

# Biotic Interactions In Natural History Collections



Continuing to Extend Digital Records across Communities, Platforms, Collections, and Institutions

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Arctos - Andrew Doll: Denver Museum of Nature & Science; Dr. Elizabeth Wommack: University of Wyoming Museum of Vertebrates; Mariel L. Campbell: Museum of Southwestern Biology; Teresa Mayfield-Meyer; Arctos

## Conferences Start Collaboration



First contact at the 2014 Open Tree of Life Hack-A-Thon

2016 2nd Annual Digital Data in Biodiversity Research

Conference the Arctos/GloBI Collaboration started conversations.



SPNHC in 2019 started collaboration!

Documented relationships in Arctos that are indexed by GloBI doubled in 2020/2021 to include about **150K specimen-based interaction claims** and continues to grow....

## Improving Primary Data Quality



**Found:** (parasite of) UAM:Mamm  
<http://arctos.database.museum/guid/UAM:Mamm:79101>  
 but expected something like: (parasite of) UAM:Mamm  
<http://arctos.database.museum/guid/UAM:Mamm:79101>  
 ( whitespace deleted)

Those were just entered incorrectly.

<https://arctos.database.museum/guid/MSB:Bird:60292> says that a bird is a parasite of  
<https://arctos.database.museum/guid/MSB:Para:29054>. Even as a non-biologist, I find it suspicious that a bird is reported to be a parasite of a Cestoda (tapeworm).

I (and my students) frequently get confused by the data entry screen as it pertains to setting relationships. I am often worried about doing exactly what happened here.

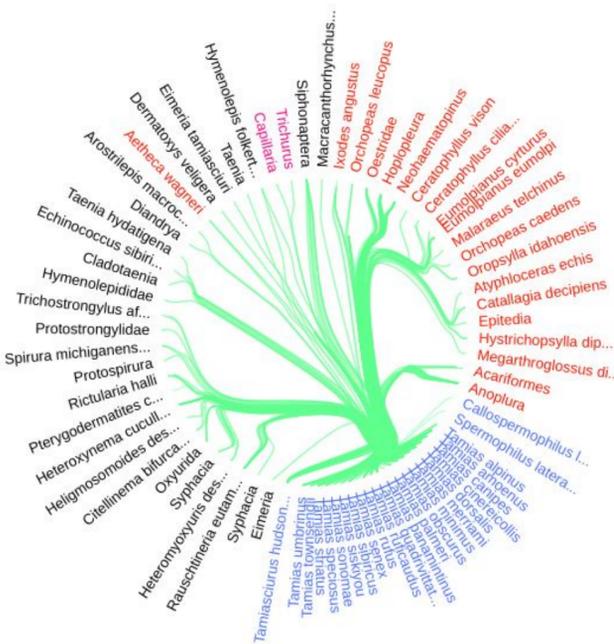
perhaps an idea for a new refutation rule: birds are unlikely parasites of tapeworms. Or something more general?

regarding confusion when entering other IDs with relationships, we changed the arrangement of the terms in that part of the data entry form.

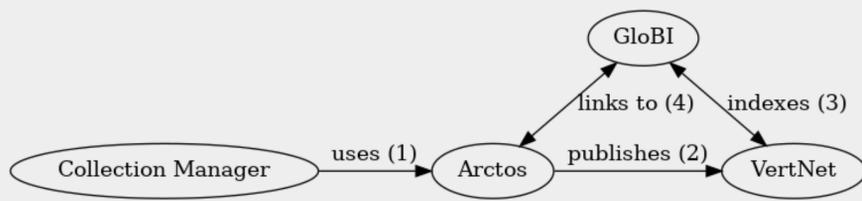
Thanks for working to make relationships easier to understand during data entry! I think that this change helps. I will follow up on this with my student workers and see if they (or I) continue to be confused about how to set up relationships.

## Continuing Collaboration

- Pioneering host/parasite associations
- Cleaning up primary data
- Always thinking about enhancing interactions!



Some chipmunk (*Tamias* sp.) biotic associations provided by Arctos as indexed and linked by GloBI on 26 September 2019



A collection manager uses Arctos to establish relationships between records. Arctos periodically shares data with VertNet which publishes a list of available datasets in the form of an RSS feed and data archives using [GBIF IPT](#). GloBI finds and downloads Arctos related data from the VertNet resource then indexes the associated Occurrences fields of records in these Arctos data archives. The associated Occurrences contain the association type (e.g., "eats") and a pointer to the occurrence id of the linked record. Arctos finds the GloBI indexes and adds them to the Arctos records.

## Challenges and Opportunities

- Newly discovered relationships
- Hidden relationships
- "Non-interactive" relationships
- "Outsider" assertions

<https://github.com/ArctosDB/arctos/issues/3172>  
 GloBI indexed and I've just confirmed that <https://arctos.database.museum/guid/UTEP:Inv:274> now includes a link to GloBI. Hurrah!



Since GloBI indexes across many platforms (including Arctos), references to Arctos records in other platforms can be found and linked.



Hoping to discuss ways in our upcoming meeting, and continued github discussions, to help make AMNH record links more explicit

Would you happen to know how the example <https://arctos.database.museum/guid/MSB:Mamm:210452> reference to AMNH: American Museum of Natural History:M-260840 translates to the occurrenceID scheme that AMNH uses as well as the location as which the AMNH DwC-A with the referenced specimen is published?



Here is the GBIF occurrence for the AMNH record - <https://www.gbif.org/occurrence/859443046>: occurrenceID = urn:catalog:AMNH:Mammals:M-260840. Also note that the associated parasite at USNM apparently is **not being published to GBIF**. At least I can't find it. I also cannot find it on the Smithsonian's collection search site. <https://collections.nmnh.si.edu/search/>

Relationships [ Find All ]  
 (host of) institutional catalog number:USNM Helm.:Coll. No.80445

(same individual as) AMNH: American Museum of Natural History:M-260840

\*symbiotype of *Ctenomys opimus*, page 1021 in Lambert et al. 1988 DOI:10.2307/3282226

GloBI knows of links from random stuff (inat) to Arctos - given sufficient metadata ("according to Jorrit's scripts...") this could be inserted into Arctos via API. GloBI is now digging interaction data out of strings. (See [globalbioticinteractions/unl-nsm#4](#) (comment) and <https://arctos.database.museum/guid/HWML:Para:49529> for example.) We should somehow do more with that - pull it into the Arctos view, use it to query, add explicit relationships, just send "interaction traffic" to GloBI

how would you want GloBI to publish claims relating Arctos records?

This would set up the structure necessary to **accept input (as opinions) from non-Curators**, so barring any social issues (which will hopefully be worked out here as well) I'd like to see you add them directly to the Arctos catalog records. I intend to do the same with reciprocal relationships, which are now only suggestions (that may or may not ever get dealt with). That should be some relatively straightforward API (which could pull some data from the API key's metadata - eg everything asserted through the API key you'd be issued magically gets asserted by Agent "GloBI")

### Current Other Identifier Structure

Identifiers  
[GenBank](#): GQ3744111 [ search ]  
[NK](#): 139712 check containers [ search ]

Relationships [ Find All ]  
 (host of) [GenBank:GQ306149](#)  
 (host of) [GenBank:GQ306150](#)  
 (host of) [GenBank:GQ306148](#)



Catalog Number: MSB:Mamm: 148794 [ find gaps ]

ID Type [ define ]	Prefix or String	ID Number (int)	Suffix	Relationship [ define ]	AssignedBy
NK	prefix	139712	suffix	self	legacy
GenBank	GQ306149	integer	suffix	host of	globi
GenBank	GQ306150	integer	suffix	host of	globi
GenBank	GQ306148	integer	suffix	host of	globi
GenBank	GQ374411	1	suffix	self	MLCampbell