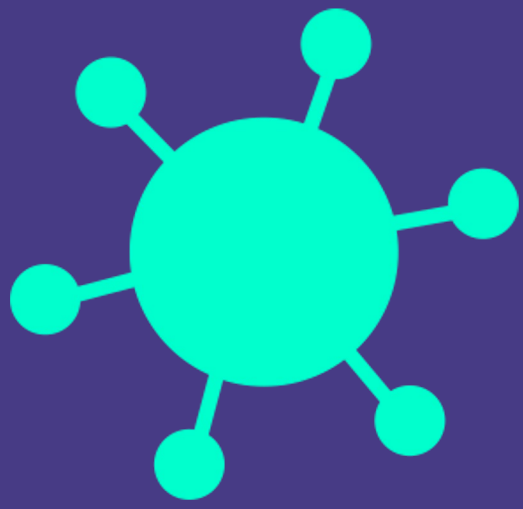


# A harmonized taxonomic resource is critical for accurately interpreting host-pathogen interactions

Kendra Phelps  
EcoHealth Alliance





# Biodiversity Exchange on Host and Pathogen Interactions (BE HaPI)



**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

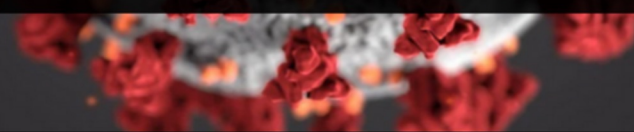


**Anna Willoughby**

Univ Georgia



**CETAF-DISCO COVID-19 TASKFORCE**

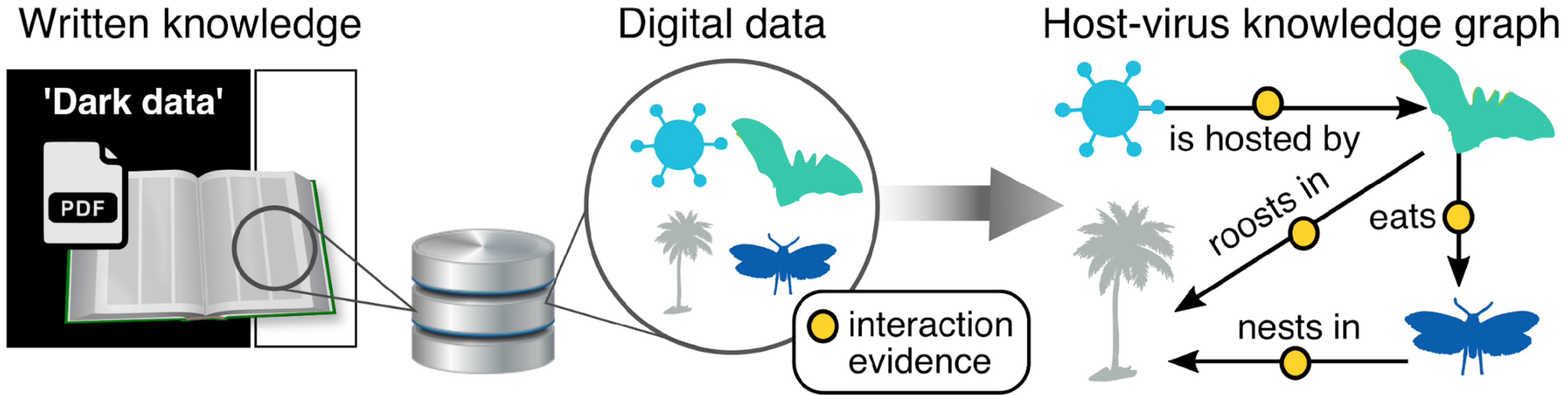


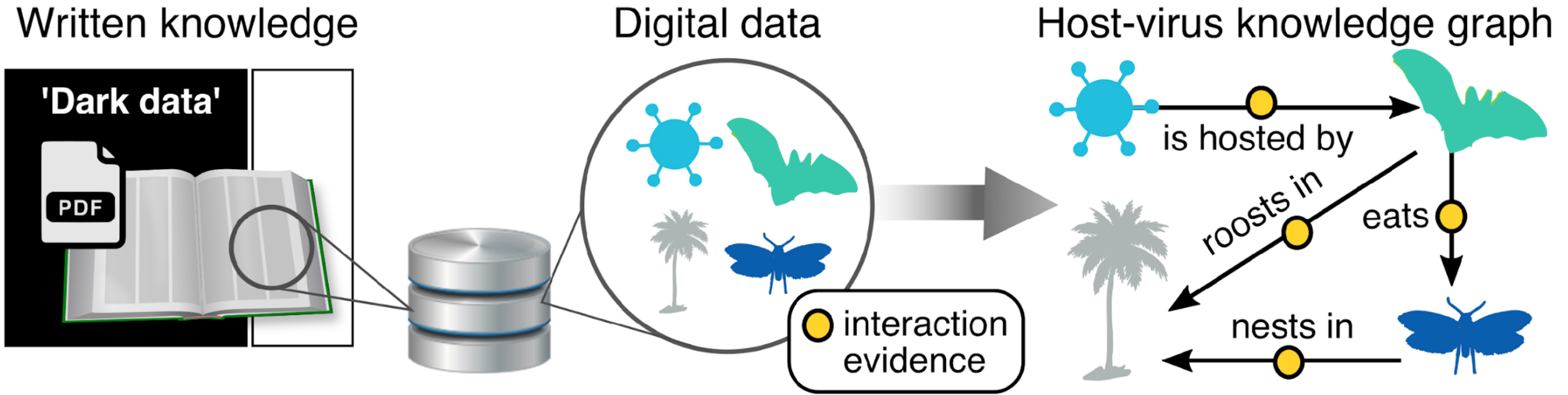


# Liberating host-virus knowledge from biological dark data



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



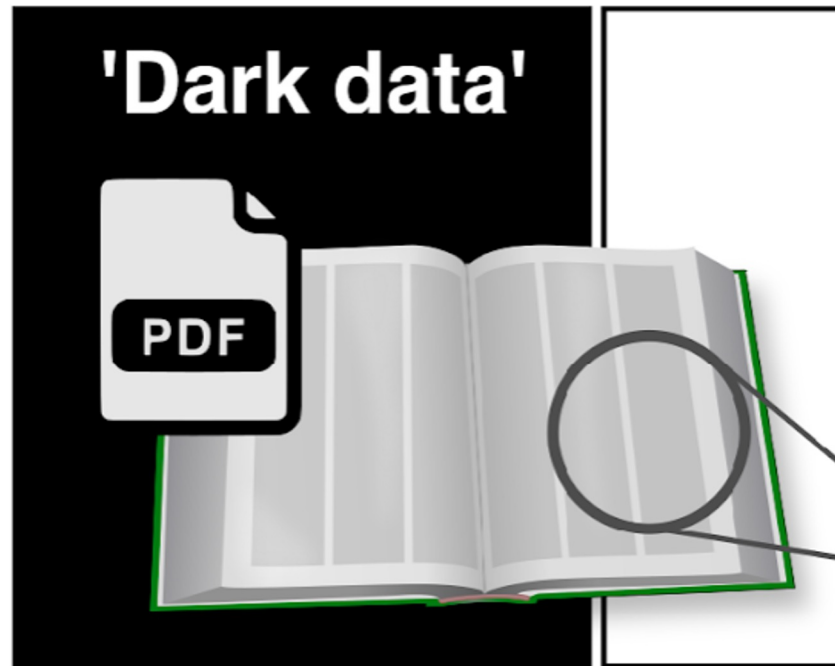


## Challenges

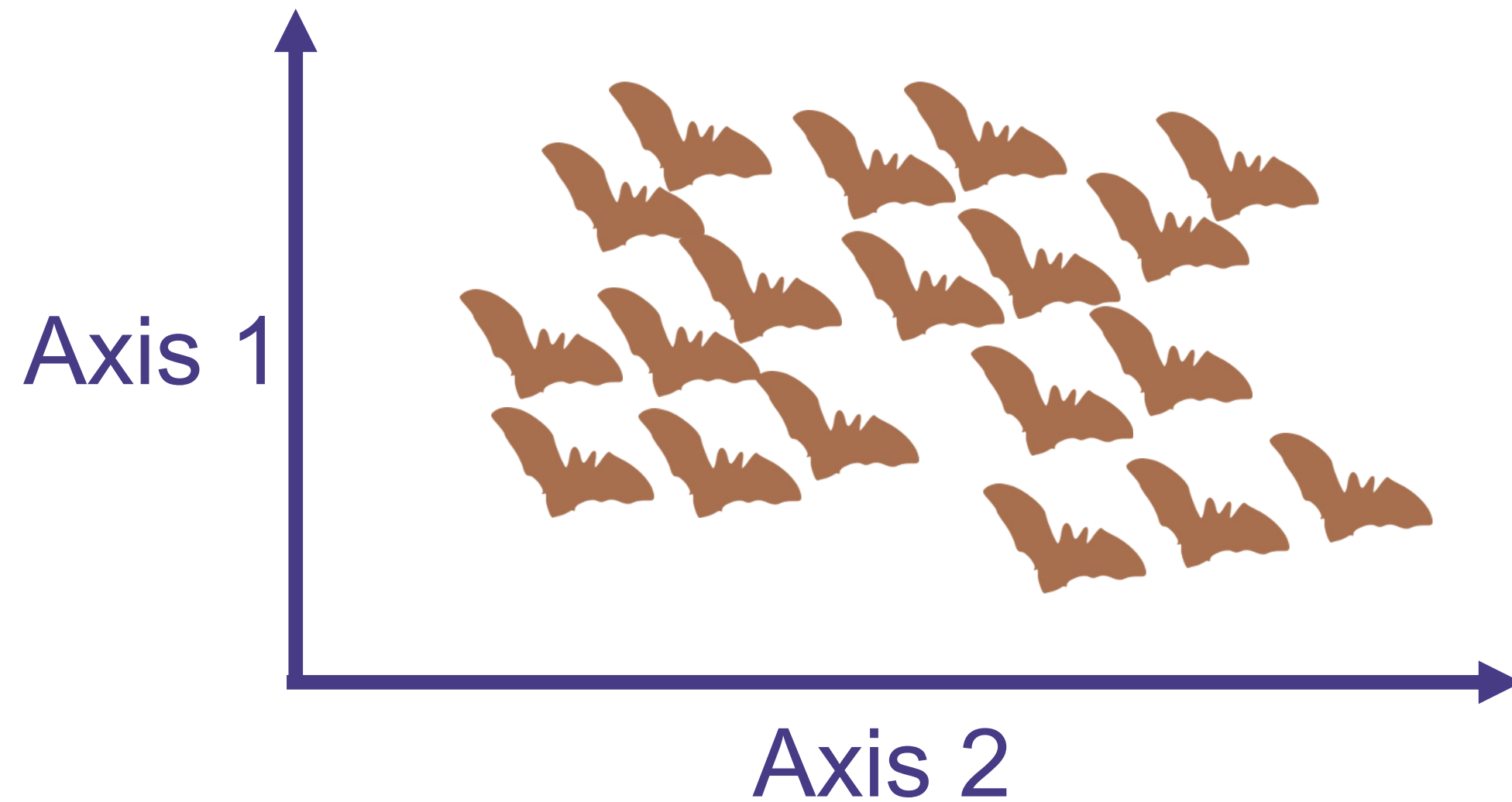
- (1) **Dark data:** most eco-interaction data are unavailable in digital format or have restricted access (e.g., paywall)



Written knowledge



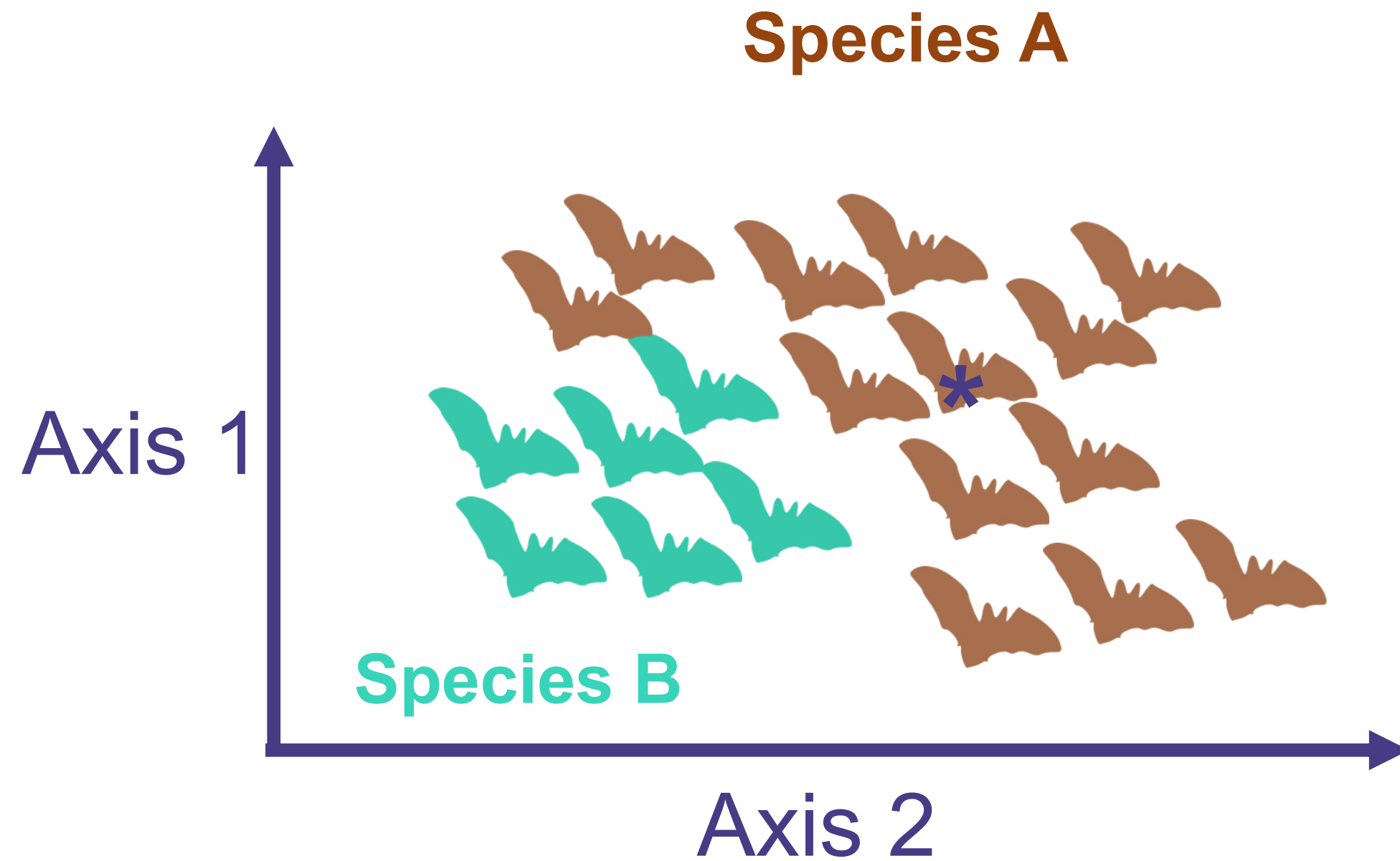
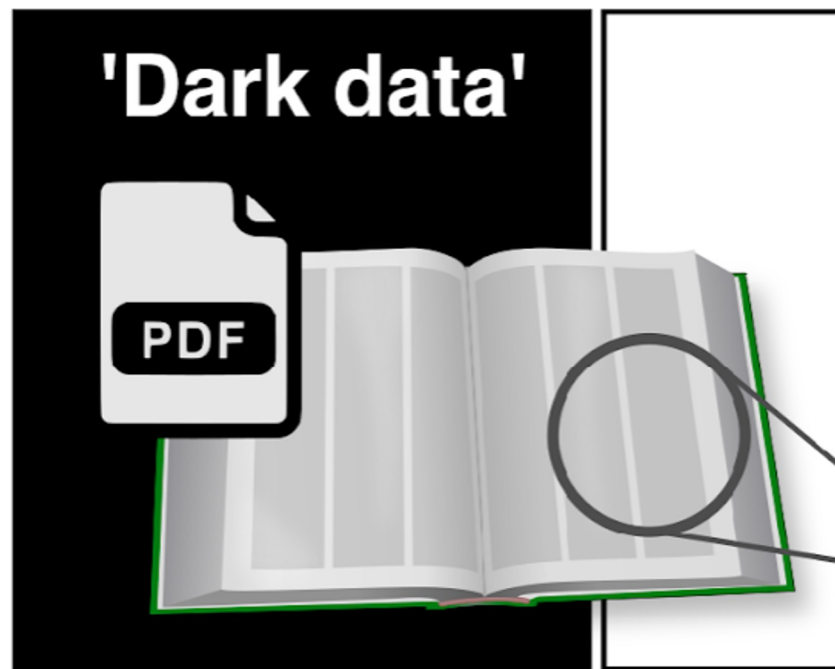
Species A



## 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

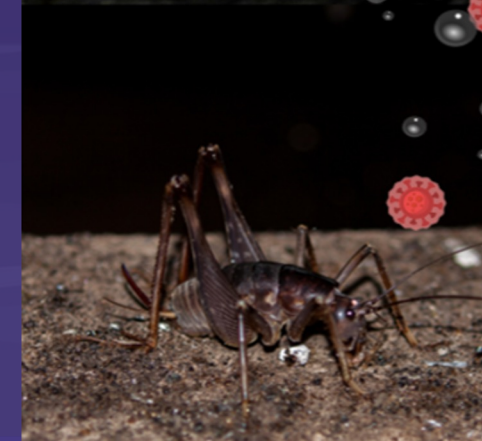


<https://bat-literature.github.io/>





# Bat Co-Roosting Project





# Bat Co-Roosting Project



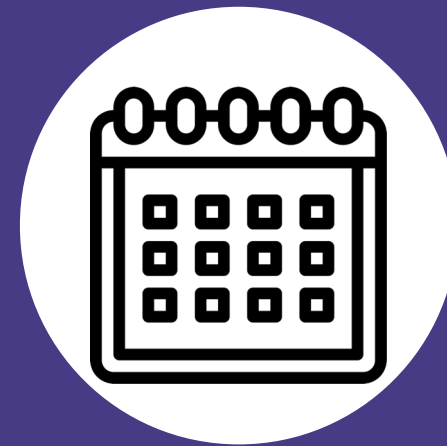
17,238  
interactions



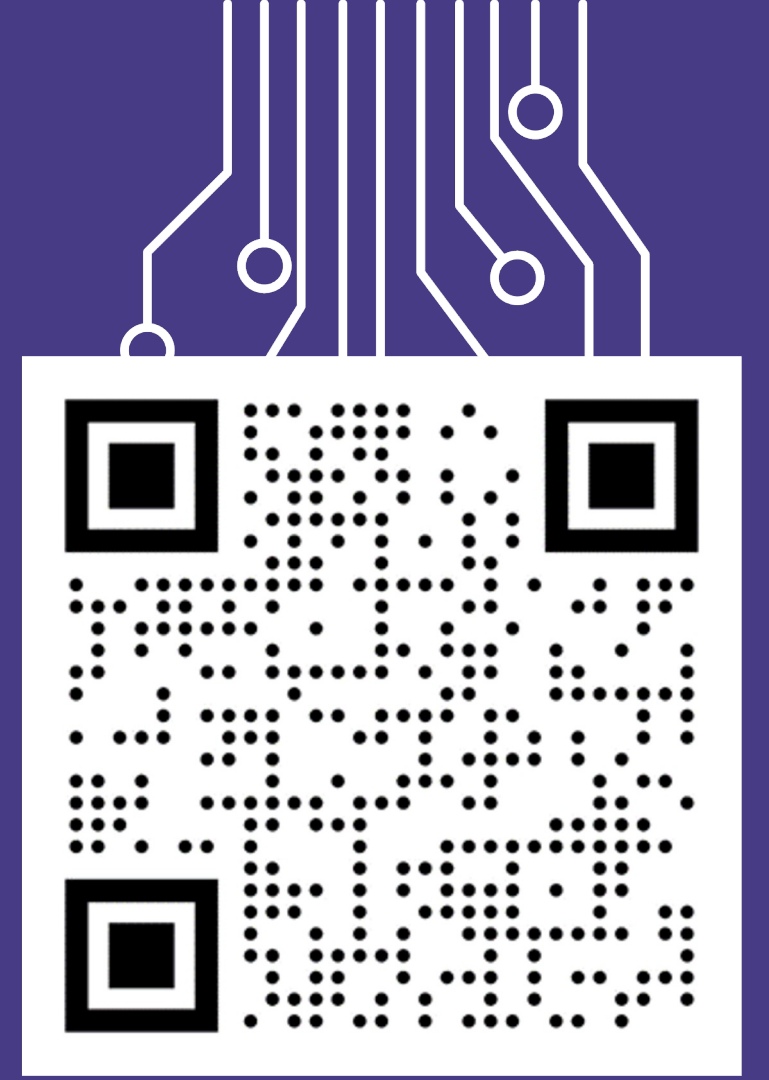
644 bat  
species



333  
publications



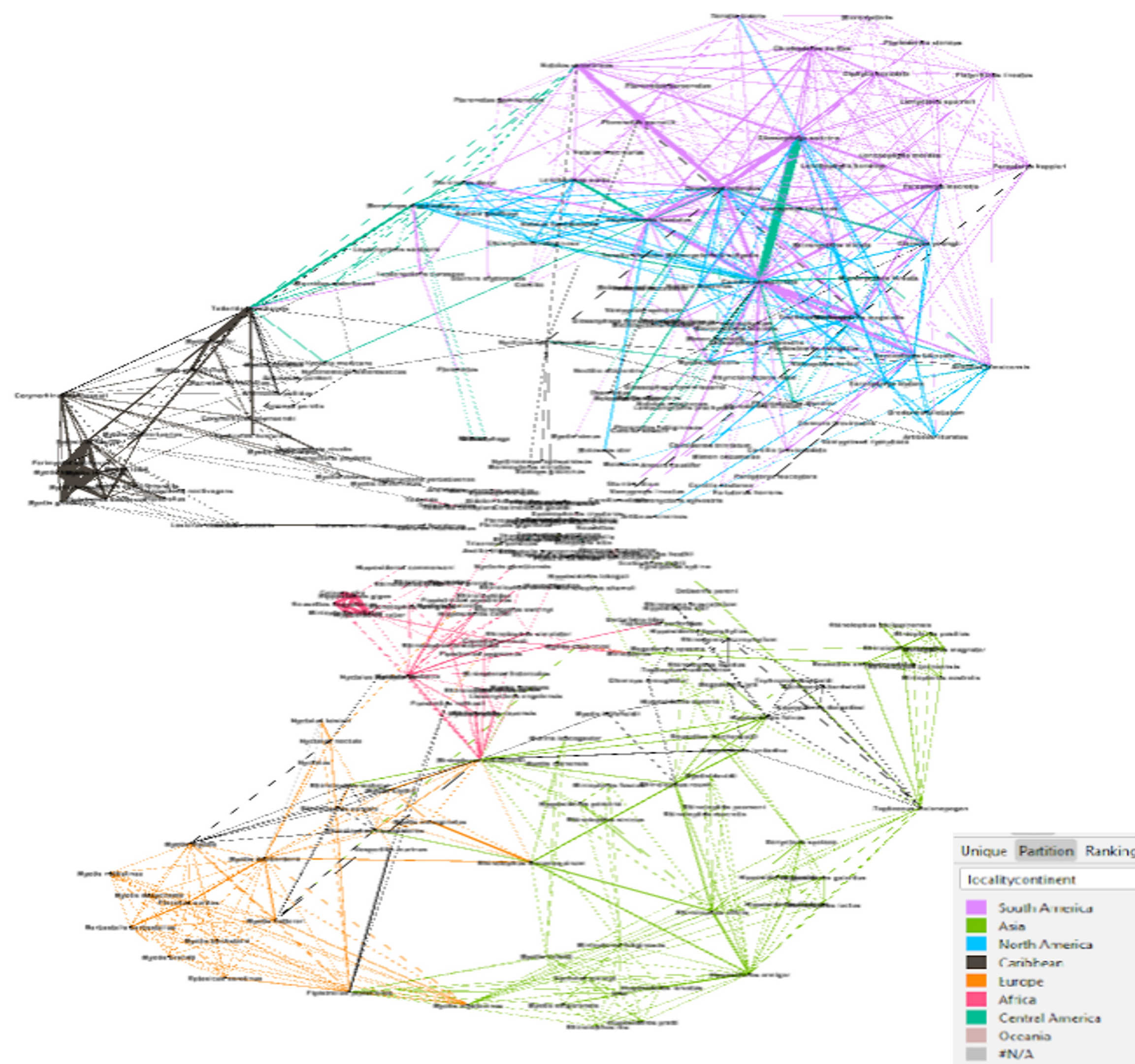
1860-2020  
span



Rollin Verlinde



# Co-roosting network

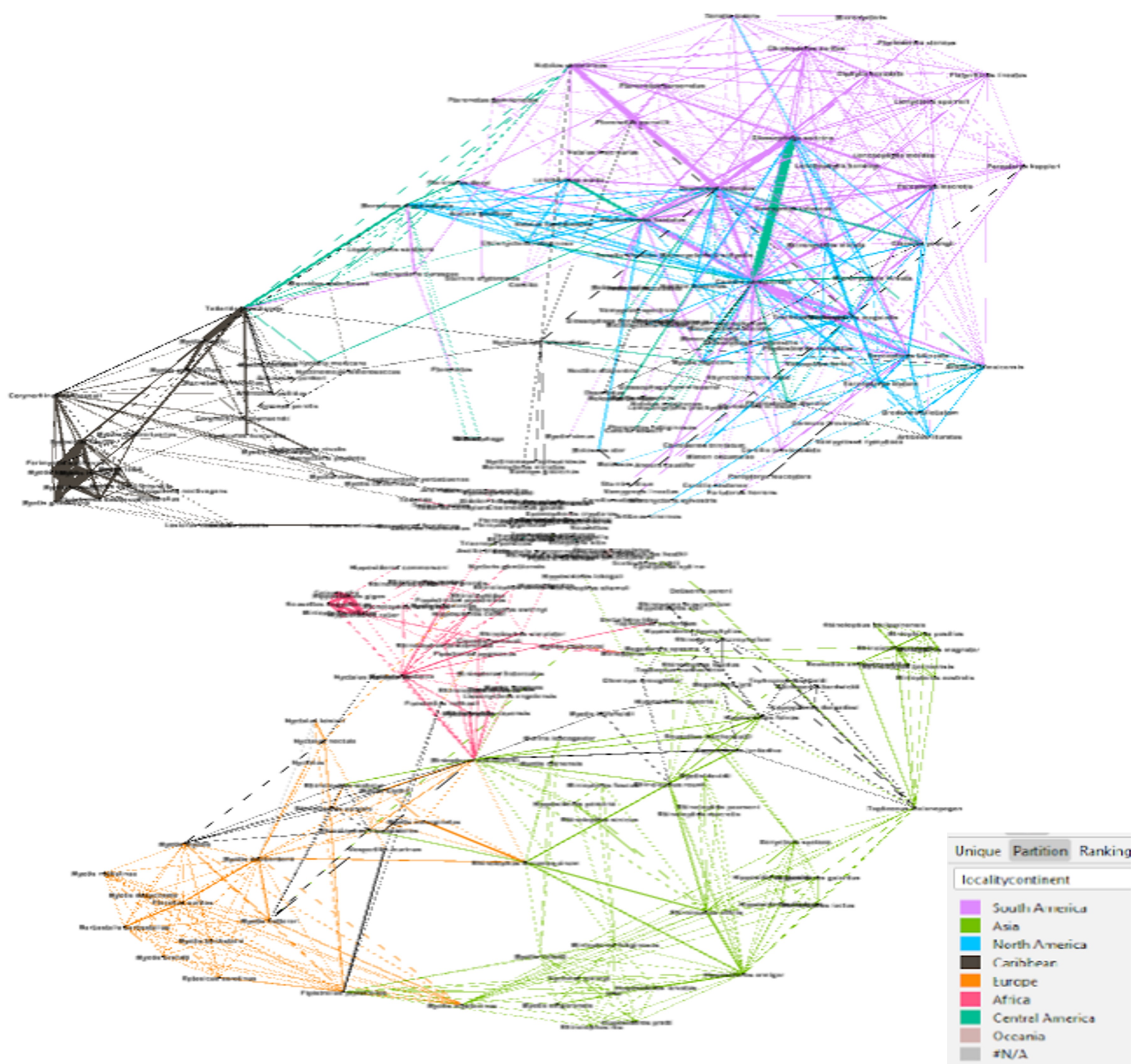






# Co-roosting network

..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







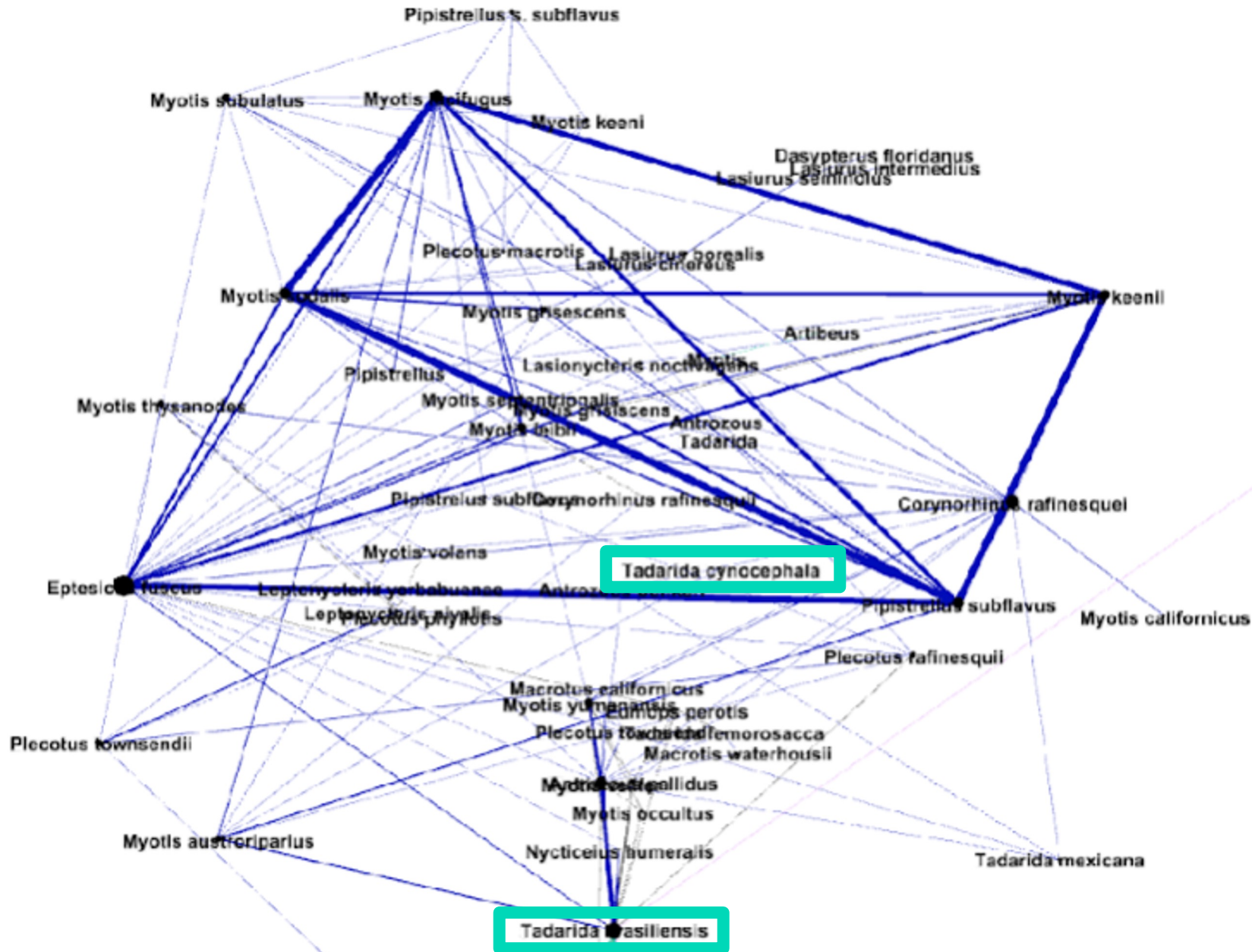
# Inconsistencies across taxonomic authorities

	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

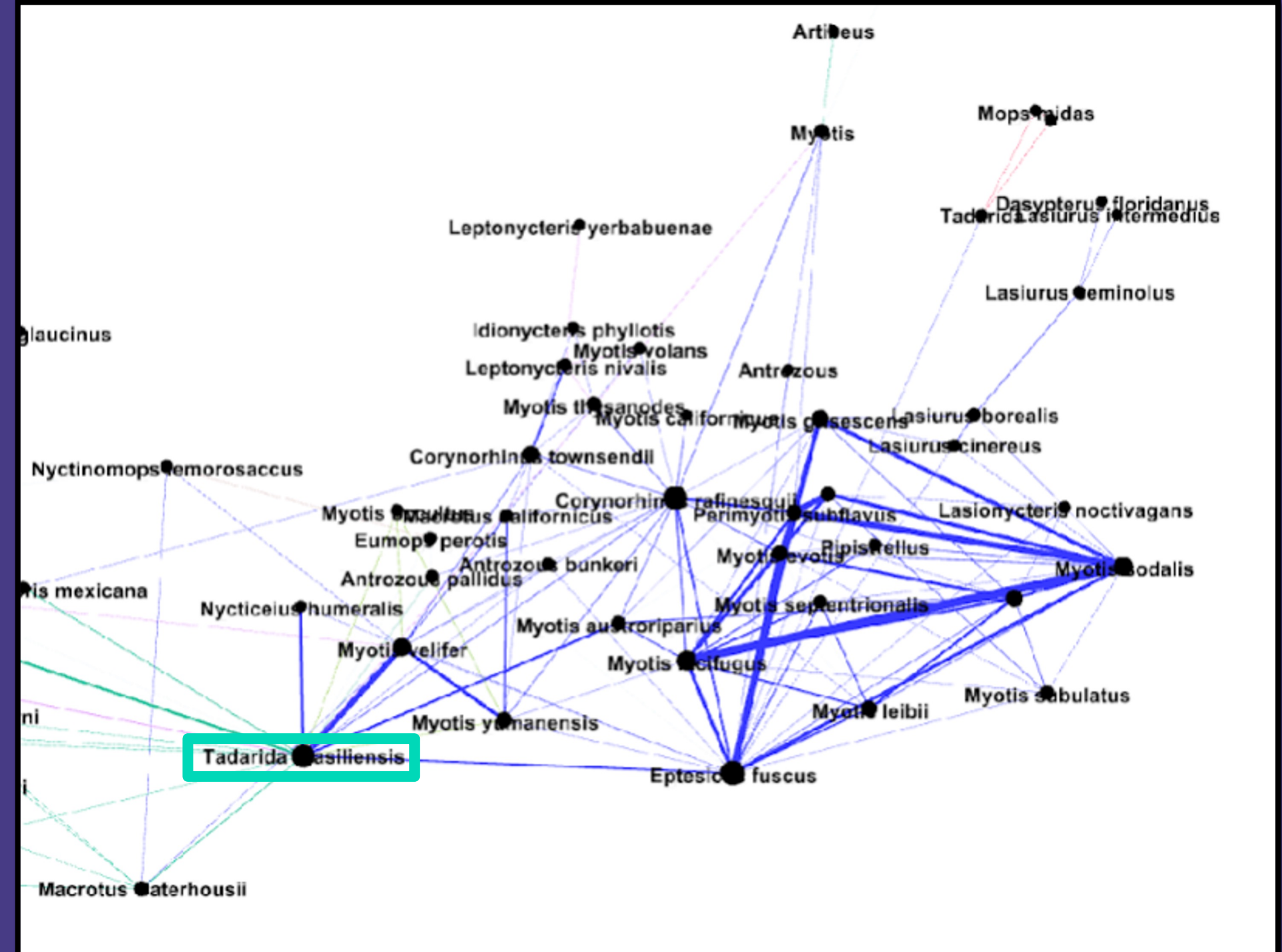
**Of 1,532 name concepts, ~15% do not match!**



# 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!

