



On Interpreting Biotic Association Records

Entomology Collections
Workshop @ Arizona
State University
2022-06-20/22

Jorrit H. Poelen

<https://jhpoelen.nl>

presentation @ <https://doi.org/10.5281/zenodo.6686306>



<https://jhpoelen.nl>



Jorrit H. Poelen is an independent software/data engineer, Ronin research scholar, and UCSB CCBER research affiliate with an interest in open science and biodiversity informatics. He lives and works in Oakland, CA (on Ohlone land) Minneapolis, MN on land originally cared for by Dakota, Ojibwe, Northern Cheyenne and others.

He contributes to Global Biotic Interactions, Nomer, Preston, Elton, Terrestrial Parasite Tracker, Big Bee, and the Open Traits Network.

He also writes peer-reviewed papers, gives talks, and reviews data publications.

For more information, please have a look at Jorrit's CV, a 2020 NSF Biosketch, or a 2020 NIH Biosketch.

How do *you* **record** associations?

How do *you* record **interpretations** (or **reviews**) of these association records?

How do *you* **share** association records?

ANIMAL ECOLOGY

BY
CHARLES ELTON

WITH AN INTRODUCTION BY
JULIAN S. HUXLEY, M.A.
FULLERIAN PROFESSOR OF PHYSIOLOGY, ROYAL INSTITUTION

NEW YORK
THE MACMILLAN COMPANY

1927

“The advantage, and at the same time the difficulty, of ecological work is that it attempts to provide conceptions which can link up into some complete scheme the colossal store of facts about natural history which has accumulated up to date in this rather haphazard manner. [...] Until more organised information about the subject is available, it is only possible to give a few instances of some of the more clear-cut niches which happen to have been worked out.”

Charles Elton, **1927**, *Animal Ecology*. pp 65-66.
<https://biodiversitylibrary.org/page/7236467>

**Center for Advancement and
Synthesis of Open
Environmental Data and
Sciences**

PROGRAM SOLICITATION
NSF 21-549



National Science Foundation

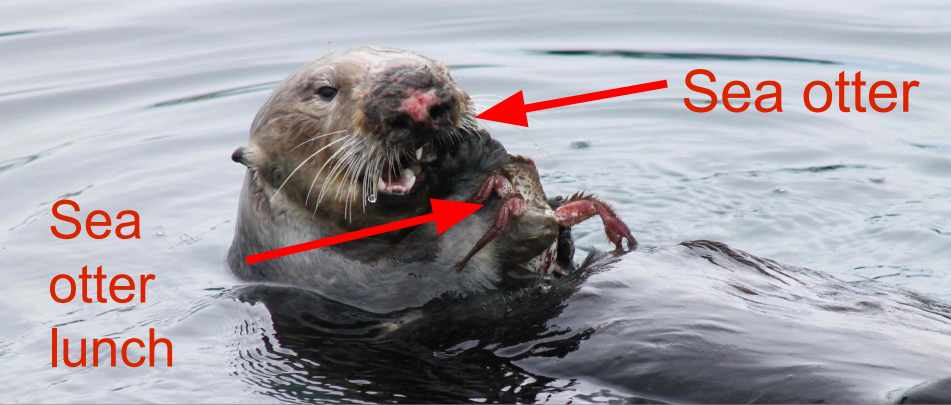
Directorate for Biological Sciences
Division of Biological Infrastructure

Directorate for Computer and Information
Science and Engineering
Office of Advanced Cyberinfrastructure

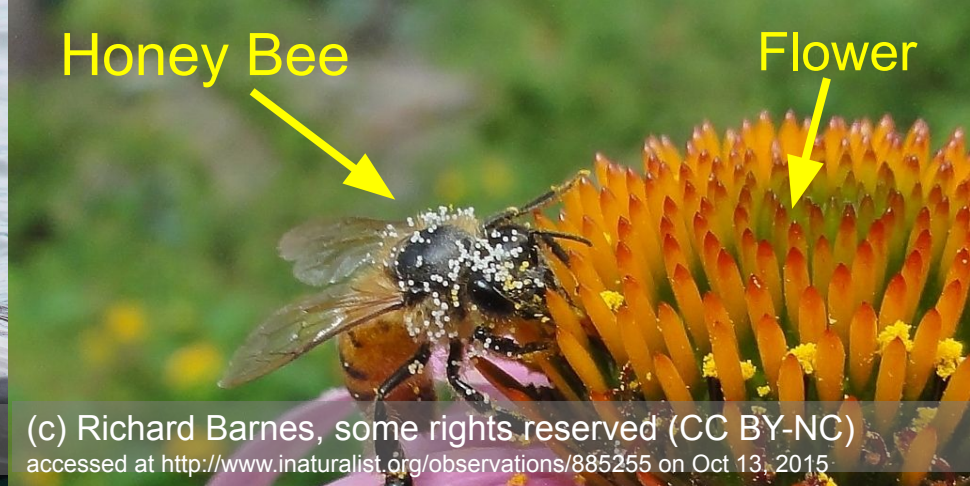
Letter of Intent Due Date(s) (required) (due by 5 p.m.
submitter's local time):

April 01, 2021

“NSF seeks to establish a Center fueled by open and freely available biological and other environmental data to catalyze novel scientific questions in environmental biology through the use of data-intensive approaches, team science and research networks, and training in the accession, management, analysis, visualization, and synthesis of large data sets. [...] The Center will provide vision for speeding discovery through the increased use of large, publicly accessible datasets to address biological research questions through collaborations with scientists in other related disciplines. [...]”



(c) edward_rooks, some rights reserved (CC BY-NC)
accessed at <http://www.inaturalist.org/observations/563486> on Feb 4, 2015



(c) Richard Barnes, some rights reserved (CC BY-NC)
accessed at <http://www.inaturalist.org/observations/885255> on Oct 13, 2015



(c) Cheryl Harleston, some rights reserved (CC BY-NC-SA)
accessed at <http://www.inaturalist.org/observations/2020957> on Oct 13, 2015

Global Biotic Interactions (GloBI) is a collaborative, open source, open data project that makes existing species-interaction datasets easier to discover and use.

Background image: Slyusarev et al. (2015): Global Biotic Interactions food web map. figshare. <http://dx.doi.org/10.6084/m9.figshare.1297762>

<http://globalbioticinteractions.org>



a brief history

2011 - Jorrit meets Jim at Texas A&M College Station for Ecological Integration Symposium.

2013 - Encyclopedia of Life Rubenstein Fellowship / GloBI / GoMexSI born

2014 - Jorrit, Jim and Chris publish GloBI paper
... many citations, workshops, conferences, integrations later ...

2022 - Association Interpretation Sessions at Ecological Collection Management Workshop @ ASU

Jorrit H. Poelen, James D. Simons and Chris J. Mungall. (2014). Global Biotic Interactions: An open infrastructure to share and analyze species-interaction datasets. *Ecological Informatics*.

<https://doi.org/10.1016/j.ecoinf.2014.08.005>.



in a nutshell

1. Existing openly accessible species interaction datasets in **any data format** are **registered** using <https://globalbioticinteractions.org/contribute>
2. **GloBI** continually and automatically **indexes and links** most recent species interaction datasets.
3. **Users discover, access and review** datasets via GloBI's many integrations, search pages, data archives or APIs.

How do *you* **record** associations?

direct observation (e.g., specimen examination, field observation)

indirect observation (e.g., transcribe specimen labels, field notes)

How do *you* record **interpretations** (or **reviews**) of these association records?

Many interpretations may coexist by recording opinions of known origin.

Interpretation vs. indirect observation

How do *you* **share** association records?

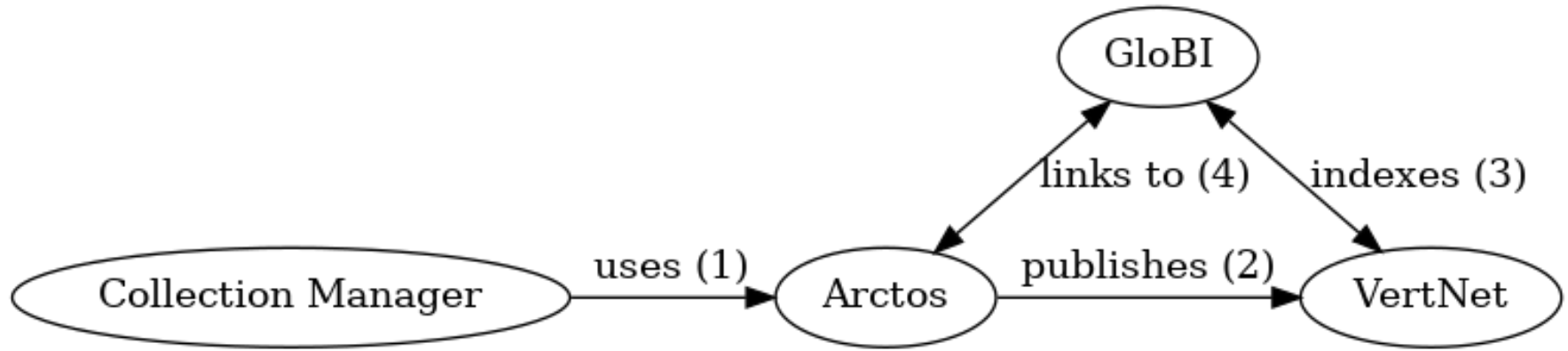
collection management system
data publications
data registries/ repositories

How do *you* **share** association records?

collection management system
data publications
data registries/ repositories

Use Case:

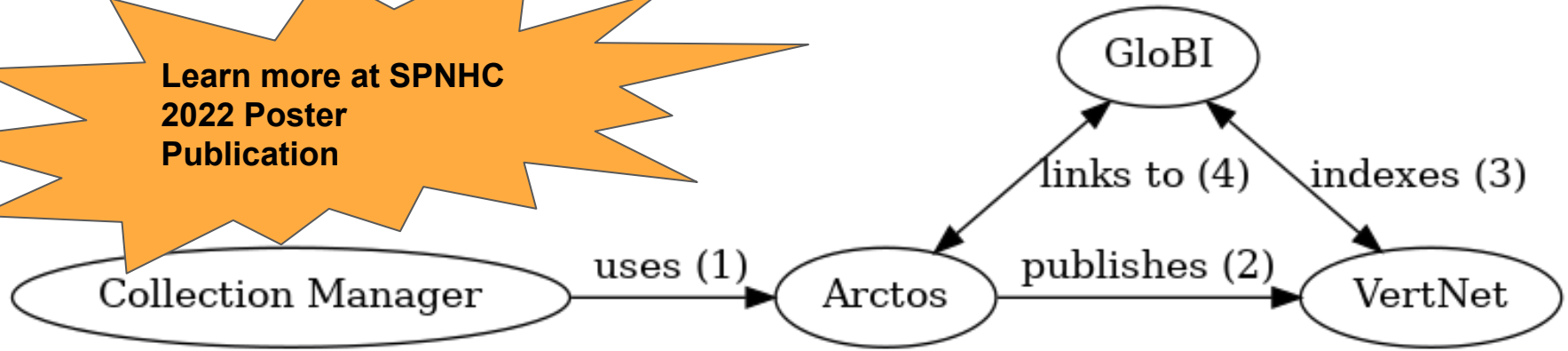
Arctos Specimen Associations



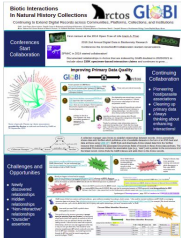
Use Case:

Arctos Specimen Associations

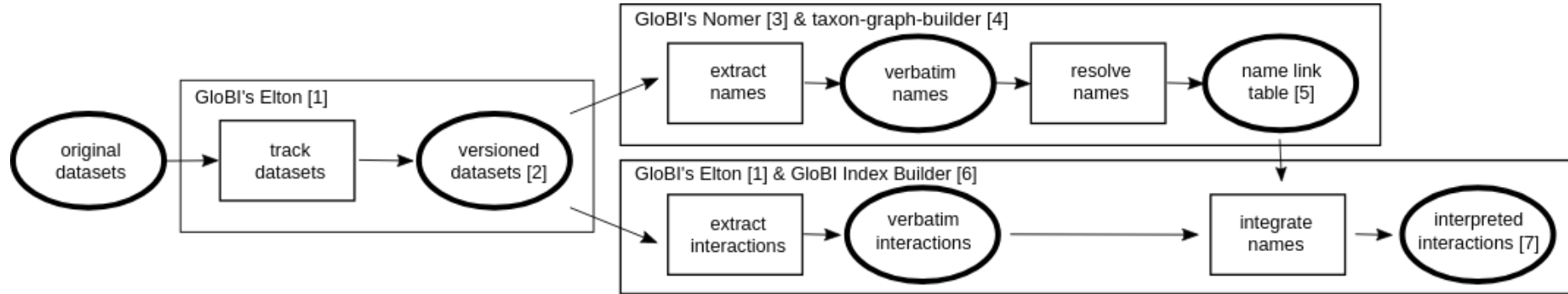
Learn more at SPNHC
2022 Poster
Publication



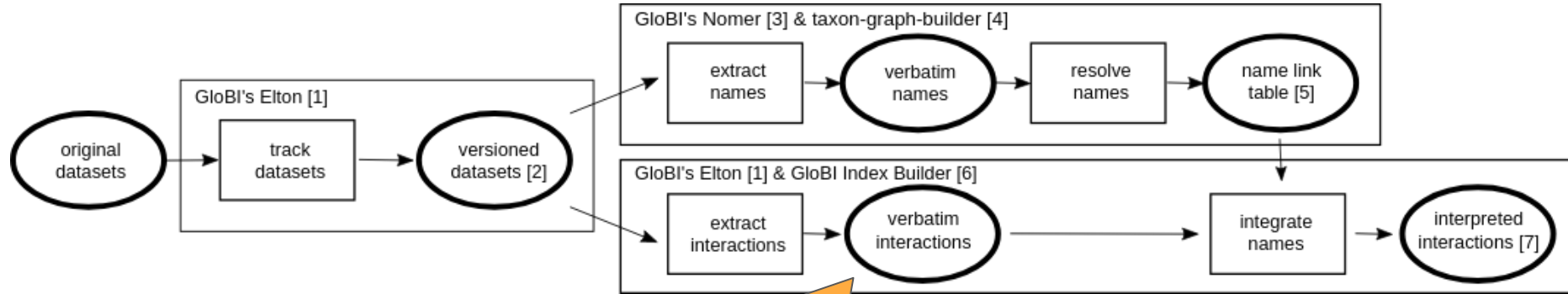
JH Poelen, EA Wommack, AC Doll, and TJ Mayfield-Meyer (2022).
Biotic Interactions In Natural History Collections: Continuing to Extend Digital
Records across Communities, Platforms, Collections, and Institutions.
Zenodo. <https://doi.org/10.5281/zenodo.6642868>



<https://globalbioticinteractions.org/process>



<https://globalbioticinteractions.org/process>



**Keep the Original Data,
Openly Share Interpretations
and Reviews**

Use Case Museum of Southwestern Biology

Museum of Southwestern Biology, Parasite Collection (MSB:Para)

[http://ipt.**vertnet**.org:8080/ipt/resource?r=msb_para](http://ipt.vertnet.org:8080/ipt/resource?r=msb_para)

hash://sha256/68f846dfdef28d1b868beaa4b973e8ace40b7bc79c7c2585f21d740d60c2542c

seen at 2022-05-14T17:10:36.292Z

links to: MSB Host Collection

[http://ipt.**vertnet**.org:8080/ipt/resource?r=msb_host](http://ipt.vertnet.org:8080/ipt/resource?r=msb_host)

hash://sha256/4217adfb4f79af7908f52ecfd17ee23b1a41d53a33af4e11a095f00e3598d393

seen at 2022-05-14T15:35:58.134Z

Museum of Comparative Zoology

[http://digir.mcz.**harvard.edu**/ipt/resource?r=mczbase](http://digir.mcz.harvard.edu/ipt/resource?r=mczbase)

hash://sha256/95b55c43633eb9c5d04550add6efeef7650f82db01de59dbc04dc8ffa9bea42c

seen at 2022-05-14T16:01:30.873Z

NMNH Extant Specimen Records

[https://collections.nmnh.**si.edu**/ipt/resource?r=nmnh_extant_dwc-a](https://collections.nmnh.si.edu/ipt/resource?r=nmnh_extant_dwc-a)

hash://sha256/c070dfa551fa5ebf42de023ab9a976943725849e5555ae9ea2a21b950d19fab7

and many more ...

Use Case MSB:Para:27368

Museum of Southwestern Biology, Parasite Collection (MSB:Para)

[http://ipt.**vertnet**.org:8080/ipt/resource?r=msb_para](http://ipt.vertnet.org:8080/ipt/resource?r=msb_para)

hash://sha256/68f846dfdef28d1b868beaa4b973e8ace40b7bc79c7c2585f21d740d60c2542c

seen at 2022-05-14T17:10:36.292Z

links to:

Museum of Comparative Zoology

[http://digir.mcz.**harvard.edu**/ipt/resource?r=mczbase](http://digir.mcz.harvard.edu/ipt/resource?r=mczbase)

hash://sha256/95b55c43633eb9c5d04550add6efeef7650f82db01de59dbc04dc8ffa9bea42c

seen at 2022-05-06T11:24:36.100Z



Division of Parasites

Museum of Southwestern Biology

License: [Arctos Data Ownership and Use](#)

Terms: [Arctos Data Ownership and Use](#)

Detail: <https://arctos.database.museum/collection/MSB:Para>

Loan Policy: [Loan Policy](#)

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MSB:Para:27368

Tetrabothisrus

Amukta Island

North America, United States, Alaska, Aleutian Islands

2002-09-01

Parts:

whole organism

[Comment or report b](#)

[\[expand all \]](#) [\[collapse all \]](#)

Identifications [\[expand \]](#)

Tetrabothisrus

Tetrabothisrus

Animalia, Platyhelminthes, Cestoda, Eucestoda, Cyclophyllidae, Tetrabothisriidae, Tetrabothisrus

Identified by [Eric P. Hoberg](#)

Nature of ID: features

Remarks: former nature of id: coarse features

Cestoda

tapeworms

Identified by [Douglas Causey](#)

Media

Location (1 Events)



[BerkeleyMapper](#)

highlight linked components

Event Type: collection

assigned by Douglas Causey on 2002-09-01

Event Date: 2002-09-01

collector

[Douglas Causey](#)

Identifiers

[collector number](#): A-41 [\[search \]](#)

[field number](#): MCZ FN 02-065 [\[search \]](#)

Relationships [\[Find All \]](#)

(collected with) [MSB:Para:27367](#)

family@2021-06-11: Reighardiidae

identification@2021-06-11: Reighardia

locality@2021-06-11: North America, United States, Alaska, Aleutian Islands: Amukta Island

(parasite of) [MCZ:Orn - Museum of Comparative Zoology Ornithology](#)

[Collection:348209](#)

Links

[GBIF Occurrence](#)

[iDigBio Occurrence](#)

[GloBI](#)



According to Arctos <http://arctos.database.museum/guid/MSB:Para:27368>

[Hot secure](#) | [arctos.database.us/guid/MSBPara:27368](#)

Division of Parasites

Museum of Southwestern Biology

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[Terms: Arctos Data Ownership and Use[®]](#)
[Detail: https://arctos.database.us/collection/MSB-Para[®]](#)
[Loan Policy Loan Policy[®]](#)

[About/Help](#)

Parts:
 whole organism

Comment or report b...

MSB:Para:27368
Tetrabothrius
 request all | collapse all
 Identifications [expand]

Tetrabothrius
Amnusia Island North America, United States, Alaska, Aleutian Islands 2002-09-01

Genbank
 Identifiers identified by Douglas Causey

Identifiers
 collection number# R-A-41 | search |
 field name# MCZ FN 02-005 | search |
 Relationships (view all)
 (collected with) MSB-Para:27367/9
 Item(s)2021-06-11: Ringedharets
 identifier=amz0201-06-11: Ringedharets
 collected@2021-06-11: North America, United States, Alaska, Aleutian Islands, Amnusia Island.
 parasite on MCZ Orn., Museum of Comparative Zoology Ornithology
 Collection:345009

Media

Location (1 Events)

BerkeleyMapper

History user comments

Event type: collection
 assigned by Douglas Causey on 2002-09-01
 Event Date: 2002-09-01

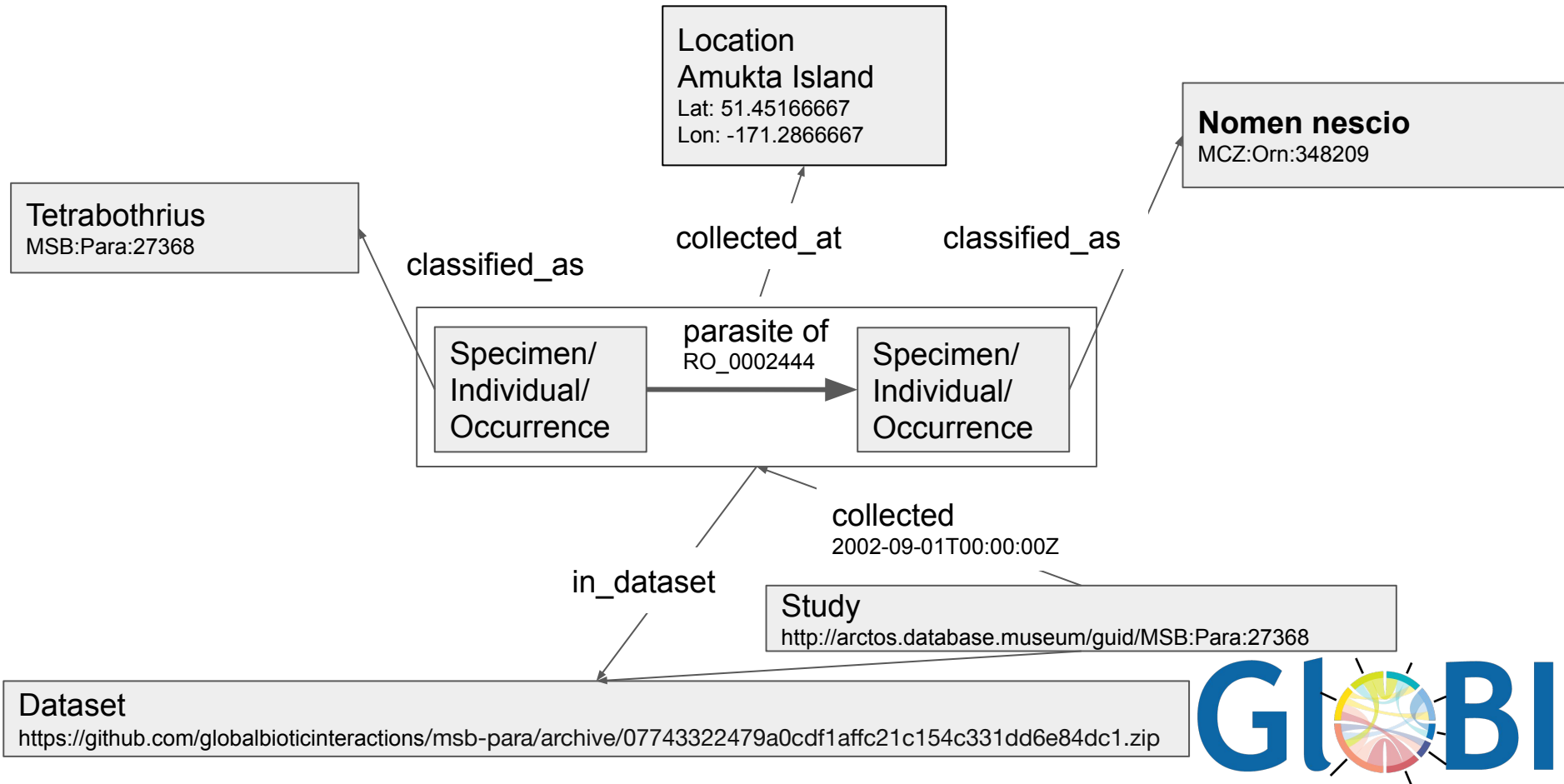
Links
 GBIF Occurrence #
 GBIF Occurrence #
 DOI

According to Arctos <http://arctos.database.museum/quid/MSB:Para:27368>

According to Arctos <http://arctos.database.museum/guid/MSB:Para:27368>

[illegible]

According to Arctos <http://arctos.database.museum/quid/MSB:Para:27368>



Simplified internal data model used by GloBI to integrate interaction data.



Search Browse Help

Ornithology 348209

Rissa tridactyla

tissue (frozen; vapor phase nitrogen); spread wing (dry); partial skeleton (dry); tissue (frozen; vapor

Identifications

Rissa tridactyla (Linnaeus, 1758)

Animalia Chordata Vertebrata Aves Neornithes Charadriiformes Lar Laridae Rissa tridactyla
Black-legged Kittiwake; Gavia pallas regina; Kittiwake; Murrelet tridactyla
Identified by Douglas Causey on 2002-09-01
Nature of ID: field ID

Locality and Collecting Event Details

Continents/Ocean: North America
Country: United States
State/Province: Alaska
Island Group: Aleutian Islands
Specific Locality: Amukta Island
Verbatim Locality: Amukta I
General Habitat: at sea
Collecting Source: wild caught
Elevation: 0 to 0 m
Coordinates: 51° 27.1' N 171° 17.2' W (Datum: not recorded)
Douglas Causey, 2002-09-01, Source: GPS
Collecting Date: 1 Sept 2002

Collectors

Douglas Causey



mczbase.mcz.harvard.edu/guid/MCZ:Orn:348209

Ornithology 348209
Rissa tridactyla

field number: MCZ FN 02-605
original number: A41

Images: none

Douglas Causey, 2002-09-01

fat deposition: large amount of retroperitoneal and subcutaneous fat

Douglas Causey, 2002-09-01

reproductive data: ovary 2 x 1 mm; largest ovum < 1 mm

[no agent data]

age class: hatching year

Katherine Donoghue, plumage

reproductive condition: o.n.e.

[no agent data]

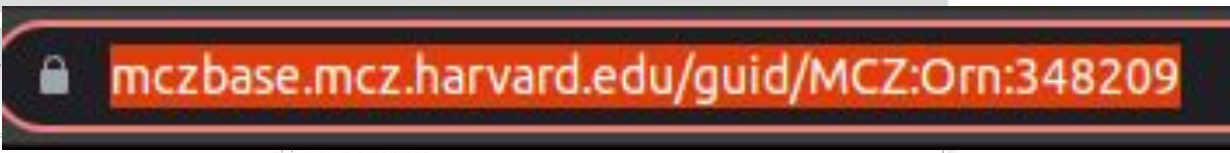
Remarks: Time: 1300 | Parasites: parasites = cestodes and nematodes |

Remarks: Time: 1300 | Parasites: parasites = cestodes and nematodes |

According to Harvard MCZ <https://mczbase.mcz.harvard.edu/guid/MCZ:Orn:348209>

Search Browse Help

Ornithology 348209
Rissa tridactyla
tissue (frozen; vapor phase nitrogen); spread wing (dry); partial skeleton (dry); tissue (frozen; vapor)



Identifications

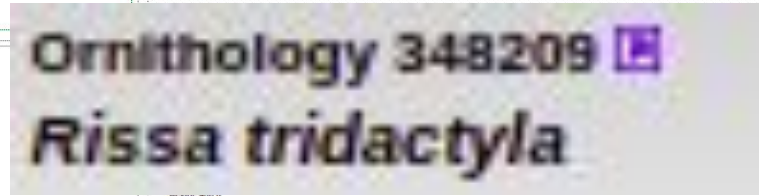
Rissa tridactyla (Linnaeus, 1758)
Animalia Chordata Vertebrata Aves Neornithes Charadriiformes Lar Laridae Rissa tridactyla
Black-legged Kittiwake; Gavia pallas regina; Kittiwake; Murrelet tridactyla
Identified by Douglas Causey on 2002-09-01
Nature of ID: field ID

Locality and Collecting Event Details

Continent/Ocean: North America
Country: United States
State/Province: Alaska
Island Group: Aleutian Islands
Specific Locality: Amukta Island
Verbatim Locality: Amukta I
General Habitat: at sea
Collecting Source: wild caught
Elevation: 0 to 0 m
Coordinates: 51° 27.1' N 171° 17.2' W (Datum: not recorded)
Douglas Causey, 2002-09-01, Source: GPS
Collecting Date: 1 Sept 2002

Collectors
Douglas Causey

field number: MCZ FN 02-605
original number: A41



fat deposition: large amount of retroperitoneal and subcutaneous fat
Douglas Causey, 2002-09-01
reproductive data: ovary 2 x 1 mm; largest ovum < 1 mm
(no agent data)
age class: hatching year
Katherine Donoghue, plumage
reproductive condition: o.n.e.
(no agent data)

Remarks: Time: 1300 | Parasites: parasites = cestodes and nematodes |

Remarks: Time: 1300 | Parasites: parasites = cestodes and nematodes |

According to Harvard MCZ <https://mczbase.mcz.harvard.edu/guid/MCZ:Orn:348209>



Highlevel Parasite Description

Remarks: Time: 1300 | Parasites: parasites = cestodes and nematodes |

According to Harvard MCZ <https://mczbase.mcz.harvard.edu/guid/MCZ:Orn:348209>



Division of Parasites

Museum of Southwestern Biology

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Terms: [Arctos Data Ownership and Use](#)

Detail: <https://arctos.database.museum/collection/MSB:Para>

Loan Policy: [Loan Policy](#)

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[Join Arctos](#)

[About/Help](#)

MSB:Para:27368

Tetrabothisrus

Amukta Island

North America, United States, Alaska, Aleutian Islands

2002-09-01

Parts:

whole organism

[Comment or report b](#)

[\[expand all \]](#) [\[collapse all \]](#)

Identifications [\[expand \]](#)

[Tetrabothisrus](#)

Tetrabothisrus

Animalia, Platyhelminthes, Cestoda, Eucestoda, Cyclophyllidea, Tetrabothisriidae, Tetrabothisrus

Identified by [Eric P. Hoberg](#)

Nature of ID: features

Remarks: former nature of id: coarse features

[Cestoda](#)

tapeworms

Identified by [Douglas Causey](#)

Media

Location (1 Events)



[BerkeleyMapper](#)

highlight linked components

Event Type: collection

assigned by Douglas Causey on 2002-09-01

Event Date: 2002-09-01

collector

[Douglas Causey](#)

Identifiers

[collector number](#): A-41 [\[search \]](#)

[field number](#): MCZ FN 02-065 [\[search \]](#)

Relationships [\[Find All \]](#)

(collected with) [MSB:Para:27367](#)

family@2021-06-11: Reighardiidae

identification@2021-06-11: Reighardia

locality@2021-06-11: North America, United States, Alaska, Aleutian Islands: Amukta Island

(parasite of) [MCZ:Orn - Museum of Comparative Zoology Ornithology](#)

[Collection:348209](#)

Links

[GBIF Occurrence](#)

[iDigBio Occurrence](#)

[GloBI](#)




According to Arctos <http://arctos.database.museum/guid/MSB:Para:27368>

[Arcos Data Ownership and Use](#)¹

[Terms: Arcos Data Ownership and Use](#)¹

[Detail: https://arcos.database.museum/collection/MSB-Para-1](#)

[Loan Policy Loan Policy](#)²

 <h2>Division of Parasites</h2> <p>Museum of Southwestern Biology</p> <p>Search Portals My Stuff Join Arcots About/Help</p> <h1>MSB:Para:27368</h1> <p>Tetrahortius</p> <p>request all [tabset #]</p> <p>Identifications [expand]</p> <p>Tetrahortius</p> <p>Amelasma, Heteramelasma, Cestodis, Eucestoda, Cyclophoridae, Tetrahortidae, Tetrahortius</p> <p>Identified by Eric P. Halberg</p> <p>Nature of ID: features</p> <p>Remarks: former nature of ID: coarse features</p> <p>Images identified by Douglas Causey</p>	<p>License:</p> <p>Terms:</p> <p>Detail:</p> <p>Loan Policy</p> <p>Parts: whole organism</p> <p>Comment or report b</p>
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<p>Media</p> <p>Location (1 Events)</p> <p>BerkleyMapper.org</p> <p>Highlight label comments</p> <p>Event type: collection</p> <p>assigned by Douglas Causey on 2002-09-01</p> <p>Event Date: 2002-09-01</p>	<p>collector</p> <p>Douglas Causey</p> <p>Identifiers</p> <p>collection number IR: A-41 search </p> <p>field number IR: MCG FN 02-005 search </p> <p>Relationships (view all)</p> <p>(collected with) MSB-Para:27367/9</p> <p>January(2002)-01: Ringhardia</p> <p>identifiers(2002)-01: R. Ringhardia</p> <p>July(2002)-01: North America, Alaska, Aleutian Islands, Amukta Island</p> <p>(parasite on) MCG-Oryz.: Museum of Comparative Zoology, Ornithology</p> <p>Collection:345C09-9</p> <p>Links</p> <p>GBIF Occurrence</p> <p>EOLife Occurrence</p> <p>Globi</p>
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According to Arctos <http://arctos.database.museum/quid/MSB:Para:27368>



host of



Tetrabothrius



Kittiwake, Black-legged Kittiwake
(*Rissa tridactyla*)

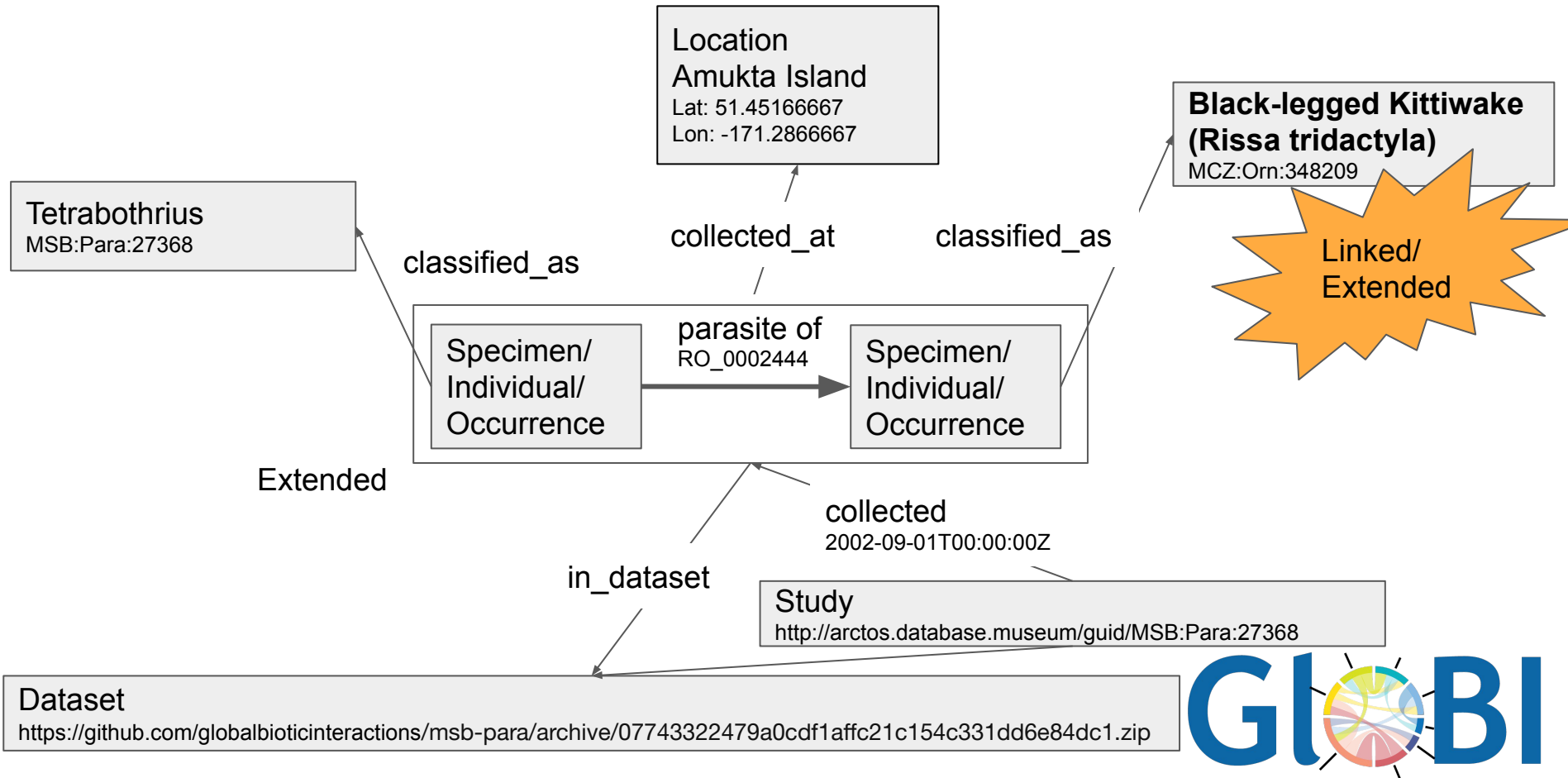


Supported by:

 <http://arctos.database.museum/guid/MSB:Para:27368> Provider:  Natural History Collections managed by Arctos
(<https://arctosdb.org>) accessed via <https://vertnet.org> . Accessed via
<<https://github.com/globalbioticinteractions/vertnet/archive/411bd21192e50ddccd51381a731444f74b032ffb.zip>> at 2022-05-15T07:09:05.354Z.  [discuss...](#)

GloBI Web Interface

<https://globalbioticinteractions.org/?accordingTo=http%3A%2F%2Farctos.database.museum%2Fguid%2FMSB%3APara%3A27368>



Simplified internal data model used by GloBI to integrate interaction data.

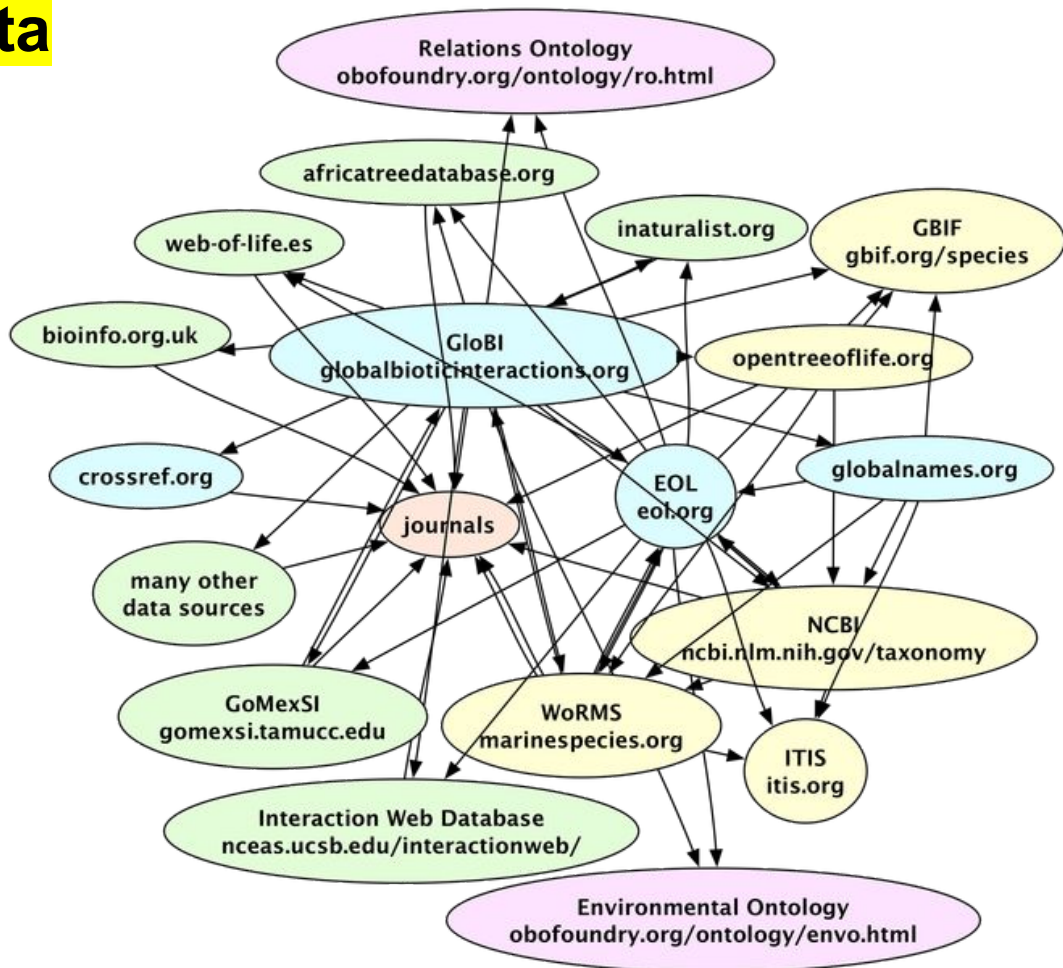


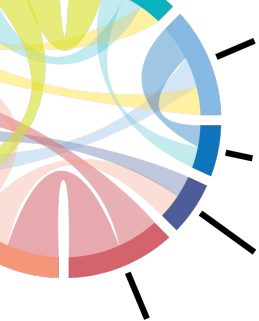
linking all the data

Bidirectional links include Encyclopedia of Life, Gulf of Mexico Species Interactions, NCBI Taxonomy, World Register of Marine Species, iNaturalist, Fishbase, SeaLifeBase, and Arctos.

Outgoing links include UBERON (body parts, life stage, physiological state), EnvO, GeoNames, CMECS, FEOW, MEOW, TEOW, doi.org, ITIS, Open Tree of Life, NBN and ALA.

Link services include Global Names and CrossRef.



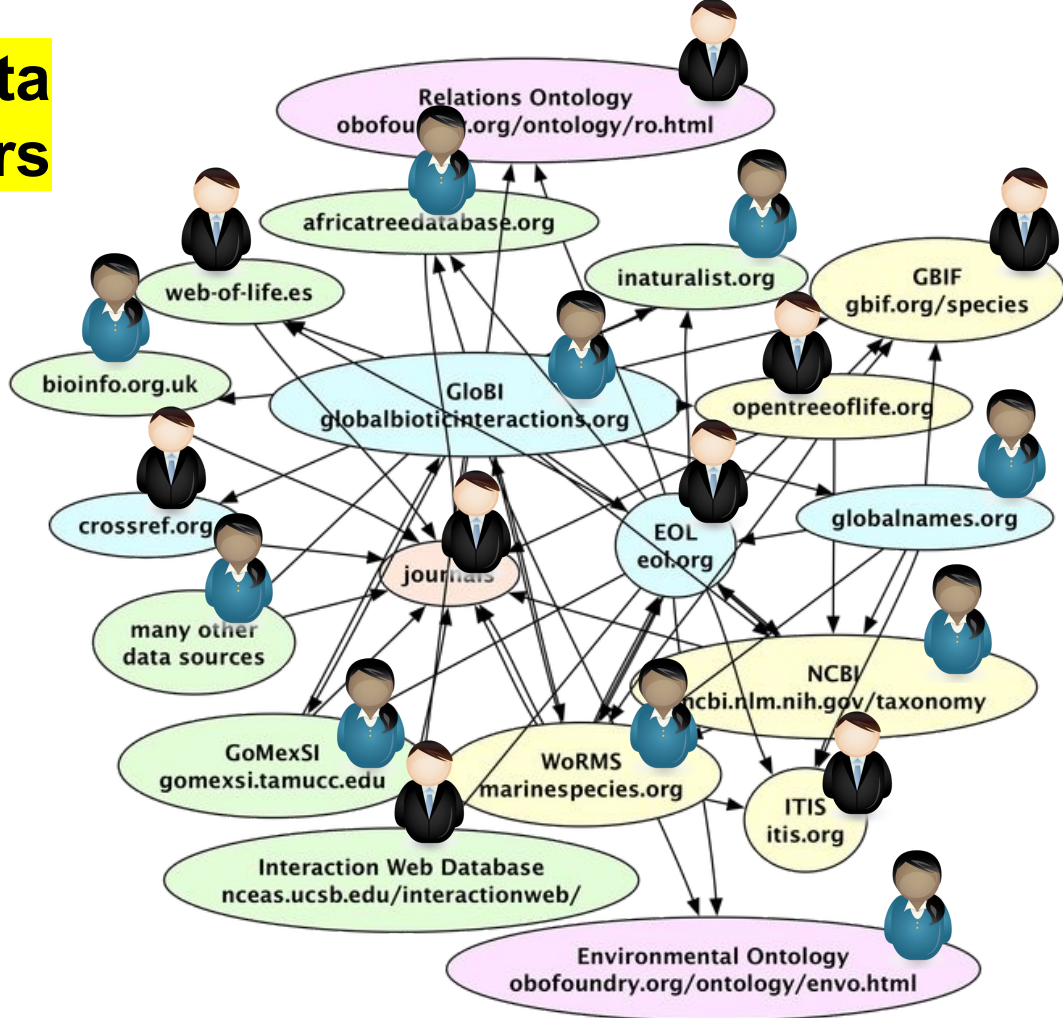


linking all the data and their curators

Bidirectional links include Encyclopedia of Life, Gulf of Mexico Species Interactions, NCBI Taxonomy, World Register of Marine Species, iNaturalist, Fishbase, SeaLifeBase, and Arctos

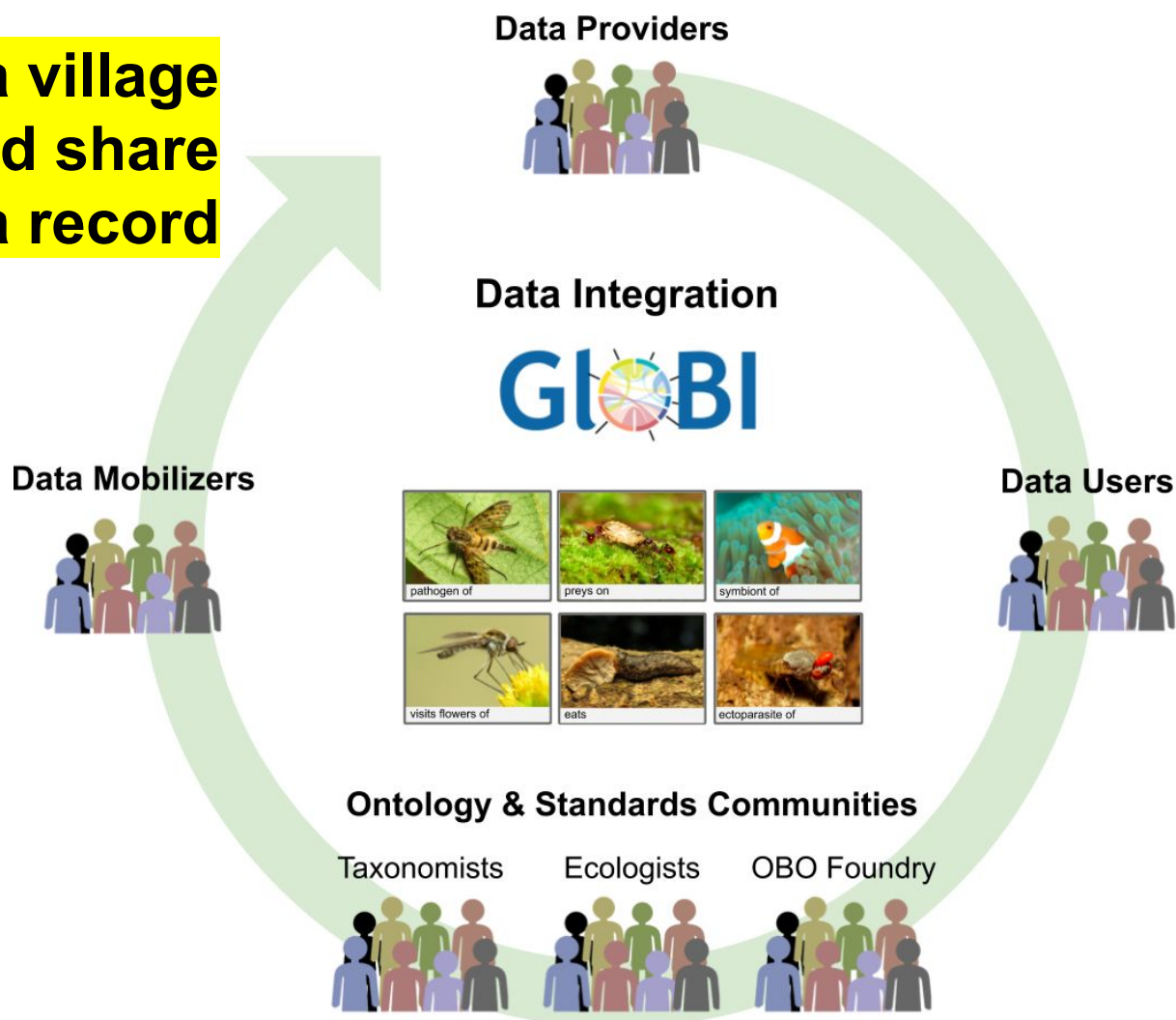
Outgoing links include UBERON (body parts, life stage, physiological state), EnvO, GeoNames, CMECS, FEOW, MEOW, TEOW, doi.org, ITIS, Open Tree of Life, NBN and ALA.

Link services include Global Names and CrossRef.





it takes a village
to keep and share
a record

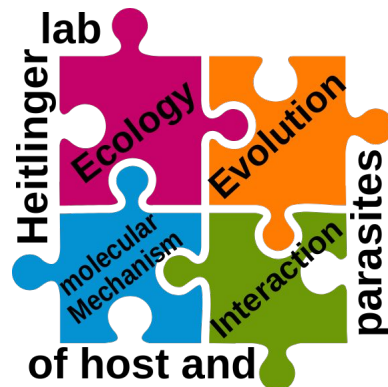




partners



Encyclopedia of Life



Acknowledgments

an incomplete list in no particular order

These projects would not have been possible without the many contributions (big and small) of folks like Jen Hammock, Katja Schulz, Pepper Luboff, Chris Mungall, Katja Seltmann, Brian Hayden, Ken-ichi Ueda, Jim Simons, Theresa Mitchell, Emanuel Heitlinger, Kathy Kwan, Deng Palomares, Josephine “Skit” Barile, Anne Thessen, Allen Hurlbert, Dmitri Mozzherin, Malcolm Storey, Michael Elliott, José Fortes, Quentin Groom, Nathan Upham, Deb Paul, Mariya Dimitrova, Lyubomir Penev, Donat Agosti, Alex Ioannidis, Marcus Guidoti, Jen Zaspel, Carl Boettiger, Erika Tucker ... and thousands of others that have collected and shared biodiversity data and related tools.

Jorrit Poelen @ <https://jhpoelen.nl>

Thank you!

Works presented are funded in part by grants OAC 1839201, DBI 1901932, DBI 1901926, DBI 2102006 from the National Science Foundation, 1-R21-AI164268-01 from the National Institutes of Health, the Encyclopedia of Life Rubenstein Fellows Program (CRDF EOL-33066-13/F33066, 2013), EOL David M. Rubenstein Grant (FOCX-14-60988-1, 2014), and the Smithsonian Institution (SI) (T15CC10297-002, 2016).

How do *you* **record** associations?

How do *you* record **interpretations** (or **reviews**) of these association records?

How do *you* **share** association records?

<https://www.globalbioticinteractions.org/ecm-workshop/>

Interaction Data Interpretation Workshop

Entomology Collections Management Association Data Workshop

22 June 2022

2-4p Mountain Standard Time

Instructors: Erika Tucker, Jorrit Poelen,
Katja Seltsmann, Kathryn Sullivan, Jennifer
Zaspel

Helpers: you!

Extra

```

jorrit@lightgrey:~$ curl --sile
> | gunzip |
| mlr --itsvltite --ojson filter '$s
| jq .
{
  "argumentType": "https://en.wiktic
  "sourceAccessionId": "http://arctos
  "sourceCatalogNumber": "MSB:Para:273
  "sourceCollectionCode": "Para",
  "sourceCollectionId": 27,
  "sourceInstitutionCode": "MSB",
  "sourceTaxonId": "",
  "sourceTaxonName": "Tetrabothrius",
  "sourceTaxonPath": "Animalia | Platy
  "sourceTaxonPathName": "kingdom | p
  "sourceBodyPart": "",
  "sourceBodyPartName": "",
  "sourceFootageId": "",
  "sourceFootageName": "adult",
  "sourceSex": "",
  "sourceSexName": "",
  "sourceSexPath": "http://purl.ob
  "targetAccessionId": "http://purl.ob
  "targetAccessionName": "parasiteOf",
  "targetAccessionCode": "MCZ:Orn:3482
  "targetCatalogNumber": 348209,
  "targetCollectionCode": "Orn",
  "targetCollectionId": "",
  "targetInstitutionCode": "MCZ",
  "targetTaxonId": "",
  "targetTaxonName": "Rissa tridactyla
  "targetTaxonPath": "",
  "targetTaxonPathName": "Animalia | Chord
  "targetTaxonPathName": "kingdom | p
  "targetBodyPart": "",
  "targetBodyPartName": "",
  "targetFootageId": "",
  "targetFootageName": "",
  "targetSex": "",
  "targetSexName": "Female",
  "targetSexPath": "",
  "targetSexPathName": "PreservedSpeci
  "http": {
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  },
  "decimalLatitude": 51.45166667,
  "decimalLongitude": -171.2866667,
  "locality": "",
  "localityName": "Amukta Island",
  "reference": "",
  "reference": "http://arctos.datab
  "reference": "http://arctos.
  "comment": "globalbioticinteractions/msb-para",
  "citation": "MSB Parasite Collection (Arctos)",
  "archival": "http://ipt.vertnet.org:8880/ipt/archive.do?r=msb-para",
  "lastUpdate": "2022-05-06T12:09:52.583Z",
  "contentHash": "1ca906b994d48830a4971d9c932dd91244bca5f9a7070e6e2d9735c4dfcfc6d3",
  "version": "0.12.4"
}

```

```

"sourceCatalogNumber": "MSB:Para:27368",
"sourceCollectionCode": "Para",
"sourceCollectionId": 27,
"sourceInstitutionCode": "MSB",
"sourceTaxonId": "",
"sourceTaxonName": "Tetrabothrius",

```



```

"interactionTypeId": "http://purl.obolibrary.org/obo/RO_0002444",
"interactionTypeName": "parasiteOf",
"targetOccurrenceId": "MCZ:Orn:348209",
"targetCatalogNumber": 348209,
"targetCollectionCode": "Orn",
"targetCollectionId": "",
"targetInstitutionCode": "MCZ",
"targetTaxonId": "",
"targetTaxonName": "Rissa tridactyla (Linnaeus, 1758)",

```

Extracted from MSB Para Review By Elton in JSON format using MLR



Not secure | arctos.database.museum/guid/DMNS:Mamm:14219

503 Service Not Available

Use Case MSB:Para:28915

Museum of Southwestern Biology, Parasite Collection (MSB:Para)

[http://ipt.**vertnet**.org:8080/ipt/resource?r=msb_para](http://ipt.vertnet.org:8080/ipt/resource?r=msb_para)

hash://sha256/68f846dfdef28d1b868beaa4b973e8ace40b7bc79c7c2585f21d740d60c2542c

seen at 2022-05-14T17:10:36.292Z

links to:

NMNH Extant Specimen Records

[https://collections.nmnh.**si.edu**/ipt/resource?r=nmnh_extant_dwc-a](https://collections.nmnh.si.edu/ipt/resource?r=nmnh_extant_dwc-a)

hash://sha256/c070dfa551fa5ebf42de023ab9a976943725849e5555ae9ea2a21b950d19fab7

seen at 2022-05-06T11:24:36.100Z



Division of Parasites
Museum of Southwestern Biology

License: [Arctos Data Ownership and Use](#)
Terms: [Arctos Data Ownership and Use](#)
Detail: <https://arctos.database.museum/collection/MSB:Para>
Loan Policy: [Loan Policy](#)

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MSB:Para:28915
Arostrilepis insperata

Monogehela National Forest, Elleber Sods Road (US Forest Service Rd. 1681) 3282 ft elevation
North America, United States, West Virginia, Pocahontas County
2016-08-26

Parts:
whole organism; whole organism; whole organism

[Comment or report bad data \[0\]\[0\]](#)

[\[expand all \]](#) [\[collapse all \]](#)

Identifications [\[expand \]](#)

Arostrilepis insperata

Arostrilepis insperata sensu [Makarikov et al. 2020](#)
Arostrilepis insperata, Eukaryota, Metazoa, Platyhelminthes, Cestoda, Eucestoda, Cyclophyllidea, Hymenolepididae, *Arostrilepis* sensu [Makarikov et al. 2020](#)
Identified by [Kurt Egan Galbreath](#), [Eric P. Hoberg](#), [Ralph P. Eckerlin](#) and [Arseny A. Makarikov](#) on 2020-01-04
Nature of ID: features
Remarks: PARATYPE; former nature of ID = expert

Citations

paratype of *Arostrilepis insperata*, page 11 in [Makarikov et al. 2020](#) DOI:10.1007/s00436-019-06584-4

Media

Location (1 Events)



[BerkeleyMapper](#)

highlight linked components

Event Type: collection
assigned by Alfred L. Gardner on 2016-08-26
Event Date: 2016-08-26
Verbatim Date: 2016-08-26

Higher Geography: North America, United States, West Virginia, Pocahontas County [details](#)

Specific Locality: Monogehela National Forest, Elleber Sods Road (US Forest Service Rd. 1681) 3282 ft elevation [details](#)

Verbatim Locality: Monogehela National Forest, Elleber Sods Road (US Forest Service Rd. 1681) 3282 ft elevation [details](#)

Associated Names: United States, United States of America, West Virginia, Pocahontas, Nicholas, NORTH AMERICA MAINLAND

Coordinates: 38.4419 / -79.7174666667
As Entered: 38d 26.514m N/79d 43.048m W

collector

[Ralph P. Eckerlin](#)
[Alfred L. Gardner](#)

Identifiers

[collector number](#): Mgap [\[search \]](#)
[field number](#): ALG-15615 [\[search \]](#)

Relationships [\[Find All \]](#)

(parasite of) [ARK:65665/3777ecb64-7edc-4479-8486-a0b584092bd0](#)
(parasite of) USNM: National Museum of Natural History:602540

Links

[GBIF Occurrence](#)
[iDigBio Occurrence](#)
[GloBI](#)

Attributes

Attribute	Value	Determiner	Date	Method	Remark
age class	adult	Ralph P. Eckerlin	2016-08-26		
experimental	no	Ralph P. Eckerlin	2016-08-26		
location in host	intestine	Ralph P. Eckerlin	2016-08-26		
verbatim host ID	Myodes gapperi	Ralph P. Eckerlin	2016-08-26		

Remarks: Voucher specimen, Semichons, Canada balsam; in mixed infection with *A. gardneri*; field number corrected from ALG-15640 to ALG-15615 per Makarikov et al. 2021 by campmic on 2021-05-27

Accession

View [2019.003.Para](#)

According to Arctos @ <http://arctos.database.museum/guid/MSB:Para:28915>



Smithsonian
National Museum of Natural History

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Search the Division of Mammals Co

Keyword Search Results - Gallery View

USNM 602540
Myodes gapperi carolinensis

Page 1 of 1 Clear Selections Export All Results

Mammals Collections Keyword Search Search by Field Whale Coll

Mammal Collections

The Division of Mammals, National Museum of Natural History, Smithsonian's largest mammal collection with over 600,000 specimens. The ta USNM (acronym derived from our former name United States National I globe, with especially strong representation from North America, Centra and southeast Asia. The research value of this collection to mammalogi specimens preserved, a number exceeded only by The Natural History

Myodes gapperi carolinensis : Cricetidae : Rodentia : Mammalia : Chordata

Specimen/Lot

Museum: NMNH
Catalog Number: USNM 602540
Special Collections: Biological Survey Specimen
Specimen Count: 1
Current Identification: **Myodes gapperi carolinensis**
Date Collected: 26 Aug 2016
Country: United States
Province/State: West Virginia
District/County: Pocahontas County
Precise Locality: Elleber Sods Road at bridge over north fork Greenbrier River, Monongahela National Forest

Other Numbers: Type Value
Mammals Field Number ALG 15615
Sex/Stage: Sex Stage Remarks
Female

Preparation Details: Preparation Remarks
Skin
Skull

Measurements:	Of	Type	Value	Unit	Remarks
Specimen	Weight	21	g		
Total	Length	130	mm		
Tail	Length	37	mm		
Hind Tarsus	Length	20	mm		
Ear Notch	Length	14	mm		

EZID: <http://n2t.net/ark:/65665/3777ecb64-7edc-4479-8486-a0b584092bd0>



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GloBI currently includes **268,317 references** obtained from **310 data sources**. In total, **2,852,596 interaction records** were discovered, covering **181,570 taxa**. A [taxon map](#) shows how these taxa relate to other projects (e.g. NCBI, WoRMS, EOL). Names that could not be linked by our automated taxon matching algorithm are documented in the [list of unmatched taxon names by reference/source](#). These unmatched or unresolved names are typically unknown or invalid names.

Below, you can search for references that contain species interaction records. Example queries: Which references document sea otters (*Enhydra lutris*) prey? or Who documented what honey bees (*Apis*) pollinate?

Which references containing claim that ?

<http://globalbioticinteractions.org/references>

Accessed at 28 Sept 2017



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Occurrence records	Datasets	Publishers
850,599,127	36,495	1,104

<https://gbif.org>

Accessed at 28 Sept 2017

2.8M records

0.1k datasets

~100k **taxa**

950.6M records

36.5k datasets

~1-2M **species**

Eltonian shortfall*: a lack of species-interaction records

*Hortal, J. et al., 2015. Seven Shortfalls that Beset Large-Scale Knowledge of Biodiversity. Annual Review of Ecology, Evolution, and Systematics, 46(1). Available at: <http://dx.doi.org/10.1146/annurev-ecolsys-112414-054400>.



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GloBI currently includes **293,203 references** obtained from **326 data sources**. In total, **3,379,426 interaction records** were discovered, covering **233,557 taxa**. A [taxon map](#) shows how these taxa relate to other projects (e.g. [NCBI](#), [WoRMS](#), [EOL](#)). Names that could not be linked by our automated taxon matching algorithm are documented in the [list of unmatched taxon names by reference/source](#). These unmatched or unresolved names are typically unknown or invalid names.

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Which references containing claim that

<http://globalbioticinteractions.org/references>

Accessed at 26 Feb 2018



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Occurrence records	Datasets	Publishers
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<https://gbif.org>

Accessed at 26 Feb 2018

3.4M records

0.1k datasets

~100k **taxa**

972.7M records

38.1k datasets

~1-2M **species**

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Accessed at 9 Jan 2020



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Occurrence records	Datasets	Publishers
850,599,127	36,495	1,104

<https://gbif.org>

Accessed at 9 Jan 2020

4.4M records

0.2k datasets

~0.2M taxa

1.4B records

50.0k datasets

~1-2M species

Eltonian shortfall*: a lack of species-interaction records

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Which references containing claim that

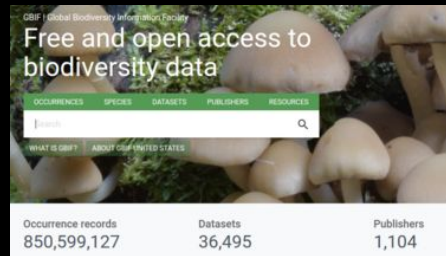
<http://globalbioticinteractions.org/references>

Accessed at 11 April 2021



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Accessed at 11 April 2021

6.8M records

0.3k datasets

~0.7M taxa

1.7B records

57.6k datasets

~1-2M species

Eltonian shortfall*: a lack of species-interaction records

*Hortal, J. et al., 2015. Seven Shortfalls that Beset Large-Scale Knowledge of Biodiversity. Annual Review of Ecology, Evolution, and Systematics, 46(1). Available at: <http://dx.doi.org/10.1146/annurev-ecolsys-112414-054400>.



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Which references containing claim that

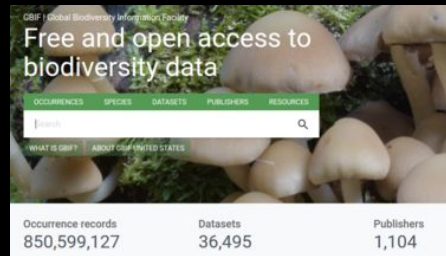
<http://globalbioticinteractions.org/references>

Accessed at 24 Oct 2021



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<https://gbif.org>

Accessed at 24 Oct 2021

10.2M records

0.3k datasets

~0.7M taxa

1.9B records

62.8k datasets

~1-2M species

Eltonian shortfall*: a lack of species-interaction records

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Occurrence records	Datasets	Publishers
850,599,127	36,495	1,104

<https://gbif.org>

Accessed at 22 May 2022

13.9M records

0.3k datasets

~0.8M taxa

2.2B records

69.4k datasets

~1-2M species

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*Hortal, J. et al., 2015. Seven Shortfalls that Beset Large-Scale Knowledge of Biodiversity. Annual Review of Ecology, Evolution, and Systematics, 46(1). Available at: <http://dx.doi.org/10.1146/annurev-ecolsys-112414-054400>.



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