

Versioned Archive and Review of Biotic Interactions and Taxon Names Found within globalbioticinteractions/carvalho2023 hash://md5/d768c5cff9fa25c1ae83054d4a34f529

by Nomer, Elton and Preston, three naive review bots
review@globalbioticinteractions.org
<https://globalbioticinteractions.org/contribute>
<https://github.com/globalbioticinteractions/carvalho2023/issues>

2025-07-07

Abstract

Life on Earth is sustained by complex interactions between organisms and their environment. These biotic interactions can be captured in datasets and published digitally. We present a review and archiving process for such an openly accessible digital interactions dataset of known origin and discuss its outcome. The dataset under review, named globalbioticinteractions/carvalho2023, has fingerprint hash://md5/d768c5cff9fa25c1ae83054d4a34f529, is 1.66MiB in size and contains 685 interactions with 1 unique type of association (e.g., flowersVisitedBy) between 63 primary taxa (e.g., *Scabiosa columbaria*) and 171 associated taxa (e.g., *Bombus pascuorum*). This report includes detailed summaries of interaction data, a taxonomic review from multiple catalogs, and an archived version of the dataset from which the reviews are derived.

Contents

Introduction	2
Data Review and Archive	2
Methods	2
Results	4
Files	4
Archived Dataset	13

Biotic Interactions	13
Interaction Networks	18
Taxonomic Alignment	20
Additional Reviews	23
GloBI Review Badge	24
GloBI Index Badge	24
Discussion	24
Acknowledgements	25
Author contributions	25
References	25

Introduction

Data Review and Archive

Data review and archiving can be a time-consuming process, especially when done manually. This review report aims to help facilitate both activities. It automates the archiving of datasets, including Darwin Core archives, and is a citable backup of a version of the dataset. Additionally, an automatic review of species interaction claims made in the dataset is generated and registered with Global Biotic Interactions (J. H. Poelen, Simons, and Mungall 2014).

This review includes summary statistics about, and observations about, the dataset under review:

WorldFAIR pilot data from: VisitationData_Luisa_Carvalho.

<https://github.com/globalbioticinteractions/carvalho2023/archive/b71267f81c2e4b3c015a9cc0fafcc8842025-07-04T23:07:37.983Z> hash://md5/d768c5cff9fa25c1ae83054d4a34f529

For additional metadata related to this dataset, please visit <https://github.com/globalbioticinteractions/carvalho2023> and inspect associated metadata files including, but not limited to, *README.md*, *eml.xml*, and/or *globi.json*.

Methods

The review is performed through programmatic scripts that leverage tools like Preston (Elliott et al. 2025), Elton (Kuhn, Poelen, and Leinweber 2025), Nomer (Salim and Poelen 2025), globinizer (J. Poelen, Seltmann, and Mietchen 2024) combined with third-party tools like `grep`, `mlr`, `tail` and `head`.

Table 1: Tools used in this review process

tool name	version
preston	0.10.1
elton	0.15.13
nomer	0.5.17
globinizer	0.4.0
mlr	6.0.0
jq	1.6
yq	4.25.3
pandoc	3.1.6.1
duckdb	1.3.1

The review process can be described in the form of the script below ¹.

```
# get versioned copy of the dataset (size approx. 1.66MiB) under review
elton pull globalbioticinteractions/carvalho2023

# generate review notes
elton review globalbioticinteractions/carvalho2023\
> review.tsv

# export indexed interaction records
elton interactions globalbioticinteractions/carvalho2023\
> interactions.tsv

# export names and align them with the Catalogue of Life using Nomer
elton names globalbioticinteractions/carvalho2023\
| nomer append col\
> name-alignment.tsv
```

or visually, in a process diagram.

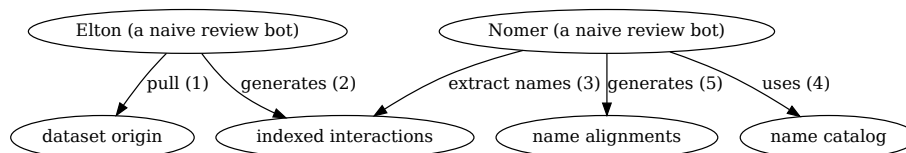


Figure 1: Review Process Overview

¹Note that you have to first get the data (e.g., via `elton pull globalbioticinteractions/carvalho2023`) before being able to generate reviews (e.g., `elton review globalbioticinteractions/carvalho2023`), extract interaction claims (e.g., `elton interactions globalbioticinteractions/carvalho2023`), or list taxonomic names (e.g., `elton names globalbioticinteractions/carvalho2023`)

You can find a copy of the full review script at `check-data.sh`. See also GitHub and Codeberg.

Results

In the following sections, the results of the review are summarized ². Then, links to the detailed review reports are provided.

Files

The following files are produced in this review:

filename	description
biblio.bib	list of bibliographic reference of this review
check-dataset.sh	data review workflow/process as expressed in a bash script
data.zip	a versioned archive of the data under review
HEAD	the digital signature of the data under review
index.docx	review in MS Word format
index.html	review in HTML format
index.md	review in Pandoc markdown format
index.pdf	review in PDF format
indexed-citations.csv.gz	list of distinct reference citations for reviewed species interaction claims in gzipped comma-separated values file format
indexed-citations.html.gz	list of distinct reference citations for reviewed species interactions claims in gzipped html file format
indexed-citations.tsv.gz	list of distinct reference citations for reviewed species interaction claims in gzipped tab-separated values format
indexed-interactions-col-family-col-family.svg	network diagram showing the taxon family to taxon family interaction claims in the dataset under review as interpreted by the Catalogue of Life via Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024)

²Disclaimer: The results in this review should be considered friendly, yet naive, notes from an unsophisticated robot. Please keep that in mind when considering the review results.

filename	description
indexed-interactions-col-kingdom-col-kingdom.svg	network diagram showing the taxon kingdom to taxon kingdom interaction claims in the dataset under review as interpreted by the Catalogue of Life via Nomen Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024)
indexed-interactions.csv.gz	species interaction claims indexed from the dataset under review in gzipped comma-separated values format
indexed-interactions.html.gz	species interaction claims indexed from the dataset under review in gzipped html format
indexed-interactions.tsv.gz	species interaction claims indexed from the dataset under review in gzipped tab-separated values format
indexed-interactions.parquet	species interaction claims indexed from the dataset under review in Apache Parquet format
indexed-interactions-sample.csv	list of species interaction claims indexed from the dataset under review in gzipped comma-separated values format
indexed-interactions-sample.html	first 500 species interaction claims indexed from the dataset under review in html format
indexed-interactions-sample.tsv	first 500 species interaction claims indexed from the dataset under review in tab-separated values format
indexed-names.csv.gz	taxonomic names indexed from the dataset under review in gzipped comma-separated values format
indexed-names.html.gz	taxonomic names found in the dataset under review in gzipped html format
indexed-names.tsv.gz	taxonomic names found in the dataset under review in gzipped tab-separated values format
indexed-names.parquet	taxonomic names found in the dataset under review in Apache Parquet format

filename	description
indexed-names-resolved-col.csv.gz	taxonomic names found in the dataset under review aligned with the Catalogue of Life as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped comma-separated values format
indexed-names-resolved-col.html.gz	taxonomic names found in the dataset under review aligned with the Catalogue of Life as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped html format
indexed-names-resolved-col.tsv.gz	taxonomic names found in the dataset under review aligned with the Catalogue of Life as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped tab-separated values format
indexed-names-resolved-col.parquet	taxonomic names found in the dataset under review aligned with the Catalogue of Life as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in Apache Parquet format
indexed-names-resolved-discoverlife.csv.gz	taxonomic names found in the dataset under review aligned with Discover Life bee species checklist as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped comma-separated values format
indexed-names-resolved-discoverlife.html.gz	taxonomic names found in the dataset under review aligned with Discover Life bee species checklist as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped html format

filename	description
indexed-names-resolved-discoverlife.tsv.gz	taxonomic names found in the dataset under review aligned with Discover Life bee species checklist as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped tab-separated values format
indexed-names-resolved-discoverlife.parquet	taxonomic names found in the dataset under review aligned with Discover Life bee species checklist as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in Apache Parquet format
indexed-names-resolved-gbif.csv.gz	taxonomic names found in the dataset under review aligned with GBIF Backbone Taxonomy as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped comma-separated values format
indexed-names-resolved-gbif.html.gz	taxonomic names found in the dataset under review aligned with GBIF Backbone Taxonomy as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped html format
indexed-names-resolved-gbif.tsv.gz	taxonomic names found in the dataset under review aligned with GBIF Backbone Taxonomy as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped tab-separated values format
indexed-names-resolved-gbif.parquet	taxonomic names found in the dataset under review aligned with GBIF Backbone Taxonomy as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in Apache Parquet format

filename	description
indexed-names-resolved-itis.csv.gz	taxonomic names found in the dataset under review aligned with Integrated Taxonomic Information System (ITIS) as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped comma-separated values format
indexed-names-resolved-itis.html.gz	taxonomic names found in the dataset under review aligned with Integrated Taxonomic Information System (ITIS) as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped html format
indexed-names-resolved-itis.tsv.gz	taxonomic names found in the dataset under review aligned with Integrated Taxonomic Information System (ITIS) as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped tab-separated values format
indexed-names-resolved-itis.parquet	taxonomic names found in the dataset under review aligned with Integrated Taxonomic Information System (ITIS) as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in Apache Parquet format
indexed-names-resolved-mdd.csv.gz	taxonomic names found in the dataset under review aligned with the Mammal Diversity Database as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped comma-separated values format
indexed-names-resolved-mdd.html.gz	taxonomic names found in the dataset under review aligned with Mammal Diversity Database as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped html format

filename	description
indexed-names-resolved-mdd.tsv.gz	taxonomic names found in the dataset under review aligned with Mammal Diversity Database as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped tab-separated values format
indexed-names-resolved-mdd.parquet	taxonomic names found in the dataset under review aligned with Mammal Diversity Database as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in Apache Parquet format
indexed-names-resolved-ncbi.csv.gz	taxonomic names found in the dataset under review aligned with the NCBI Taxonomy as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped comma-separated values format
indexed-names-resolved-ncbi.html.gz	taxonomic names found in the dataset under review aligned with the NCBI Taxonomy as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped html format
indexed-names-resolved-ncbi.tsv.gz	taxonomic names found in the dataset under review aligned with the NCBI Taxonomy as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped tab-separated values format
indexed-names-resolved-ncbi.parquet	taxonomic names found in the dataset under review aligned with the NCBI Taxonomy as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in Apache Parquet format

filename	description
indexed-names-resolved-pbdb.csv.gz	taxonomic names found in the dataset under review aligned with the Paleobiology Database as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped comma-separated values format
indexed-names-resolved-pbdb.html.gz	taxonomic names found in the dataset under review aligned with Paleobiology Database as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped html format
indexed-names-resolved-pbdb.tsv.gz	taxonomic names found in the dataset under review aligned with Paleobiology Database as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped tab-separated values format
indexed-names-resolved-pbdb.parquet	taxonomic names found in the dataset under review aligned with Paleobiology Database as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in Apache Parquet format
indexed-names-resolved-tpt.csv.gz	taxonomic names found in the dataset under review aligned with the Terrestrial Parasite Tracker (TPT) Taxonomic Resource as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped comma-separated values format
indexed-names-resolved-tpt.html.gz	taxonomic names found in the dataset under review aligned with the Terrestrial Parasite Tracker (TPT) Taxonomic Resource as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped html format

filename	description
indexed-names-resolved-tpt.tsv.gz	taxonomic names found in the dataset under review aligned with the Terrestrial Parasite Tracker (TPT) Taxonomic Resource as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped tab-separated values format
indexed-names-resolved-tpt.parquet	taxonomic names found in the dataset under review aligned with the Terrestrial Parasite Tracker (TPT) Taxonomic Resource as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in Apache Parquet format
indexed-names-resolved-wfo.csv.gz	taxonomic names found in the dataset under review aligned with the World of Flora Online as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped comma-separated values format
indexed-names-resolved-wfo.html.gz	taxonomic names found in the dataset under review aligned with the World of Flora Online as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped html format
indexed-names-resolved-wfo.tsv.gz	taxonomic names found in the dataset under review aligned with the World of Flora Online as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped tab-separated values format
indexed-names-resolved-wfo.parquet	taxonomic names found in the dataset under review aligned with the World of Flora Online as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in Apache Parquet format

filename	description
indexed-names-resolved-worms.csv.gz	taxonomic names found in the dataset under review aligned with the World Register of Marine Species (WoRMS) as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped comma-separated values format
indexed-names-resolved-worms.html.gz	taxonomic names found in the dataset under review aligned with the World Register of Marine Species (WoRMS) as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped html format
indexed-names-resolved-worms.tsv.gz	taxonomic names found in the dataset under review aligned with the World Register of Marine Species (WoRMS) as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in gzipped tab-separated values format
indexed-names-resolved-worms.parquet	taxonomic names found in the dataset under review aligned with the World Register of Marine Species (WoRMS) as accessed through the Nomer Corpus of Taxonomic Resources (J. H. (ed.). Poelen 2024) in Apache Parquet format
indexed-names-sample.csv	first 500 taxonomic names found in the dataset under review in comma-separated values format
indexed-names-sample.html	first 500 taxonomic names found in the dataset under review in html format
indexed-names-sample.tsv	first 500 taxonomic names found in the dataset under review in tab-separated values format
interaction.svg	diagram summarizing the data model used to index species interaction claims
nanopub-sample.trig	first 500 species interaction claims as expressed in the nanopub format (Kuhn and Dumontier 2014)

filename	description
nanopub.trig.gz	species interaction claims as expressed in the nanopub format (Kuhn and Dumontier 2014)
process.svg	diagram summarizing the data review processing workflow
prov.nq	origin of the dataset under review as expressed in rdf/nquads
review.csv.gz	review notes associated with the dataset under review in gzipped comma-separated values format
review.html.gz	review notes associated with the dataset under review in gzipped html format
review.tsv.gz	review notes associated with the dataset under review in gzipped tab-separated values format
review-sample.csv	first 500 review notes associated with the dataset under review in comma-separated values format
review-sample.html	first 500 review notes associated with the dataset under review in html format
review-sample.tsv	first 500 review notes associated with the dataset under review in tab-separated values format
review.svg	a review badge generated as part of the dataset review process
zenodo.json	metadata of this review expressed in Zenodo record metadata

Archived Dataset

Note that *data.zip* file in this archive contains the complete, unmodified archived dataset under review.

Biotic Interactions

In this review, biotic interactions (or biotic associations) are modeled as a primary (aka subject, source) organism interacting with an associate (aka object, target) organism. The dataset under review classified the primary/associate organisms with specific taxa. The primary and associate organisms The kind of interaction is documented as an interaction type.

The dataset under review, named *globalbioticinteractions/carvalho2023*, has

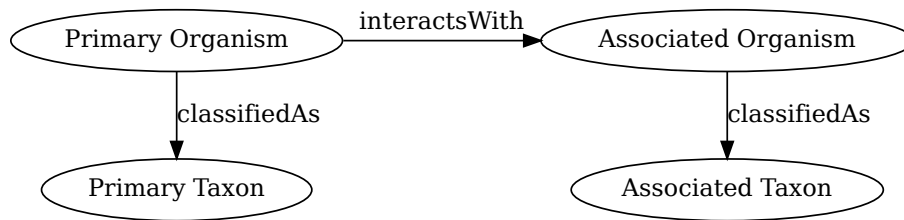


Figure 2: Biotic Interaction Data Model

fingerprint hash://md5/d768c5cff9fa25c1ae83054d4a34f529, is 1.66MiB in size and contains 685 interactions with 1 unique type of association (e.g., flowersVisitedBy) between 63 primary taxa (e.g., *Scabiosa columbaria*) and 171 associated taxa (e.g., *Bombus pascuorum*).

An exhaustive list of indexed interaction claims can be found in gzipped csv, tsv and parquet archives. To facilitate discovery, a preview of claims available in the gzipped html page at [indexed-interactions.html.gz](#) are shown below.

The exhaustive list was used to create the following data summaries below.

Table 3: Sample of Indexed Interaction Claims

sourceTaxonName	interactionType	targetTaxonName	referenceCitation
Pilosella officinarum	flowersVisitedBy	Andrena	WorldFAIR pilot data from: Visitation-Data_Luisa_Carvalho. Accessed at https://docs.google.com/spreadsheets/u/1/d/1cJ0qX9ppqHoSyqFykwYJefDFOzoutthBXjwKRY81T8/export?format=tsv&gid=776329546 on 07 Jul 2025.

sourceTaxonName	interactionTypeNam	targetTaxonName	referenceCitation
Mycelis muralis	flowersVisitedBy	Baccha	WorldFAIR pilot data from: Visitation-Data_Luisa_Carvalho. Accessed at https://docs.google.com/spreadsheets/u/1/d/1cJ0qX9ppqHoSyqFykwYJefDFOzoutthBXjwKRY81T8/export?format=tsv&gid=776329546 on 07 Jul 2025.
Apiaceae	flowersVisitedBy	Bombus	WorldFAIR pilot data from: Visitation-Data_Luisa_Carvalho. Accessed at https://docs.google.com/spreadsheets/u/1/d/1cJ0qX9ppqHoSyqFykwYJefDFOzoutthBXjwKRY81T8/export?format=tsv&gid=776329546 on 07 Jul 2025.

sourceTaxonName	interactionTypeName	targetTaxonName	referenceCitation
Origanum vulgare	flowersVisitedBy	Bombus	WorldFAIR pilot data from: Visitation- Data_Luisa_Carvalho. Accessed at https://docs.google.com/spreadsheets/u/1/d/1cJ0qX9ppqHoSyqFykwYJef-DFOzoutthBXjwKRY81T8/export?format=tsv&gid=776329546 on 07 Jul 2025.

Table 4: Most Frequently Mentioned Interaction Types (up to 20 most frequent)

interactionTypeName	count
flowersVisitedBy	685

Table 5: Most Frequently Mentioned Primary Taxa (up to 20 most frequent)

sourceTaxonName	count
Scabiosa columbaria	44
Solidago virgaurea	39
Rubus fruticosus	36
Helianthemum nummularium	32
Geranium robertianum	32
Senecio	32
Crepis	30
Centranthus ruber	26
Clematis vitalba	24
Hieracium	23
Origanum vulgare	22
Achillea millefolium	22
Pilosella officinarum	20
Torilis japonica	15

sourceTaxonName	count
Cotoneaster franchetti	14
Hypericum perforatum	13
Ligustrum vulgare	13
Lactuca serriola	12
Eupatorium cannabinum	11

Table 6: Most Frequently Mentioned Associate Taxa (up to 20 most frequent)

targetTaxonName	count
Bombus pascuorum	64
Episyrphus balteatus	25
Lasioglossum morio	22
Formica fusca	21
Meligethes solidus	20
Diptera	17
Syrphus ribesii	17
Heteroptera	16
Lasius alienus	15
Platycheirus albimanus	14
Hymenoptera	13
Halictus tumulorum	13
Anaspis pulicaria	12
Meligethes aeneus	10
Oedemera lurida	10
Paragus haemorrhous	10
Sphaerophoria scripta	10
Coleoptera	9
Thysanoptera	9

Table 7: Most Frequent Interactions between Primary and Associate Taxa (up to 20 most frequent)

sourceTaxonName	interactionTypeName	targetTaxonName	count
Geranium robertianum	flowersVisitedBy	Bombus pascuorum	6
Scabiosa columbaria	flowersVisitedBy	Bombus pascuorum	5
Solidago virgaurea	flowersVisitedBy	Bombus pascuorum	5
Teucrium scorodonia	flowersVisitedBy	Bombus pascuorum	5
Clinopodium ascendens	flowersVisitedBy	Bombus pascuorum	4
Lotus corniculatus	flowersVisitedBy	Bombus pascuorum	4

sourceTaxonName	interactionTypeName	targetTaxonName	count
Origanum vulgare	flowersVisitedBy	Bombus pascuorum	4
Rubus fruticosus	flowersVisitedBy	Bombus pascuorum	4
Achillea millefolium	flowersVisitedBy	Heteroptera	3
Centranthus ruber	flowersVisitedBy	Homoptera	3
Solidago virgaurea	flowersVisitedBy	Sarcophaga	3
Rubus fruticosus	flowersVisitedBy	Anaspis pulicaria	3
Clematis vitalba	flowersVisitedBy	Episyrphus balteatus	3
Geranium robertianum	flowersVisitedBy	Episyrphus balteatus	3
Scabiosa columbaria	flowersVisitedBy	Episyrphus balteatus	3
Scabiosa columbaria	flowersVisitedBy	Eristalis tenax	3
Cotoneaster franchetti	flowersVisitedBy	Formica fusca	3
Clematis vitalba	flowersVisitedBy	Lasioglossum morio	3
Origanum vulgare	flowersVisitedBy	Lasioglossum morio	3

Interaction Networks

The figures below provide a graph view on the dataset under review. The first shows a summary network on the kingdom level, and the second shows how interactions on the family level. It is important to note that both network graphs were first aligned taxonomically using the Catalogue of Life. Please refer to the original (or verbatim) taxonomic names for a more original view on the interaction data.



Figure 3: Interactions on taxonomic kingdom rank as interpreted by the Catalogue of Life download svg

You can download the indexed dataset under review at indexed-interactions.csv.gz. A tab-separated file can be found at indexed-interactions.tsv.gz

Learn more about the structure of this download at GloBI website, by opening a GitHub issue, or by sending an email.

Another way to discover the dataset under review is by searching for it on the GloBI website.

Taxonomic Alignment

As part of the review, all names are aligned against various name catalogs (e.g., col, ncbi, discoverlife, gbif, itis, wfo, mdd, tpt, pbdb, and worms). These alignments can help review name usage or aid in selecting of a suitable taxonomic name resource.

Table 8: Sample of Name Alignments

providedName	relationName	resolvedCatalogName	resolvedName
Achillea millefolium	SYNONYM_OF	col	Achillea aspleniifolia
Achillea millefolium	HAS_ACCEPTED_NAME	col	Achillea millefolium
Aglais urticae	HAS_ACCEPTED_NAME	col	Aglais urticae
Agrypnus murinus	NONE	col	Agrypnus murinus

Table 9: Distribution of Taxonomic Ranks of Aligned Names by Catalog. Names that were not aligned with a catalog are counted as NAs. So, the total number of unaligned names for a catalog will be listed in their NA row.

resolvedCatalogName	resolvedRank	count
col	NA	48
col	family	9
col	genus	22
col	order	5
col	species	137
col	subfamily	1
col	subspecies	6
discoverlife	NA	203
discoverlife	species	21
gbif	NA	19
gbif	family	9
gbif	genus	30
gbif	order	5
gbif	species	164
gbif	subspecies	7
itis	NA	91
itis	family	9
itis	genus	19
itis	order	5
itis	species	96

resolvedCatalogName	resolvedRank	count
itis	subfamily	1
itis	suborder	2
itis	subspecies	1
mdd	NA	224
ncbi	NA	23
ncbi	family	9
ncbi	genus	22
ncbi	order	5
ncbi	species	159
ncbi	subfamily	1
ncbi	subgenus	6
ncbi	suborder	2
ncbi	subspecies	2
pbdb	NA	187
pbdb	family	9
pbdb	genus	17
pbdb	infraorder	1
pbdb	order	5
pbdb	species	3
pbdb	subfamily	1
pbdb	suborder	2
tpt	NA	223
tpt	species	1
wfo	NA	163
wfo	family	2
wfo	genus	6
wfo	species	51
wfo	subspecies	3
worms	NA	169
worms	family	9
worms	genus	13
worms	order	5
worms	species	25
worms	subfamily	1
worms	suborder	2

Table 10: Name relationship types per catalog. Name relationship type “NONE” means that a name was not recognized by the associated catalog. “SAME_AS” indicates either a “HAS_ACCEPTED_NAME” or “SYNONYM_OF” name relationship type. We recognize that “SYNONYM_OF” encompasses many types of nomenclatural synonymies (ICZN 1999) (e.g., junior synonym, senior synonyms).

resolvedCatalogName	relationName	count
col	SYNONYM_OF	47
col	HAS_ACCEPTED_NAME	165
col	NONE	58
discoverlife	NONE	213
discoverlife	HAS_ACCEPTED_NAME	21
discoverlife	HOMONYM_OF	2
discoverlife	SYNONYM_OF	5
gbif	HAS_ACCEPTED_NAME	230
gbif	SYNONYM_OF	85
gbif	NONE	29
itis	HAS_ACCEPTED_NAME	128
itis	NONE	101
itis	SYNONYM_OF	7
mdd	NONE	234
ncbi	SAME_AS	189
ncbi	SYNONYM_OF	17
ncbi	NONE	33
pbdb	NONE	197
pbdb	HAS_ACCEPTED_NAME	39
tpt	NONE	233
tpt	SYNONYM_OF	1
wfo	HAS_ACCEPTED_NAME	52
wfo	NONE	173
wfo	SYNONYM_OF	16
wfo	HAS_UNCHECKED_NAME	18
worms	HAS_ACCEPTED_NAME	62
worms	NONE	179
worms	SYNONYM_OF	3

Table 11: List of Available Name Alignment Reports

catalog name	alignment results
col	associated names alignments report in gzipped html, csv, and tsv)

catalog name	alignment results
ncbi	associated names alignments report in gzipped html, csv, and tsv)
discoverlife	associated names alignments report in gzipped html, csv, and tsv)
gbif	associated names alignments report in gzipped html, csv, and tsv)
itis	associated names alignments report in gzipped html, csv, and tsv)
wfo	associated names alignments report in gzipped html, csv, and tsv)
mdd	associated names alignments report in gzipped html, csv, and tsv)
tpt	associated names alignments report in gzipped html, csv, and tsv)
pbdb	associated names alignments report in gzipped html, csv, and tsv)
worms	associated names alignments report in gzipped html, csv, and tsv)

Additional Reviews

Elton, Nomer, and other tools may have difficulties interpreting existing species interaction datasets. Or, they may misbehave, or otherwise show unexpected behavior. As part of the review process, detailed review notes are kept that document possibly misbehaving, or confused, review bots. An sample of review notes associated with this review can be found below.

Table 12: First few lines in the review notes.

reviewDate	reviewCommentType	reviewComment
2025-07-07T19:42:58Z	summary	https://github.com/globalbioticinteractions/carvalheiro
2025-07-07T19:42:58Z	summary	685 interaction(s)
2025-07-07T19:42:58Z	summary	0 note(s)
2025-07-07T19:42:58Z	summary	685 info(s)

In addition, you can find the most frequently occurring notes in the table below.

: Most frequently occurring review notes, if any.

For additional information on review notes, please have a look at the first 500 Review Notes in html format or the download full gzipped csv or tsv archives.

GloBI Review Badge

As part of the review, a review badge is generated. This review badge can be included in webpages to indicate the review status of the dataset under review.



Figure 5: Picture of a GloBI Review Badge ³

Note that if the badge is green, no review notes were generated. If the badge is yellow, the review bots may need some help with interpreting the species interaction data.

GloBI Index Badge

If the dataset under review has been registered with GloBI, and has been successfully indexed by GloBI, the GloBI Index Status Badge will turn green. This means that the dataset under review was indexed by GloBI and is available through GloBI services and derived data products.



Figure 6: Picture of a GloBI Index Badge ⁴

If you'd like to keep track of reviews or index status of the dataset under review, please visit GloBI's dataset index ⁵ for badge examples.

Discussion

This review and archive provides a means of creating citable versions of datasets that change frequently. This may be useful for dataset managers, including natural history collection data managers, as a backup archive of a shared Darwin Core archive. It also serves as a means of creating a trackable citation for the dataset in an automated way, while also including some information about the contents of the dataset.

This review aims to provide a perspective on the dataset to aid in understanding of species interaction claims discovered. However, it is important to note that this review does *not* assess the quality of the dataset. Instead, it serves as an

³Up-to-date status of the GloBI Review Badge can be retrieved from the GloBI Review Depot

⁴Up-to-date status of the GloBI Index Badge can be retrieved from GloBI's API

⁵At time of writing (2025-07-07) the version of the GloBI dataset index was available at <https://globalbioticinteractions.org/datasets>

indication of the open-ness⁶ and FAIRness (Wilkinson et al. 2016; Trekels et al. 2023) of the dataset: to perform this review, the data was likely openly available, **F**indable, **A**ccessible, **I**nteroperable and **R**eusable. The current Open-FAIR assessment is qualitative, and a more quantitative approach can be implemented with specified measurement units.

This report also showcases the reuse of machine-actionable (meta)data, something highly recommended by the FAIR Data Principles (Wilkinson et al. 2016). Making (meta)data machine-actionable enables more precise processing by computers, enabling even naive review bots like Nomer and Elton to interpret the data effectively. This capability is crucial for not just automating the generation of reports, but also for facilitating seamless data exchanges, promoting interoperability.

Acknowledgements

We thank the many humans that created us and those who created and maintained the data, software and other intellectual resources that were used for producing this review. In addition, we are grateful for the natural resources providing the basis for these human and bot activities. Also, thanks to <https://github.com/zygoballus> for helping improve the layout of the review tables.

Author contributions

Nomer was responsible for name alignments. Elton carried out dataset extraction, and generated the review notes. Preston tracked, versioned, and packaged, the dataset under review.

References

- Elliott, Michael, Jorrit Poelen, Icaro Alzuru, Emilio Berti, and partha04patel. 2025. “Bio-Guoda/Preston: 0.10.5.” Zenodo. <https://doi.org/10.5281/zenodo.14662206>.
- ICZN. 1999. “International Code of Zoological Nomenclature.” The International Trust for Zoological Nomenclature, London, UK. <https://www.iczn.org/the-code/the-code-online/>.
- Kuhn, Tobias, and Michel Dumontier. 2014. “Trusty URIs: Verifiable, Immutable, and Permanent Digital Artifacts for Linked Data.” In *The Semantic Web: Trends and Challenges*, edited by Valentina Presutti, Claudia d’Amato, Fabien Gandon, Mathieu d’Aquin, Steffen Staab, and Anna Tordai, 395–410. Cham: Springer International Publishing.

⁶According to <http://opendefinition.org/>: “Open data is data that can be freely used, reused and redistributed by anyone - subject only, at most, to the requirement to attribute and sharealike.”

- Kuhn, Tobias, Jorrit Poelen, and Katrin Leinweber. 2025. “Globalbioticinteractions/Elton: 0.15.1.” Zenodo. <https://doi.org/10.5281/zenodo.14927734>.
- Poelen, Jorrit H. (ed.). 2024. “Nomer Corpus of Taxonomic Resources Hash://Sha256/ B60c0d25a16ae77b24305782017b1a270b79b5d1746f832650 F2027ba536e276 Hash://Md5/17f1363a277ee0e4ecaf1b91c665e47e.” Zenodo. <https://doi.org/10.5281/zenodo.12695629>.
- Poelen, Jorrit H., James D. Simons, and Chris J. Mungall. 2014. “Global Biotic Interactions: An Open Infrastructure to Share and Analyze Species-Interaction Datasets.” *Ecological Informatics* 24 (November): 148–59. <https://doi.org/10.1016/j.ecoinf.2014.08.005>.
- Poelen, Jorrit, Katja Seltmann, and Daniel Mietchen. 2024. “Globalbioticinteractions/Globinizer: 0.4.0.” Zenodo. <https://doi.org/10.5281/zenodo.10647565>.
- Salim, José Augusto, and Jorrit Poelen. 2025. “Globalbioticinteractions/Nomer: 0.5.15.” Zenodo. <https://doi.org/10.5281/zenodo.14893840>.
- Trekels, Maarten, Debora Pignatari Drucker, José Augusto Salim, Jeff Ollerton, Jorrit Poelen, Filipi Miranda Soares, Max Rünzel, Muo Kasina, Quentin Groom, and Mariano Devoto. 2023. “WorldFAIR Project (D10.1) Agriculture-related pollinator data standards use cases report.” Zenodo. <https://doi.org/10.5281/zenodo.8176978>.
- Wilkinson, Mark D., Michel Dumontier, IJsbrand Jan Aalbersberg, Gabrielle Appleton, Myles Axton, Arie Baak, Niklas Blomberg, et al. 2016. “The FAIR Guiding Principles for Scientific Data Management and Stewardship.” *Scientific Data* 3 (1). <https://doi.org/10.1038/sdata.2016.18>.