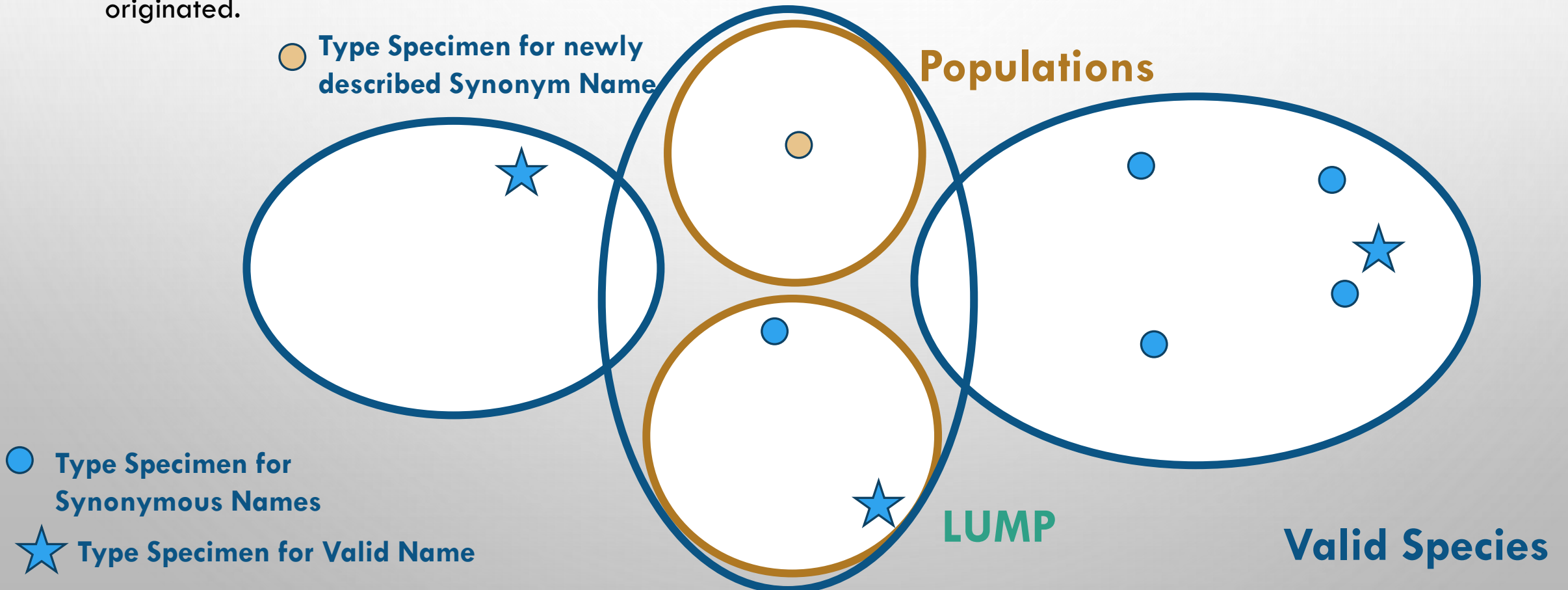
SPLIT

Valid Species

TAXONOMY

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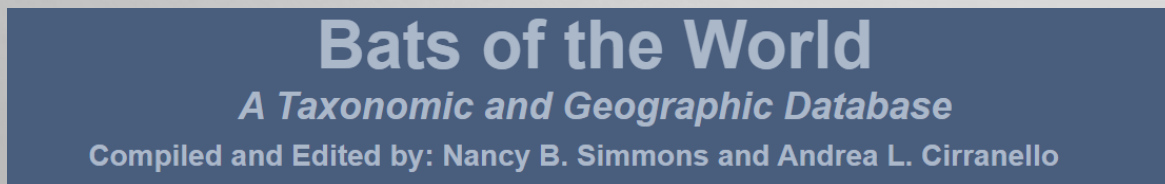
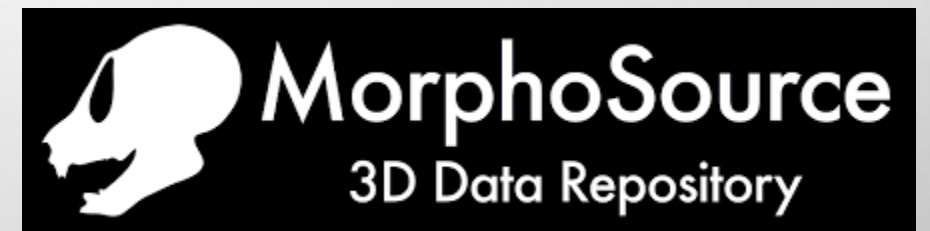
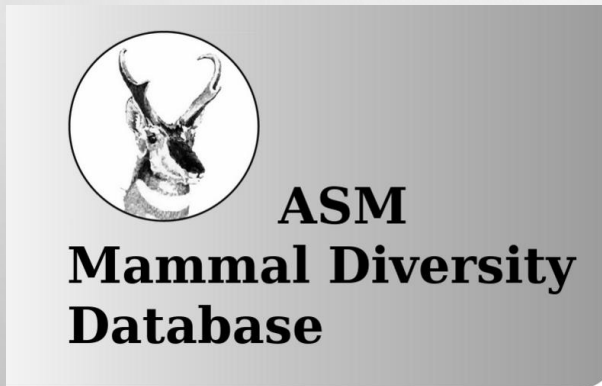
TYPE SPECIMENS



Csorba, Smeenk, & Lee, 2016

WITH SO MUCH DATA, HOW IS IT SHARED?

BIODIVERSITY INFRASTRUCTURE





ASM
Mammal Diversity
Database

Peromyscus sonoriensis

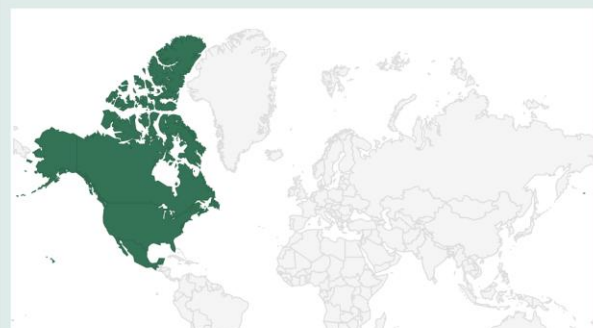
(Le Conte, 1853)
Western Deermouse

Taxonomy

Subclass : Theria
Infraclass : Placentalia
Magnorder : Boreoeutheria
Superorder : Euarchontoglires
Order : Rodentia
Suborder : Supramyomorpha
Infraorder : Myomorphi
Superfamily : Muroidea
Family : Cricetidae
Subfamily : Neotominae
Tribe : Peromyscini
Genus : *Peromyscus*

Country distribution map

The map below provides a general overview. Most species inhabit only specific regions within countries. Hover over the highlighted regions to see the country name.



Authority citation

Le Conte, J.E. 1853-12-31. Description of three new species of American Arvicolae, with remarks upon some other American Rodents. Proceedings of the Academy of Natural Sciences of Philadelphia 6(11):404-415.

Authority publication link

<https://www.biodiversitylibrary.org/page/1779949>

Original name as described

Hesperomys sonoriensis

Type material

USNM:MAMM:146 (= USNM:MAMM:A1128)

Type kind

holotype

Type specimen URI

<http://n2t.net/ark:/65665/3cfeb1f00-e666-4764-a3c2-e4ff8c221d84>

Type locality

Santa Cruz, Sonora, Mexico.

Names and synonyms

Present and past (if available) associated names to the species. Click on a name to view its details. If the list is long, scroll down to see more.

[Peromyscus michiganensis pallescens](#) J. A. Allen, 1896

[Hesperomys leucopus deserticolus](#) (Mearns, 1890)

[Hesperomys leucopus nebrascensis](#) (Mearns, 1890)

[Peromyscus maniculatus osgoodi](#) Mearns, 1911

[Peromyscus texanus subarcticus](#) J. A. Allen, 1899

[Sitomys insolatus](#) (Rhoads, 1894)

[Sitomys americanus artemisiae](#) (Rhoads, 1894)

[Mus Bairdii](#) (Hoy & Kennicott, 1857)

Country distribution

Canada · United States · Mexico

Subregion distribution

USA(AK,OR,WA,ID,MT,CA,NV,AZ,NM,TX,UT,CO,WY,ND,SD,NE,KS,OK,LA,AR,MO,IA,MN)

Taxonomy notes

split from *P. maniculatus*

Taxonomy notes citation

Bradley, R. D., Francis, J. Q., Platt II, R. N., Soniat, T. J., Alvarez, D., & Lindsey, L. L. (2019). Mitochondrial DNA sequence data indicate evidence for multiple species within *Peromyscus maniculatus*. Museum of Texas Tech University. · Greenbaum, I. F., Honeycutt, R. L., & Chirhart, S. E. (2019). Taxonomy and phylogenetics of the *Peromyscus maniculatus* species group. From field to laboratory: a memorial volume in honor of Robert J. BaÑer, 988-1001.

IUCN Red List status

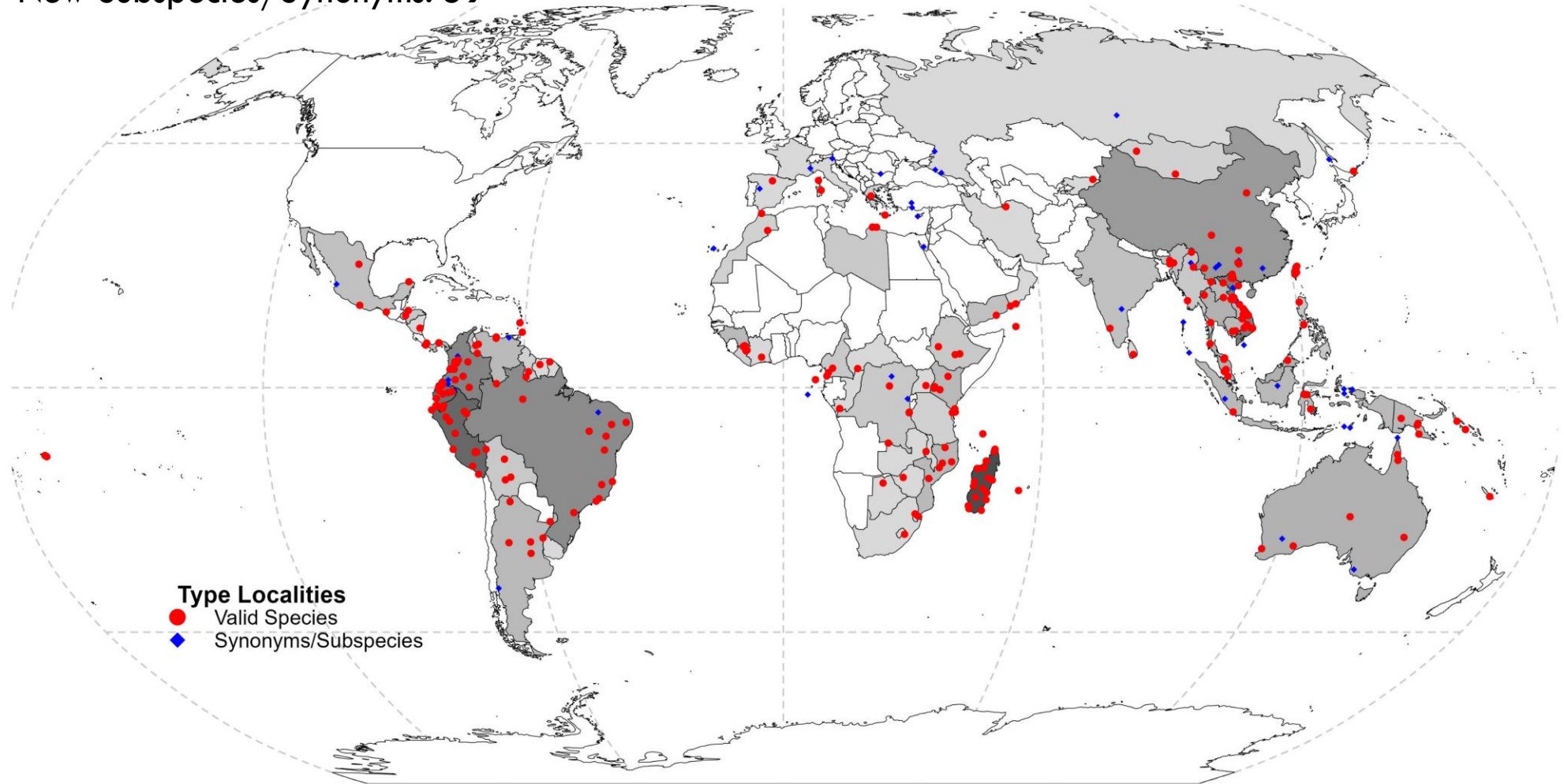
Not Evaluated

Species Permalink

<https://www.mammaldiversity.org/taxon/1002336>

New Species: **251**

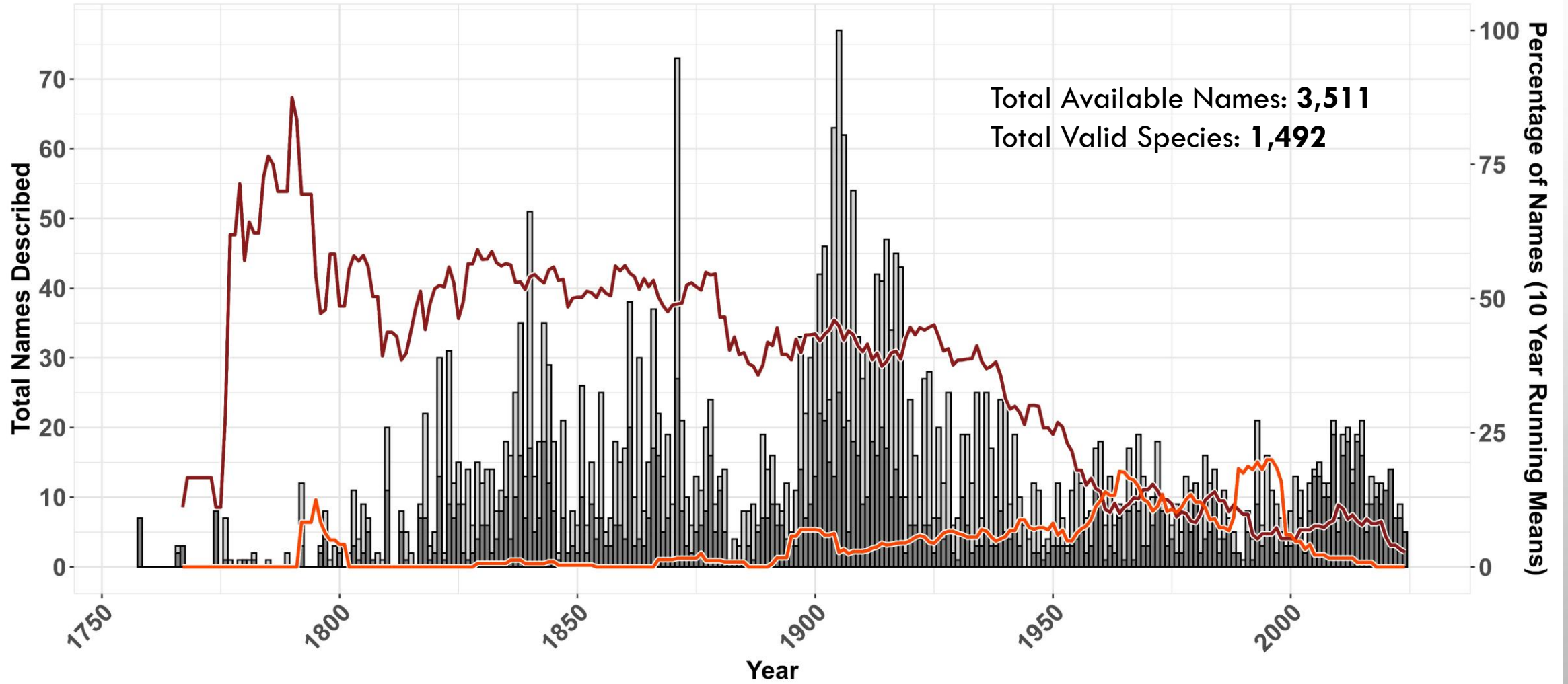
New Subspecies/Synonyms: **59**



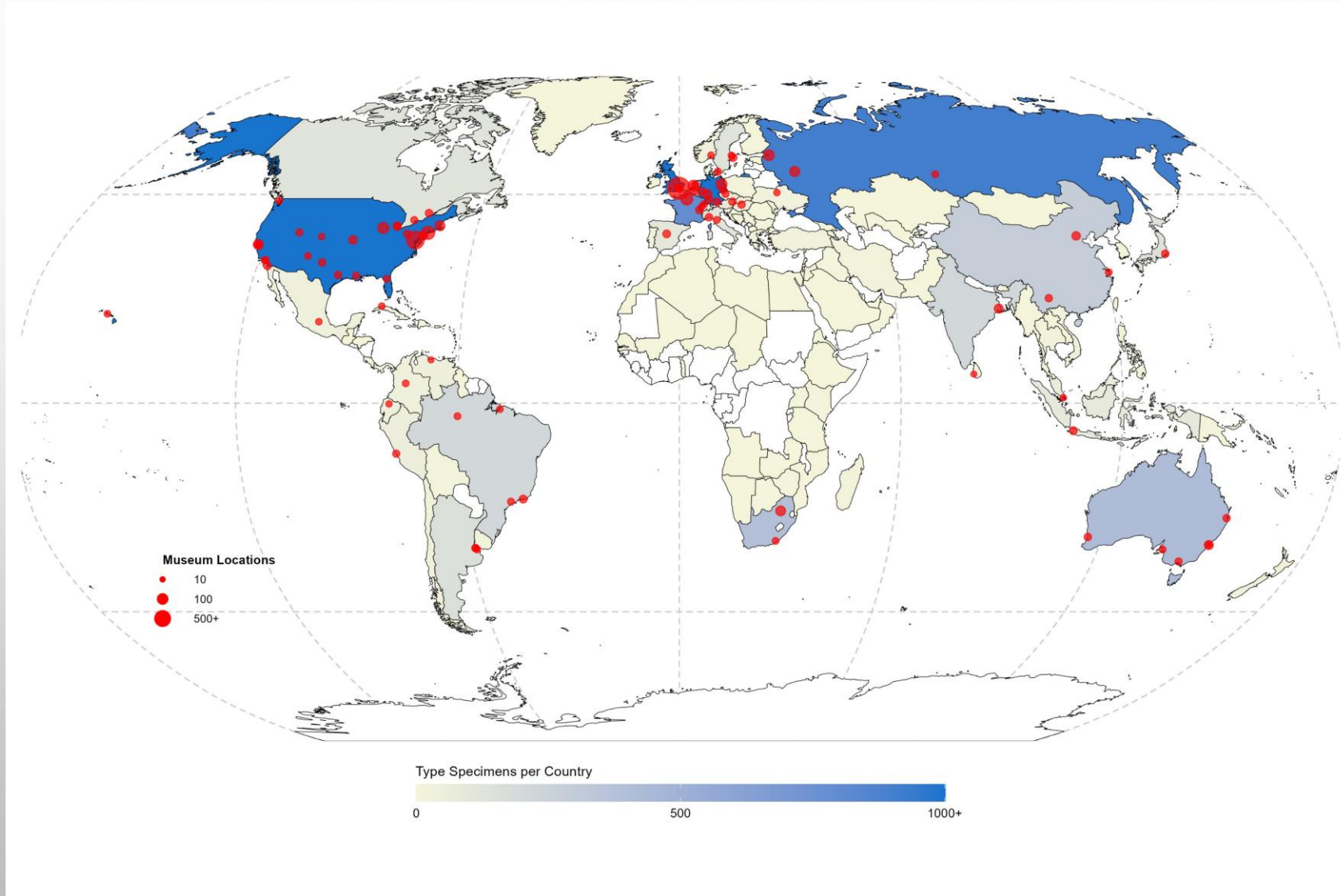
New Species Described Since 2000 (Chiroptera)



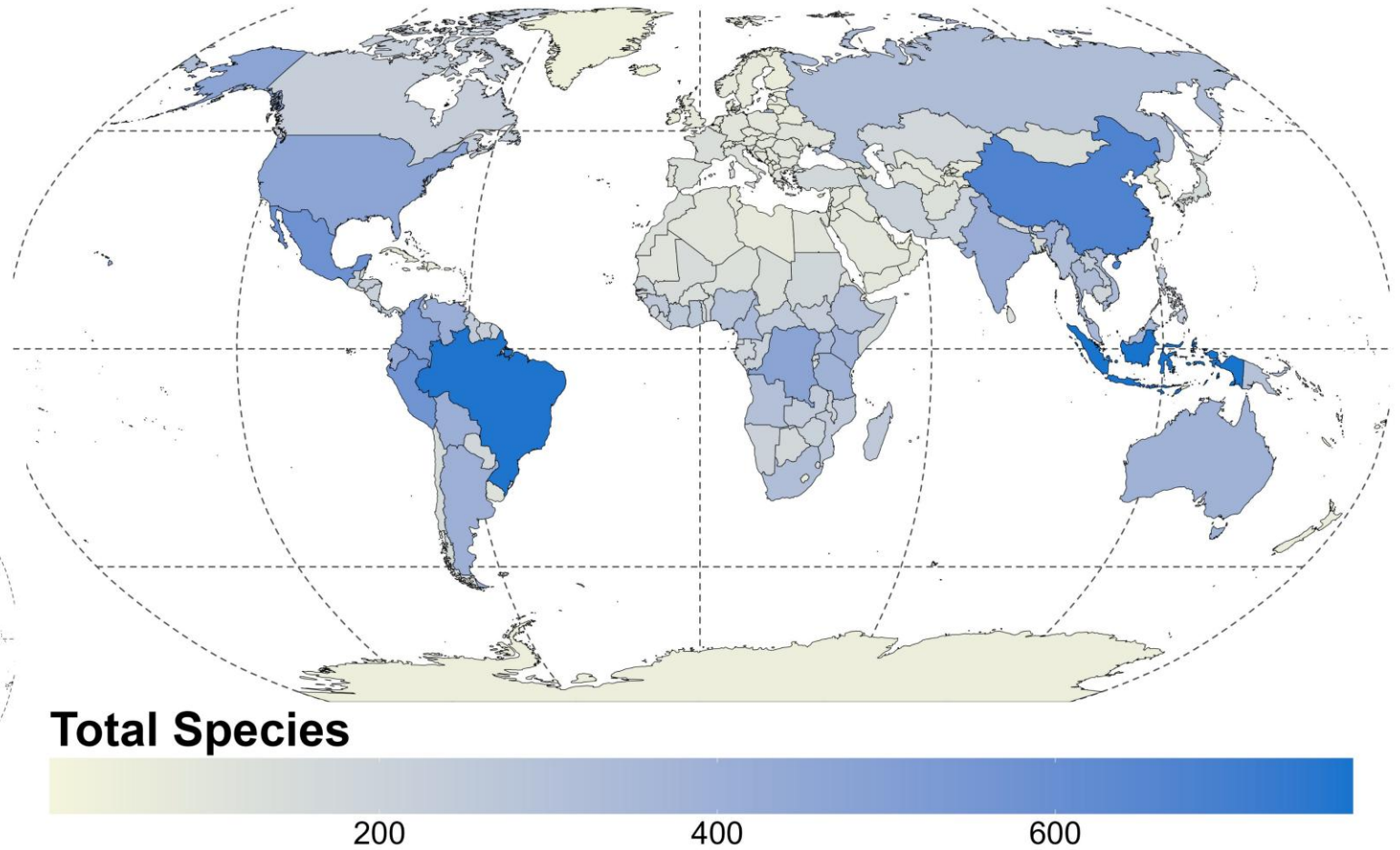
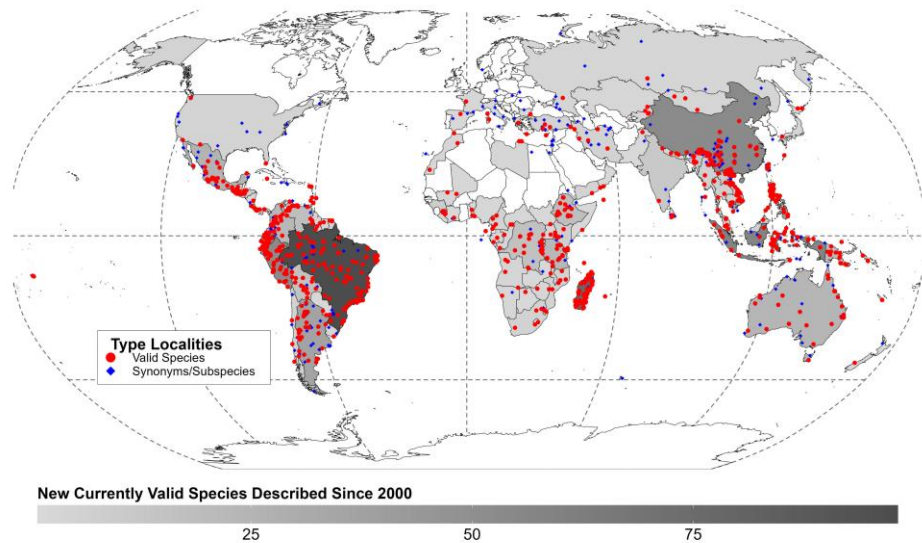
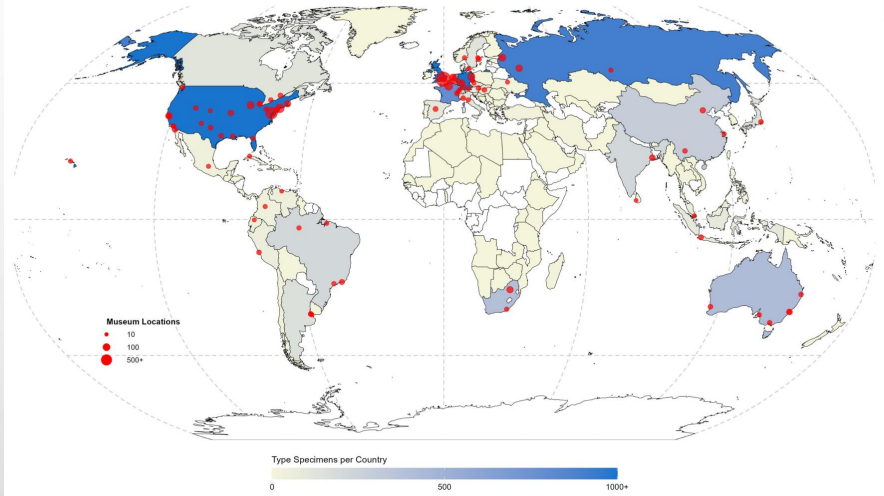
Available Names Currently Valid Species Species Split Since Description Species Lumped Since Description

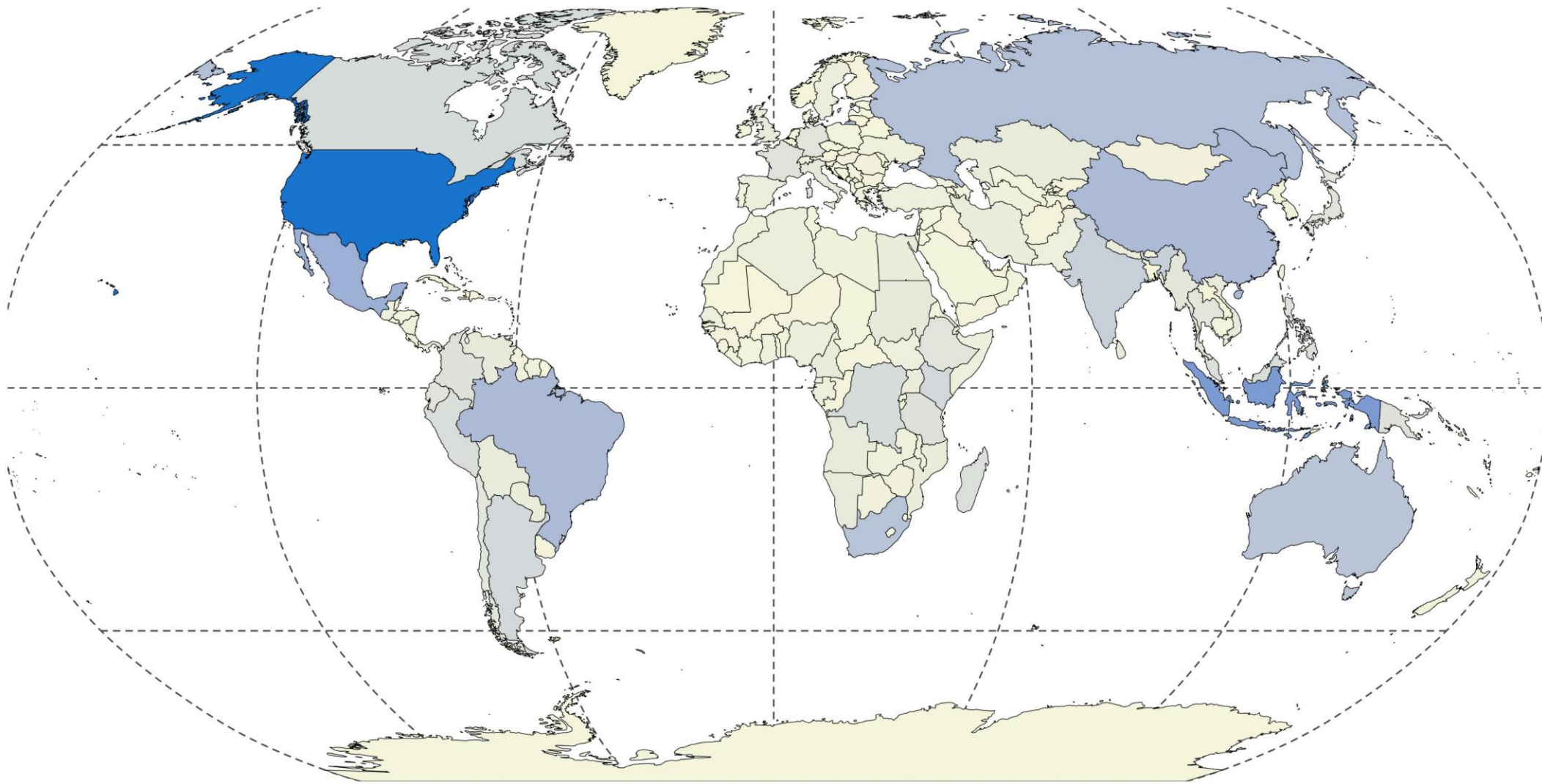


MAMMAL TYPE SPECIMEN MUSEUM DISTRIBUTION



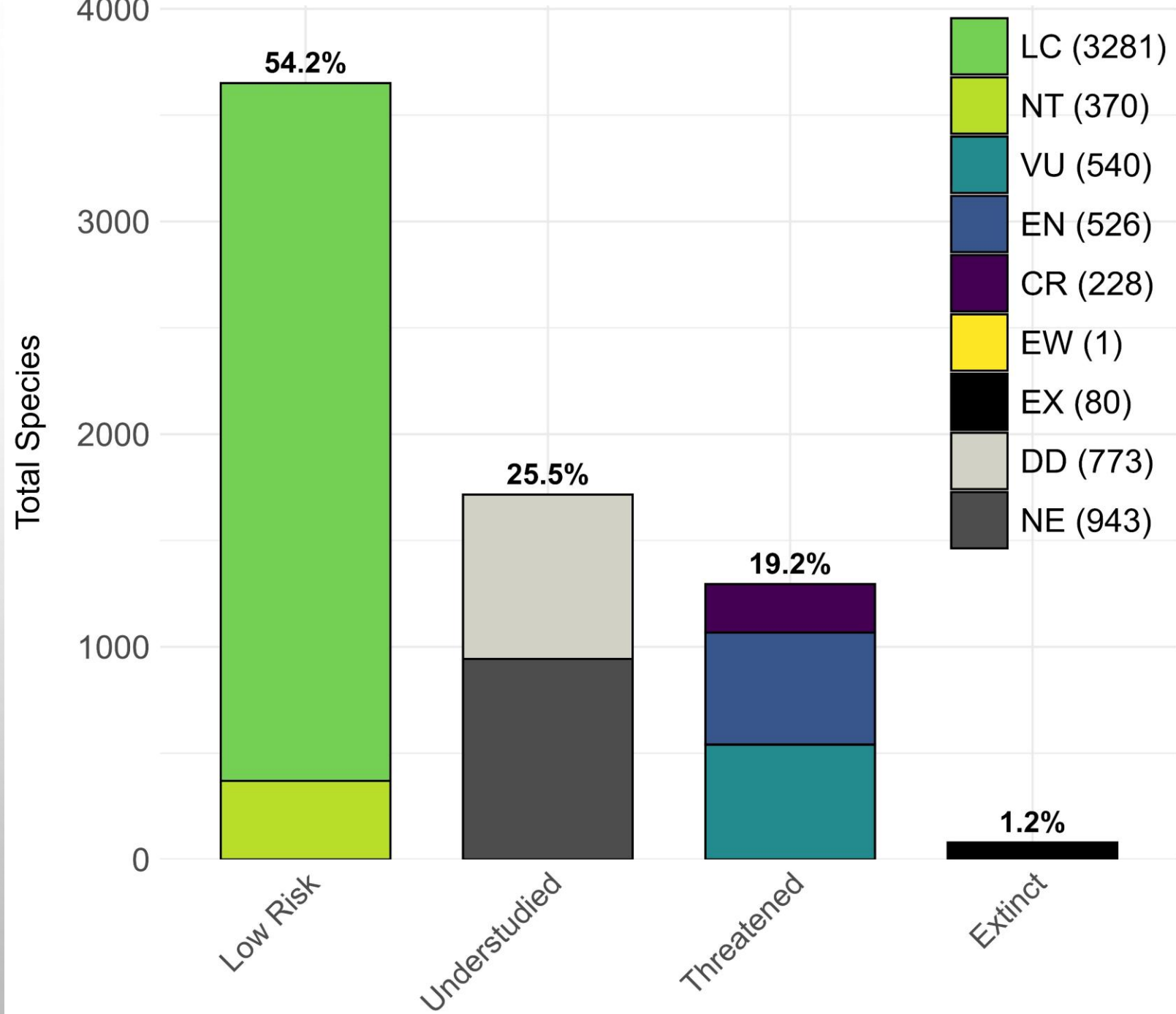
BUT WHERE ARE THE SPECIES FOUND?



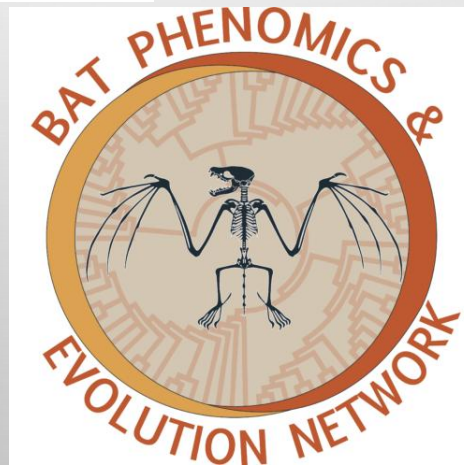
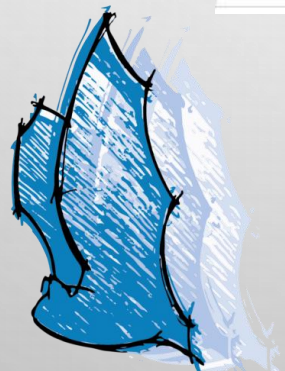


Available Name Type Localities





GLOBAL COLLABORATIONS



HURDLES TO MAINTAINING AND GROWING MUSEUM COLLECTIONS

- SECURING FUNDING
- PUBLIC PERCEPTION
- INTERNATIONAL POLITICS
- GLOBAL INEQUITIES



ACKNOWLEDGMENTS

- COLLABORATORS
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 - AMERICAN SOCIETY OF MAMMALOGISTS BIODIVERSITY COMMITTEE
 - MAMMAL DIVERSITY DATABASE EDITORIAL TEAM
- ADVISORS/LAB
 - JOSEPH COOK, CORINNE MYERS, LISA BARROW
 - COOK MOLECULAR ECOLOGY AND EVOLUTION LAB
- FUNDING SOURCES
 - AMERICAN SOCIETY OF MAMMALOGISTS
 - SOCIETY OF SYSTEMATIC BIOLOGISTS
 - UNIVERSITY OF NEW MEXICO



ASM Mammal Diversity Database

Bats of the World

A Taxonomic and Geographic Database

Compiled and Edited by: Nancy B. Simmons and Andrea L. Cirranello

The *Hesperomys* Project

QUESTIONS?

