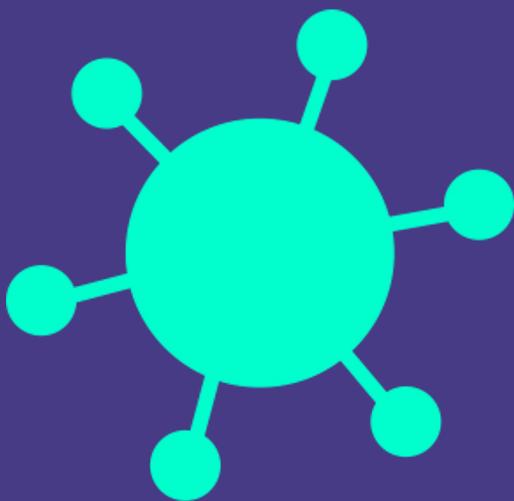


A harmonized taxonomic resource is critical for accurately interpreting host-pathogen interactions

Kendra Phelps
EcoHealth Alliance





Biodiversity Exchange on Host and Pathogen Interactions (BE HaPI)



CETAF-DISSCO COVID-19 TASKFORCE



Aja Sherman

Bat Eco-Interaction Project



Cullen Geiselman

Bat Eco-Interaction Project



Nancy Simmons

American Museum of
Natural History



Jorrit Poelen

UC Santa Barbara



Quentin Groom

Meise Botanical



DeeAnn Reeder

Bucknell University



Nathan Upham

Arizona State University



Kendra Phelps

EcoHealth Alliance



Donat Agosti

Plazi



Anna Willoughby

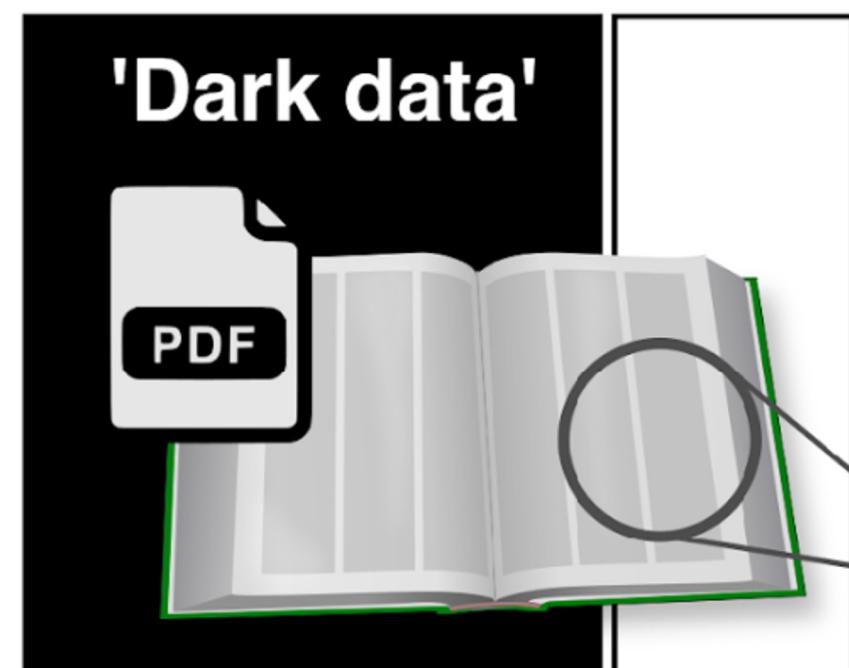
Univ Georgia

Liberating host–virus knowledge from biological dark data

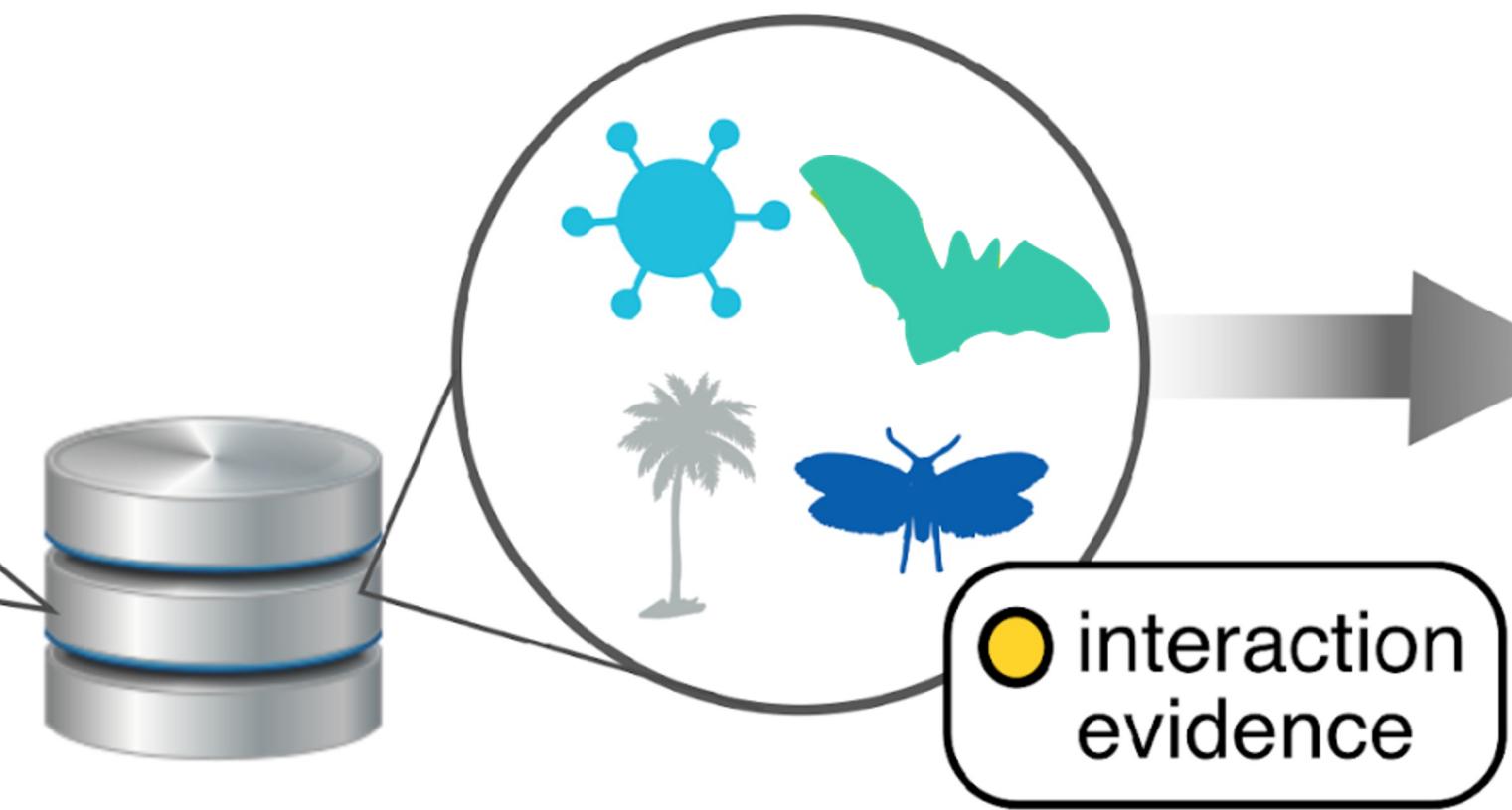


Nathan S Upham, Jorrit H Poelen, Deborah Paul, Quentin J Groom, Nancy B Simmons, Maarten P M Vanhove, Sandro Bertolino, DeeAnn M Reeder, Cristiane Bastos-Silveira, Atriya Sen, Beckett Sterner, Nico M Franz, Marcus Guidoti, Lyubomir Penev, Donat Agosti

Written knowledge

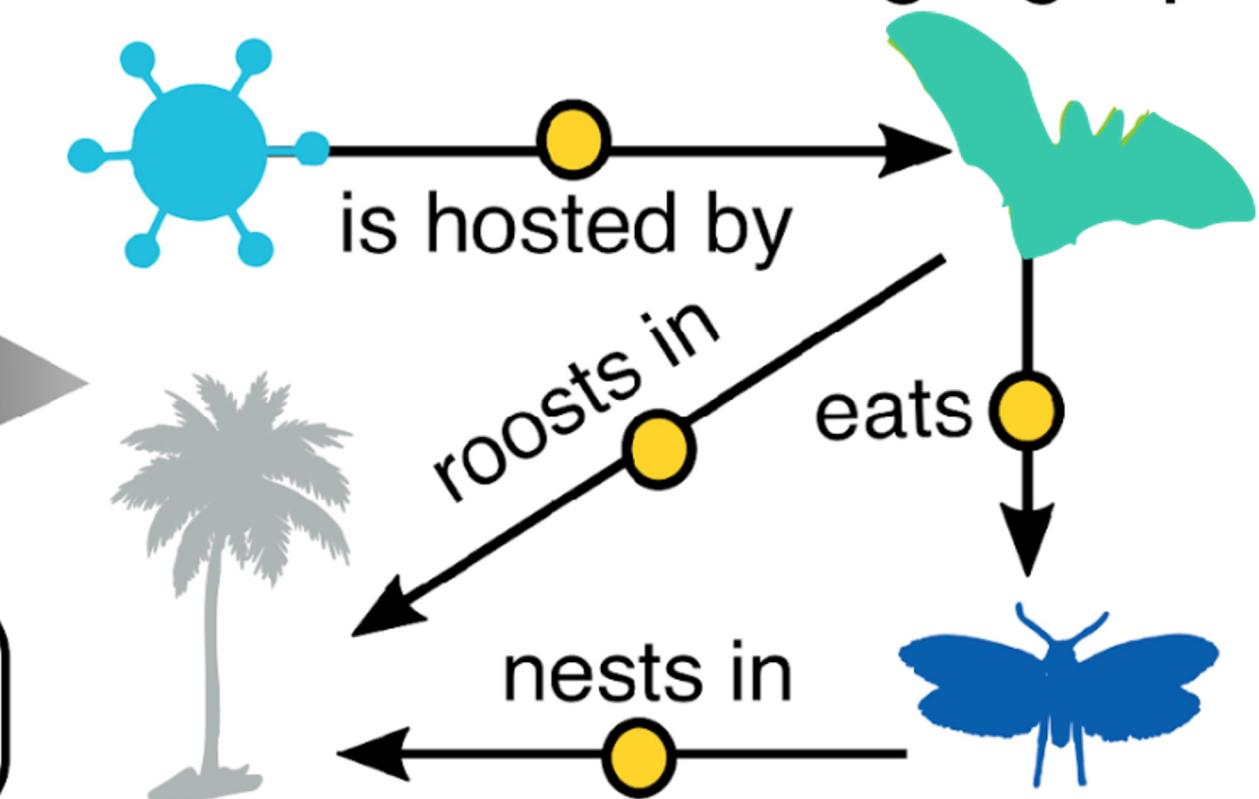


Digital data

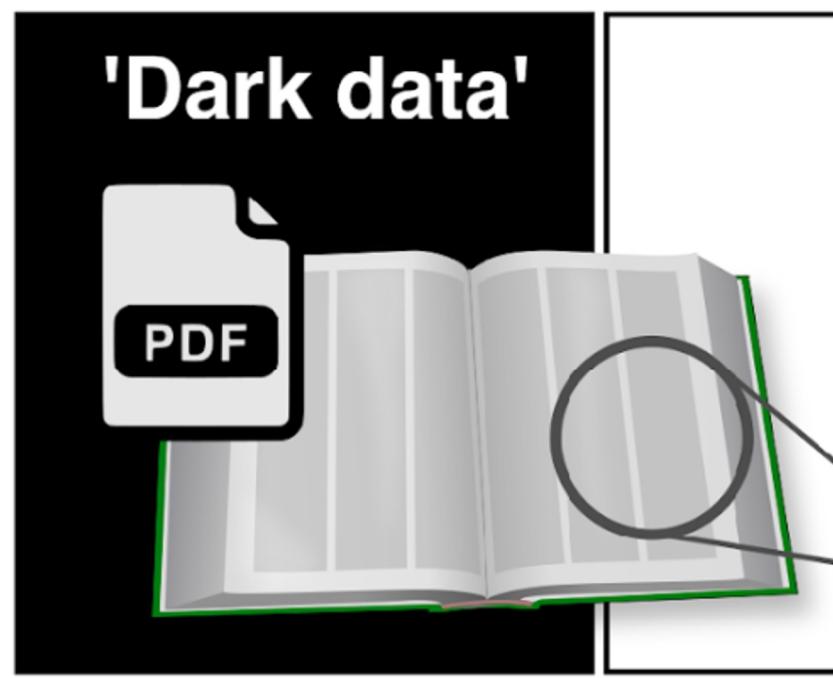


interaction evidence

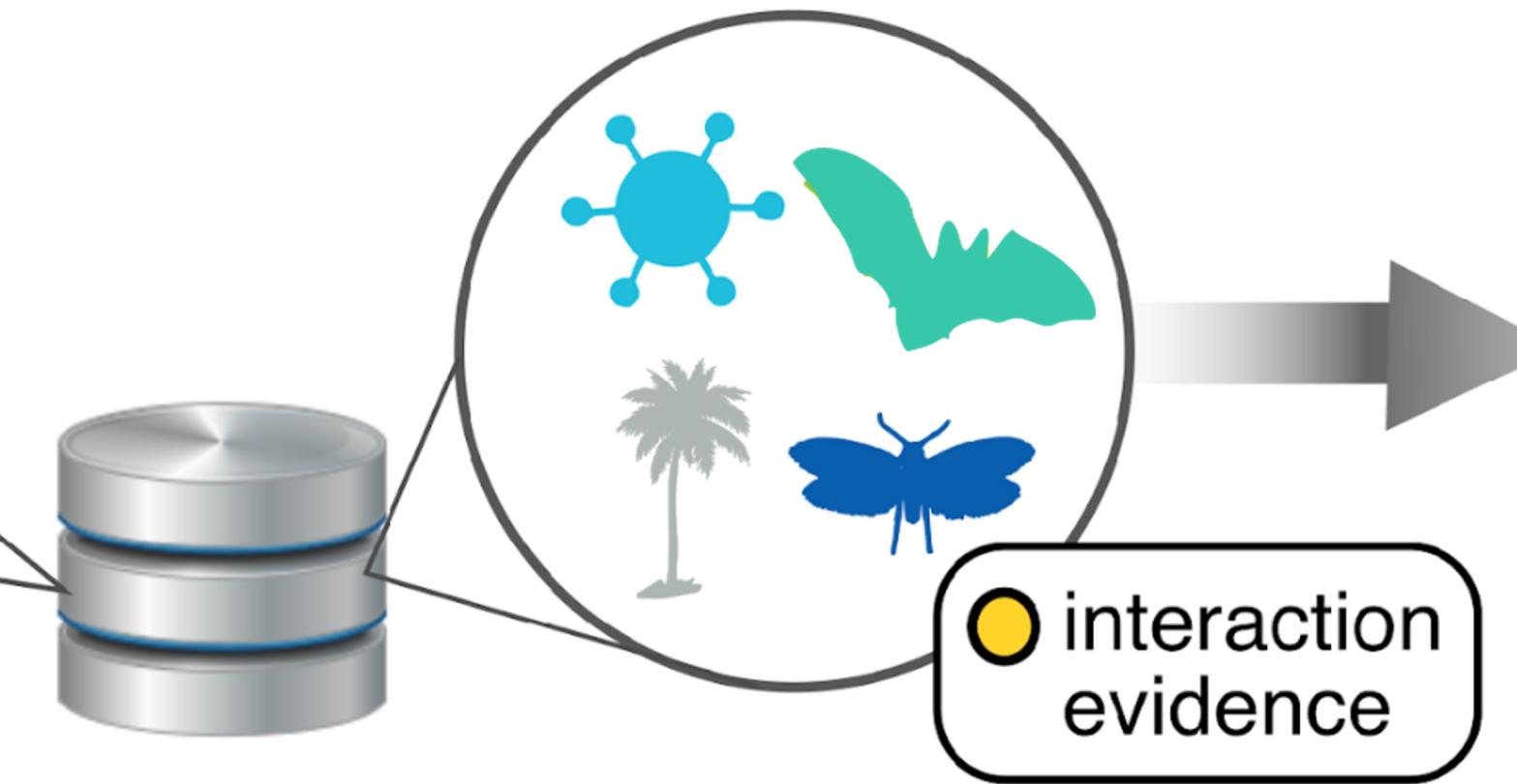
Host-virus knowledge graph



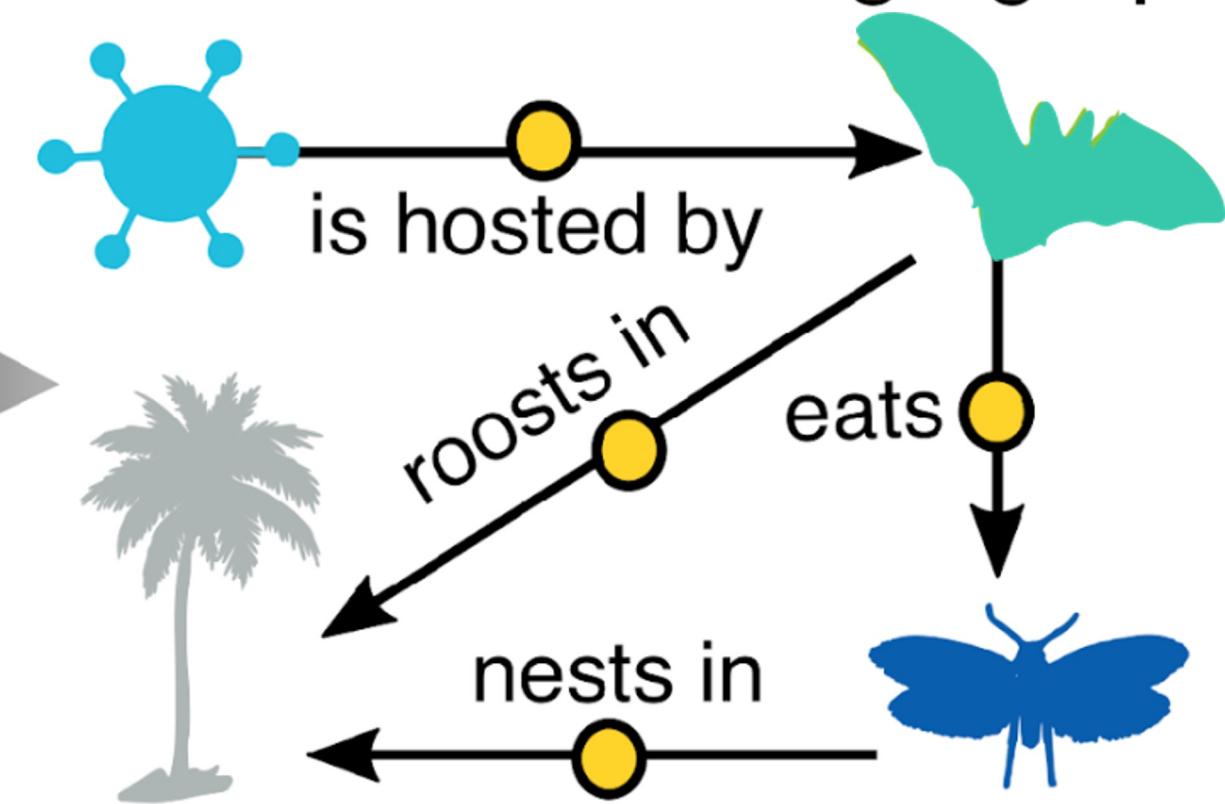
Written knowledge



Digital data



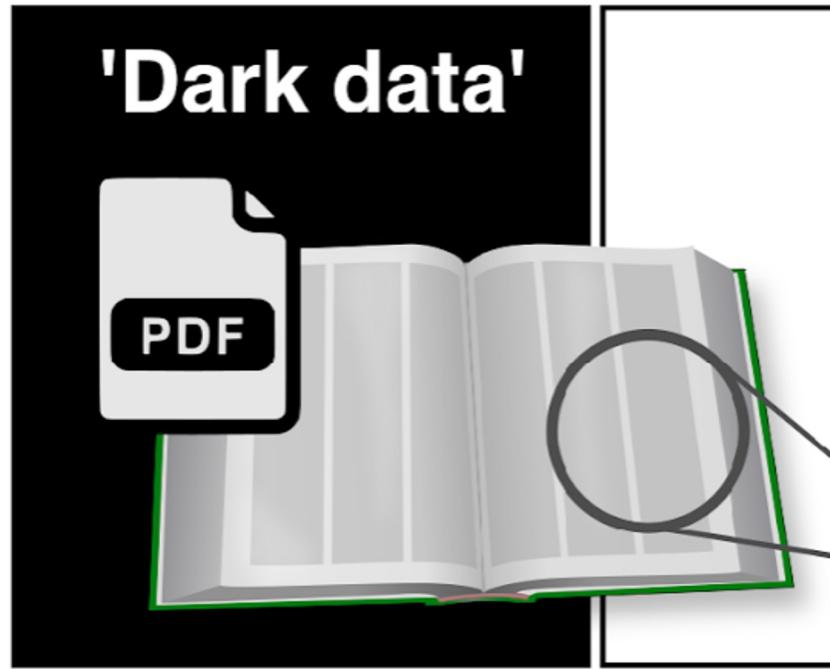
Host-virus knowledge graph



Challenges

- (1) **Dark data:** most eco-interaction data are unavailable in digital format or have restricted access (e.g., paywall)

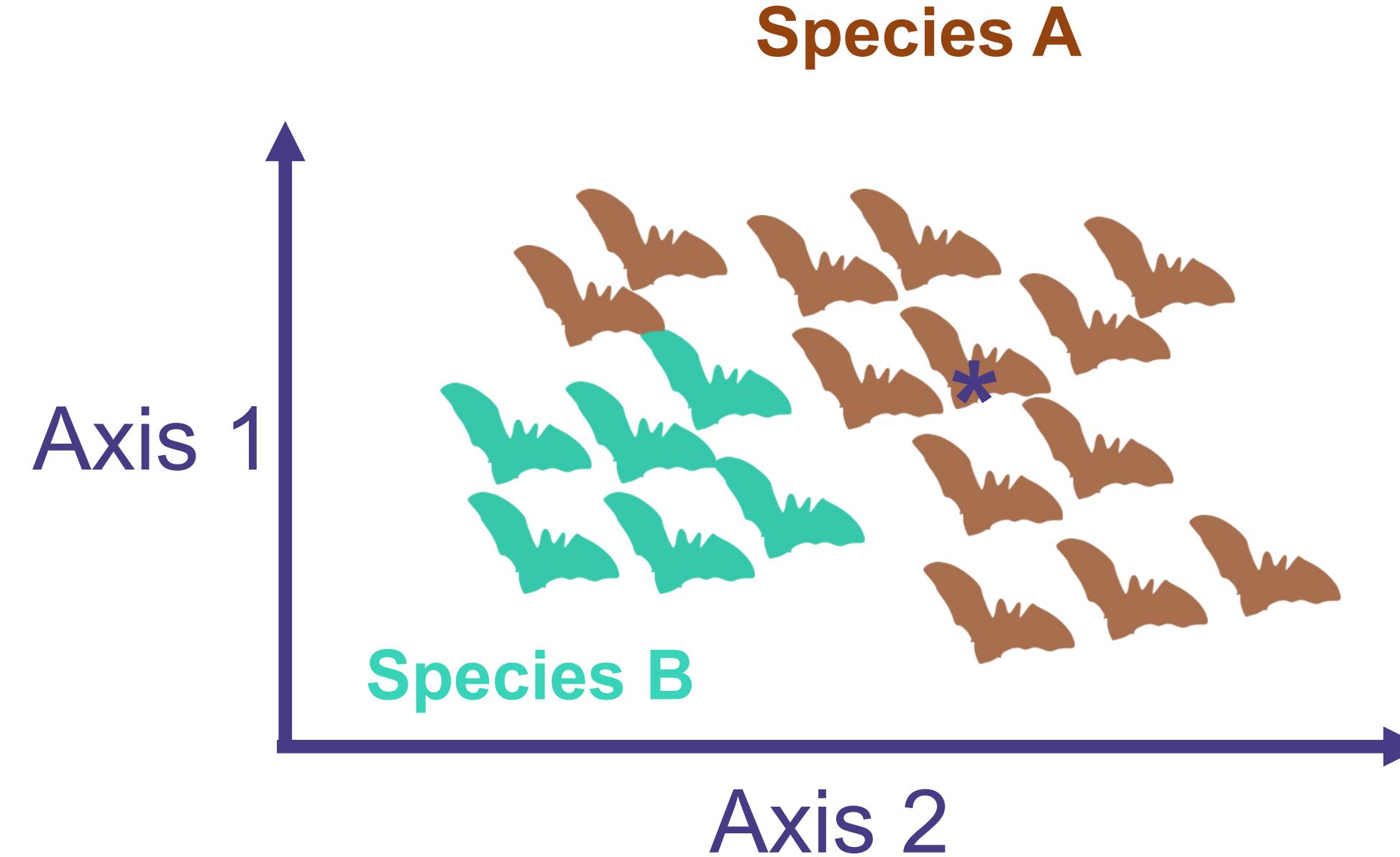
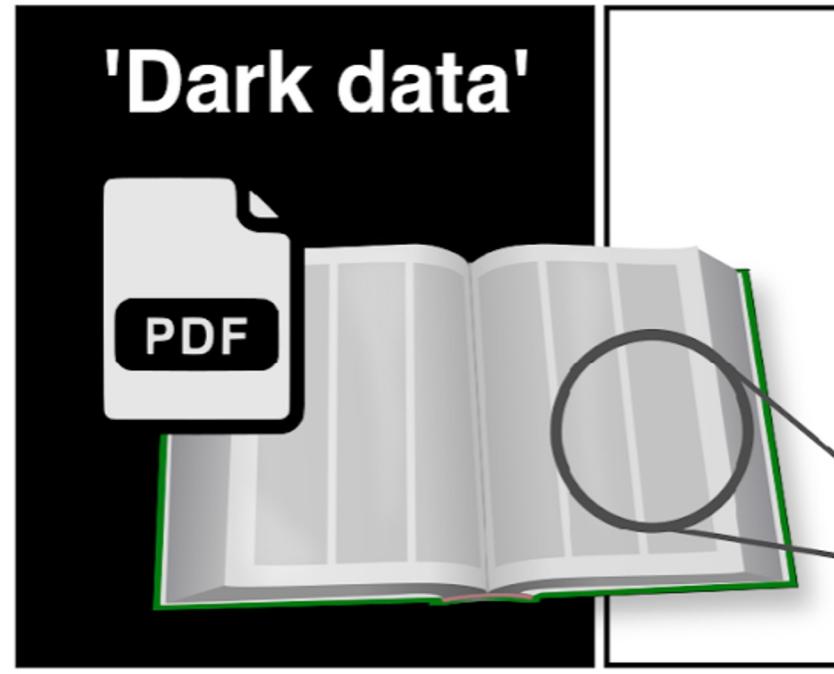
Written knowledge



Challenges

- (1) **Dark data:** most eco-interaction data are unavailable in digital format or have restricted access (e.g., paywall)
- (2) **Taxonomic inconsistencies:** species name-to-meaning changes over time

Written knowledge



Challenges

- (1) **Dark data:** most eco-interaction data are unavailable in digital format or have restricted access (e.g., paywall)
- (2) **Taxonomic inconsistencies:** species name-to-meaning changes over time

OVERCOMING CHALLENGES:



(1) Liberating dark data

→ Bat Literature Repository

→ Bat Co-Roosting Project

Bat Literature Repository



Goal: To create a global public repository of bat literature available on Zenodo

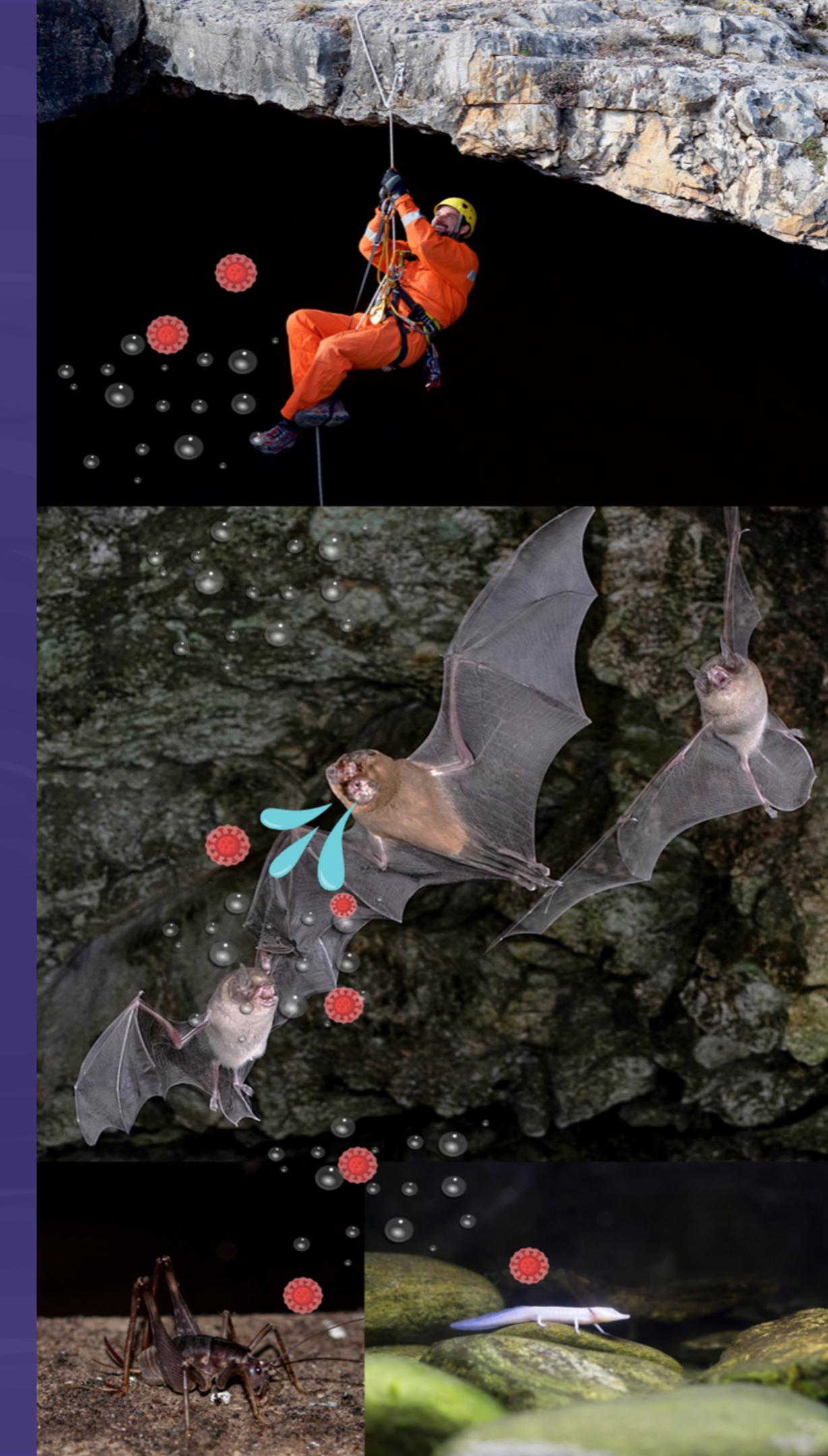
- Liberating resources for FAIR access to existing knowledge for the broader scientific community
- Make each publication citable and digitally represented
- Enhance the metadata



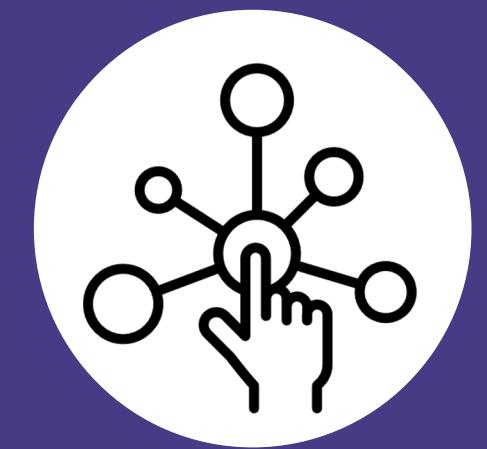
<https://bat-literature.github.io/>



Bat Co-Roosting Project



Bat Co-Roosting Project



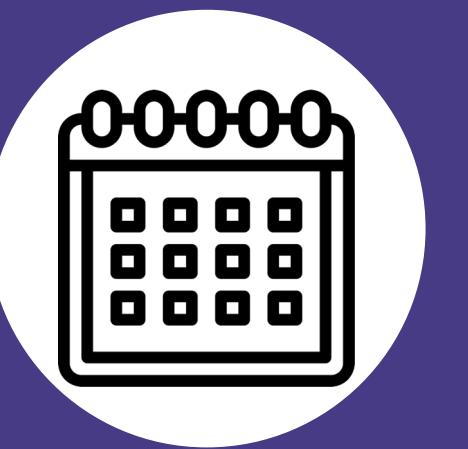
17,238
interactions



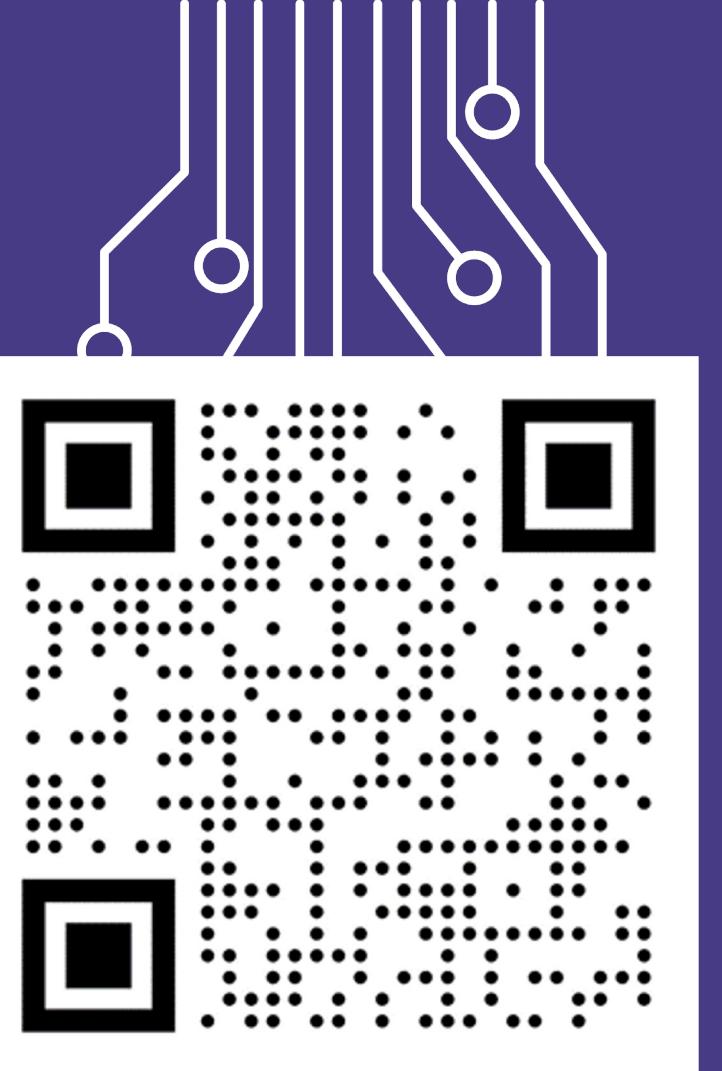
644 bat
species



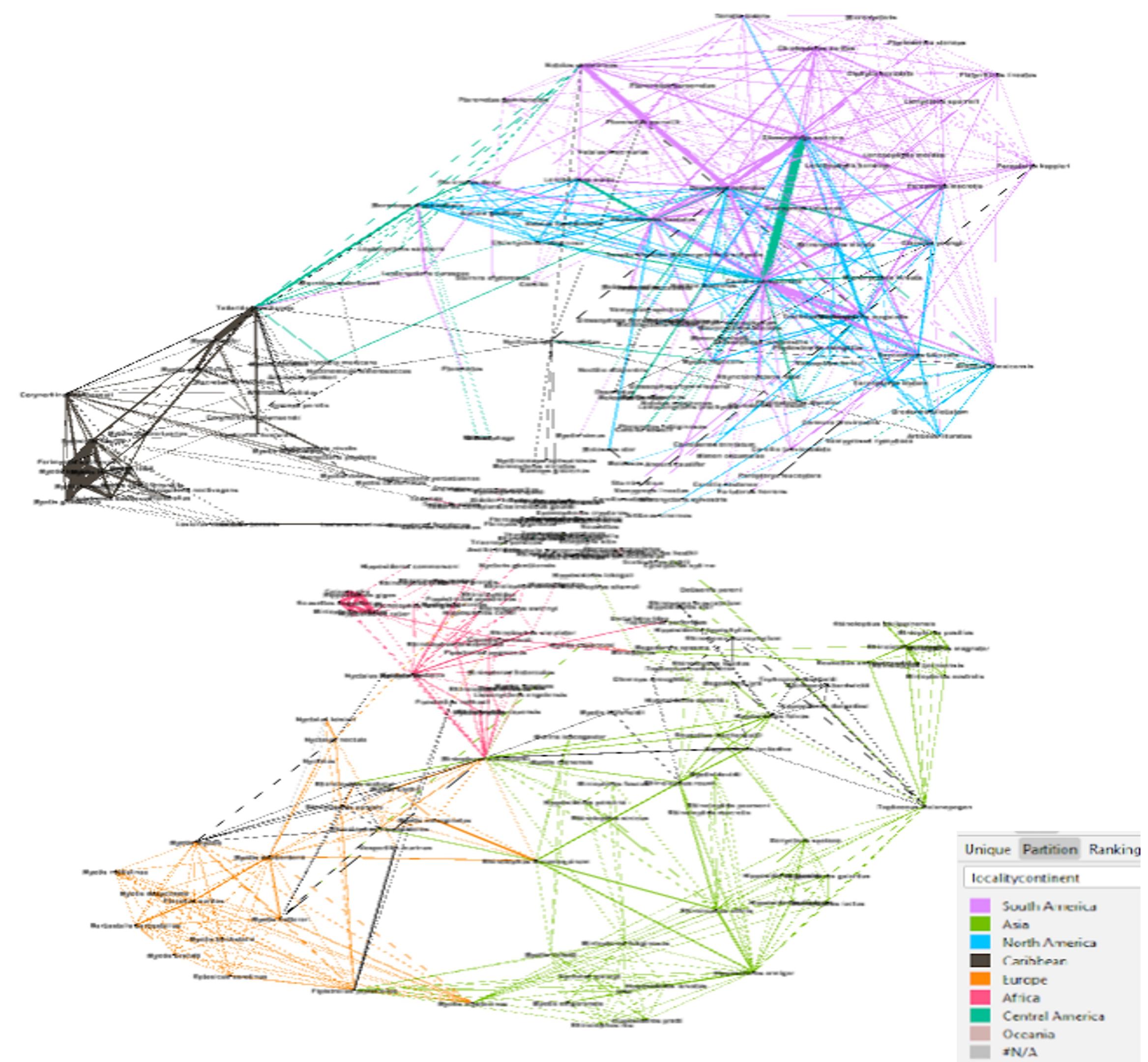
333
publications



1860-2020
span



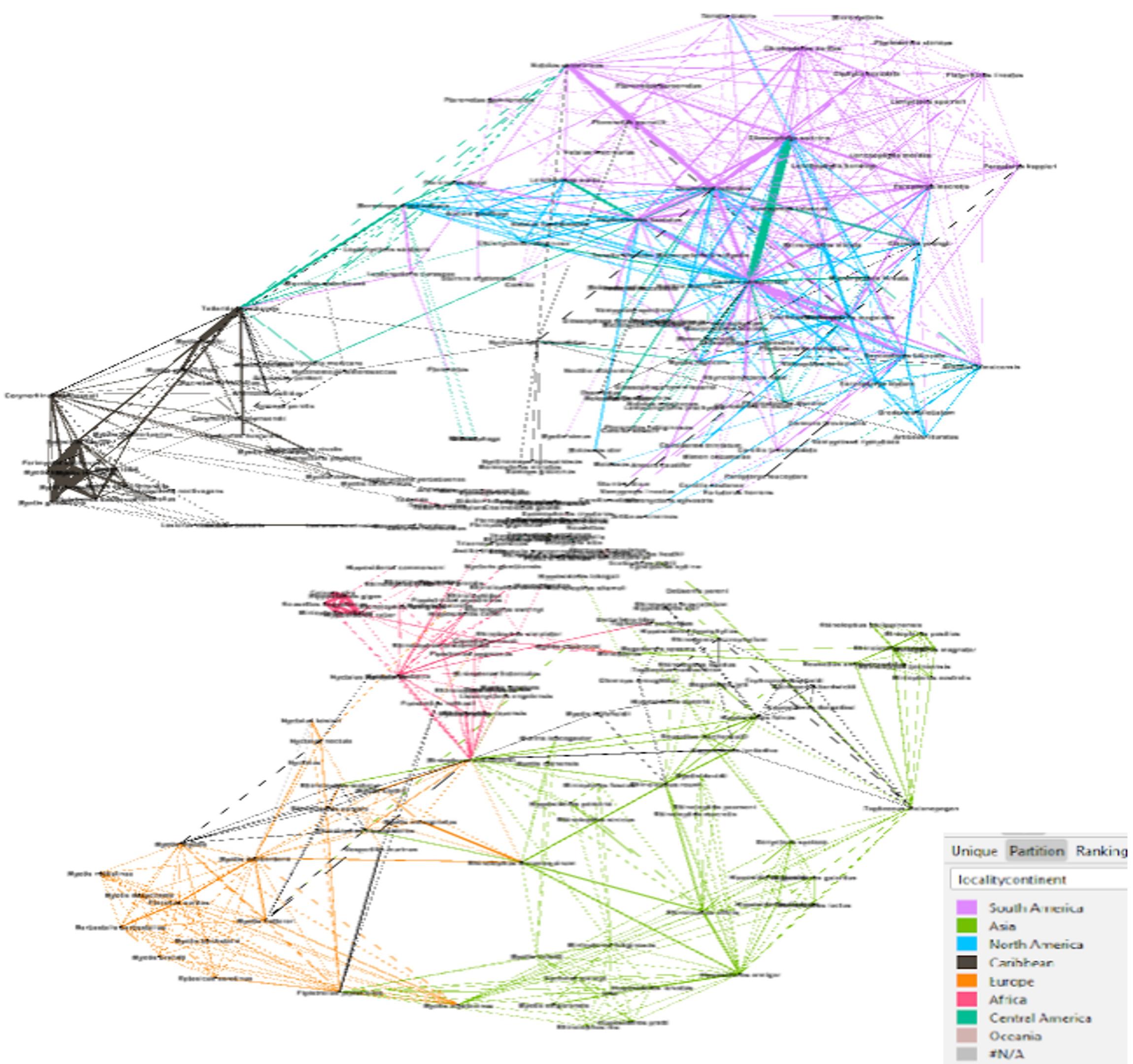
Co-roosting network





Co-roosting network

..but how to correct
taxonomic changes for
data spanning 160 years?



OVERCOMING CHALLENGES:



(1) Liberating dark data

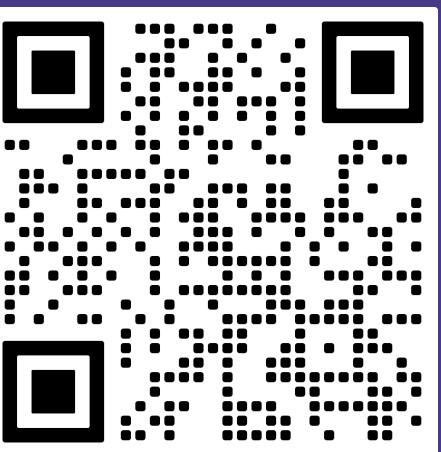
→ Bat Literature Repository

→ Bat Co-Roosting Project

(2) Harmonizing taxonomic authorities

→ Bat Taxonomic Alignment (BTA) Tool

Bat Taxonomic Alignment (BTA) Tool



<https://zenodo.org/doi/10.5281/zenodo.7915721>

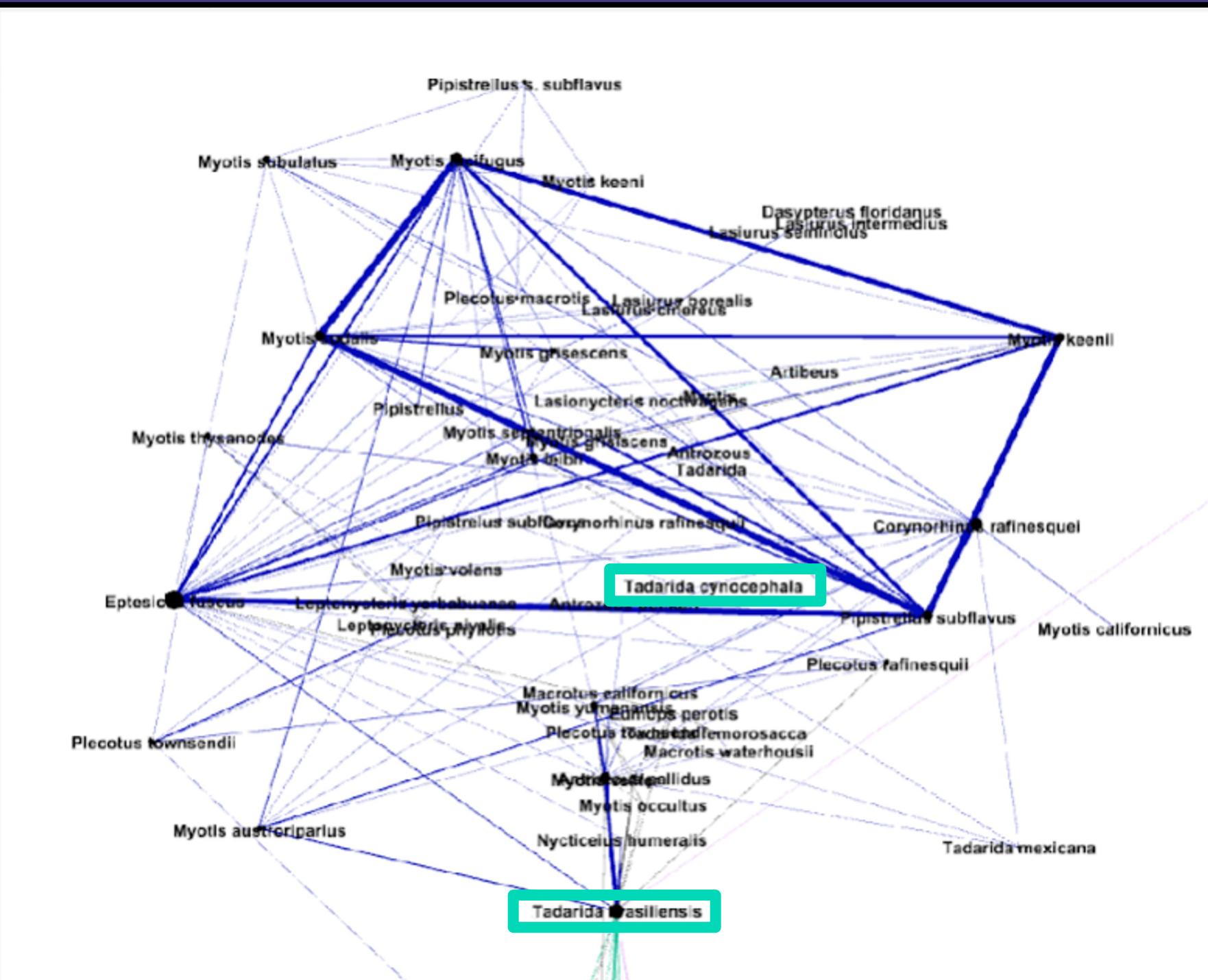
<https://jhpoelen.nl/bat-taxonomic-alignment/>

Inconsistencies across taxonomic authorities

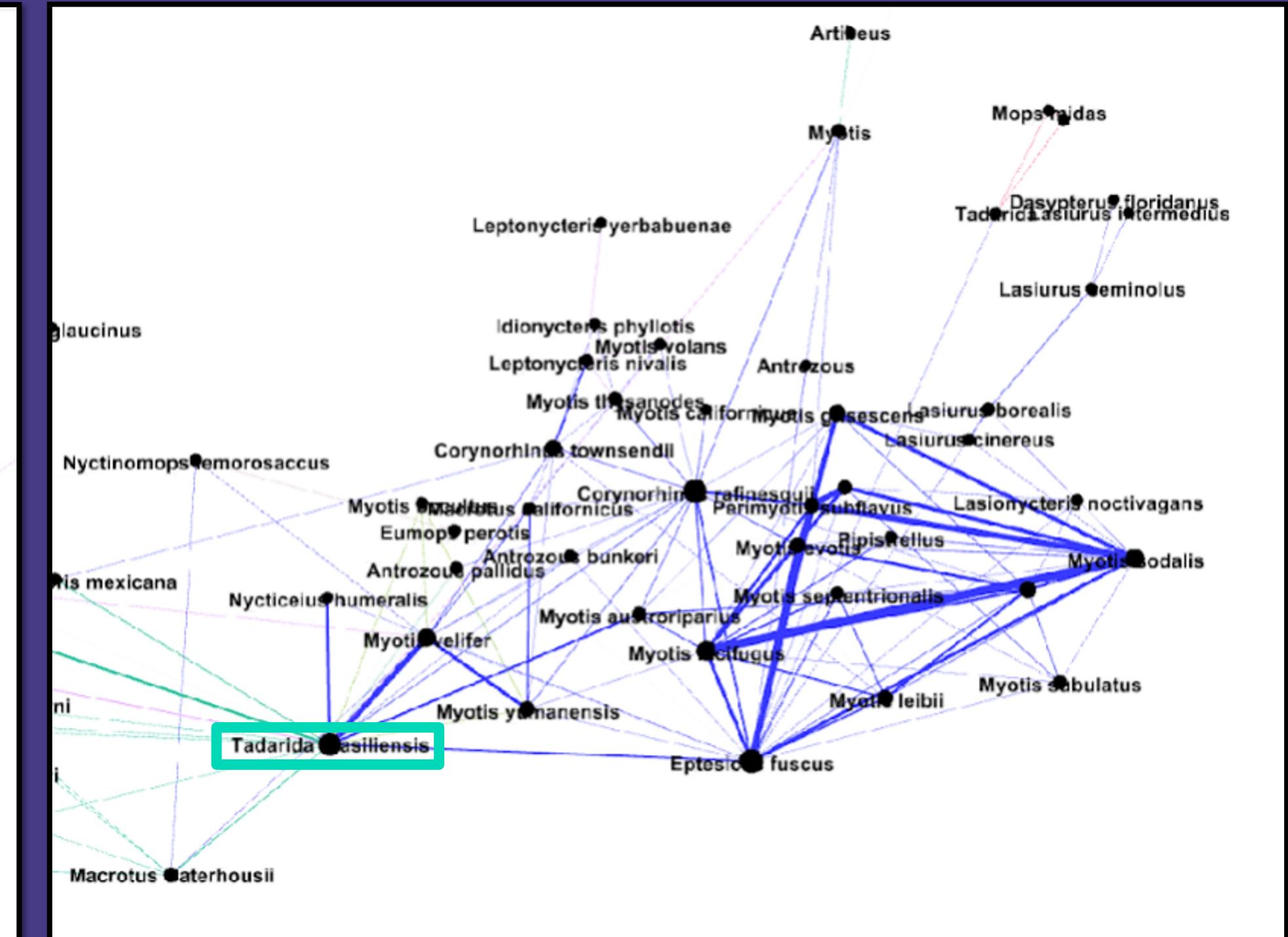
	Handbook of Mammals of the World (2019)	BatNames.org (2022)	Mammal Diversity Database (2022)	IUCN RedList (2022)	BatNames.org (2023)	Mammal Diversity Database (2023)
Mammal Species of the World (2005)	541	571	585	329	563	577
Handbook of Mammals of the World (2019)		209	192	300	241	223
BatNames.org (2022)			105	314	119	93
Mammal Diversity Database (2022)				332	138	87
IUCN RedList (2022)					315	323
BatNames.org (2023)						0

Of 1,532 name concepts,
~15% do not match!

Example of Resolved Taxonomy



Before



After

Tadarida cynocephala now considered a subspecies of *Tadarida brasiliensis*



Applications

- Taxonomic revision
- Relational databases
- Data mining
- Bioinformatics
- Data aggregates
- Ecologists
- Museum collection staff



Acknowledgments — Thank you!

