



Workshop Welcome: Supporting Inclusive and Sustainable Research infrastructure for Systematics (SISRIS) by **connecting scientists and their specimens**



Purpose: We want to empower all those (past and present) who steward, collect, and identify specimens to get credit for the work and their contributions to amassing scientific knowledge. We need your help to build a community around these efforts.

Brief Summary: Imagine being able to see, all in one place, which people have collected or identified specimens and where they have done this work over many years. Next, think about the people-knowledge you may hold in your head or in your collection. We need your input, added to online information, to help us improve vouchered specimen records and to fill in gaps in what we know about the "who".

Usually, each collection database maintains a list of people records (sometimes referred to as "agents"). With a collective effort, we can share what we know across our communities, not bound by our local collection management software or organizational walls. This means we can share what we know (e.g. birth and death dates) and what we find in publications, field notes, etc.

In this SISRIS workshop, you will learn how you can contribute your knowledge, using Bionomia. To prepare for these explorations, we have some tasks to accomplish. We will learn about Wikidata and ORCID where the identities of people are expressed and/or linked to other resources and about Bionomia where links between people and specimens will be built. We will learn about what this work makes possible for you and your institutions and research cohorts. At the end of the day we will evaluate our progress and plan next steps, such as the potential for others to help us progress even further in building our collector-specimen network.

Here's an example of what we can do (eventually for all collectors), but only with your help.

Zoë Goodwin
Zoë Africa Goodwin
Botany, Tropical Diversity, Plant Identification, Belize, Peru, Neotropics

4,313 specimens collected from at least 4 countries
870 specimens identified from at least 11 countries
110,392 specimens attributed to 20 people
1,266 specimens used in 70 works

Progress 100%

Collected From
Identified From

Map List

Identified From

Map List

Help Attribute Refresh stats Refresh

zenodo March 6, 2023

Natural history specimens collected and/or identified and deposited.

545 370

Dates Identified

Specimens

Year

2005 2010 2015 2020

2005 2010 2015 2020

2005 2010 2015 2020

2005 2010 2015 2020

DOI 10.5281/zenodo.3581428

Help Attribute Refresh stats Refresh

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Our Workshop Workflow

1. Introductions and Overview.

This workshop and paired symposium give us a structured opportunity to share new practices. These new practices will improve attribution of natural history specimens and highlight the research advances in systematics that can be made as a consequence of improved people-data within biodiversity informatics databases and beyond.

2. About Bionomia.

Bionomia (<https://bionomia.net/>) is a web-based platform that aims to make biodiversity data and data about the people who generate this information more discoverable, accessible, and reusable. Individuals worldwide can help by confirming who is asserted to have collected or identified a given specimen. Bionomia also offers a way for individuals and institutions to create and manage their own online biodiversity profile that links their name unambiguously with the specimens they have collected or identified. Through the use of both people identifiers (ORCiDs and Wikidata Q numbers) and GBIF dataset IDs, this work enhances discovery of expertise and related publications for a given specimen via GBIF (Global Biodiversity Information Facility).

Bionomia has the potential to enhance the transparency, reproducibility, and impact of biodiversity research by making it easier to track and credit the contributions of individual researchers, as well as to understand the patterns and biases in biodiversity data and collector networks.

In data-geek-speak, Bionomia “pivots” GBIF data around “name strings” so that humans can go in and make assertions that help clarify who-is-who. Identifiers for people make this work possible.

3. About Identifiers.

Think for a moment about all the ways in which you are known to your family, your friends, your professional colleagues. Then, consider the specimen and observation / checklist data aggregated by GBIF who use taxon names as the key way to search the data. If you try to search for a person, you may soon discover they have records associated with various versions of their name. There is no way to find “all” the records at one time for a given person or even be certain they are the same person. This makes it difficult to: learn about collector networks, reconstruct historical collecting, understand the impact of a given person’s efforts and expertise, and figure out exactly who-is-who if they have the same exact “name string.”

While other types of people identifiers could have been used, for various reasons (just ask us), the most suitable ones currently are ORCID IDs (for the living) or Wikidata Q numbers (for those who are no longer on the planet).

4. About Sleuthing for name strings.

Of course, we all bring different knowledge to this who’s who adventure. We bring different expertise and experience regarding where to look for information as well. Next, here are some things that you might discover when doing this work. The more unique a person’s name is, it’s generally easier to go through the specimen records quickly and be quite certain you are linking the “correct” person with the “correct” unique person identifier (e. g. Harry Hoogstraal as an example of a very distinct name string). Of course, Harry might have a son with the same name, who also collected specimens. In that case, you’re going to need to look at dates collected (or some other variable, like where collected or what was collected). This will mean trying to find out more about this person or persons using resources like the ones offered below in the resources section. You may know of other resources, please share them!

Other people have married names, dead names, maiden names, multi-part names etc. Depending on how these specimen-related data were written in the first place, and how they were captured in a given collection management database can create some puzzles to solve. Many specimens have “Mrs [Man] Name.” Sometimes “Mrs” is not captured in the local database and the specimen appears in GBIF (and Bionomia) to have been collected by a man. Sometimes, if this married person also collected before marrying, there are specimens out there with their maiden name. The specimens themselves don’t tell us (usually) what the connection is. In this case, our task becomes finding some document (e. g. publication, marriage record, death record, etc) that definitively gives us both of their “names” so we can be (relatively) certain they are one-and-the-same.

Wikidata can be quite helpful here. On a wikidata page, you can find known aliases for a given person. [HINT: if you discover another alias for a given person, it’s easy to get a Wikidata account and become an editor. Then, you add the alias to that person’s page making it easier for both humans and machines to link people together going forward]. For you, yourself, you can add aliases to your ORCID account. Note it is not etiquette to create a wikidata page for yourself.

Depending on the names you select to work on, and your own personal knowledge, you will likely start your sleuthing in a different place. For some of these names, much work will be needed to figure out exactly who they are and discern one name string from a very similar one. Other names (as in the H. Hoogstraal example above) prove quite easy to assert with

confidence that you have the correct person (and related identifier for them). If you're sure the person you're working on DID NOT collect a given specimen, you can also help Bionomia by selecting "not them" as your assertion.

5. Real life example/s.

Josephine Hart

The screenshot shows the Bionomia profile page for Josephine F. L. Hart. At the top, there is a navigation bar with icons for user profile, dashboard, collections, database, documents, network, and search. On the right side of the bar are links for "Help Others", a dropdown menu, and a user icon. Below the bar, the main content area has a dark header with the name "Josephine F. L. Hart". The header includes tabs for "Overview", "Specialties", "Network", "Deposited At", "Specimens", and "Science Enabled". The "Overview" tab is selected. A summary box displays the following statistics: "337 specimens collected from at least 2 countries", "476 specimens identified from at least 3 countries", and "90 specimens used in 7 works". To the right of this box is a "Progress" bar with a value of 8. Below the summary box, there are two sections: "Collected From" and "Identified From", each with "Map" and "List" buttons. Under "Collected From", a map of North America shows collection locations in Canada and the United States. Under "Identified From", a world map shows identification locations across various continents. At the bottom left, there are links for "Help Attribute", "Refresh stats", and "Refresh".

Josephine F. L. Hart

J. F. L. Hart; Barbs Hart; Josephine F.L. Hart;
Josephine Frances Lavinia Hart; Mrs Clifford
Carl; Josephine Carl; Mrs G. C. Carl
* June 19, 1909 – August 11, 1993 †
zoologist, carcinologist, scientific illustrator

zoologist and carcinologist (1909 – 1993)

http://www.wikidata.org/entity/Q22106378

Canada

Help Attribute Refresh stats Refresh

Overview Specialties Network Deposited At Specimens Science Enabled

337 specimens collected from at least 2 countries
476 specimens identified from at least 3 countries
90 specimens used in 7 works

Progress 8

Collected From

Map List

Identified From

Map List

Help Others

What happens when you search GBIF (or other aggregators) for specimens that might be associated with Josephine Hart? Given her aliases, now that you know them, how many searches would you need to do to find all her work? How do identifiers for people change this scenario?

Searching GBIF for Hart, J

The screenshot shows the GBIF Occurrences search results page. The search term 'Hart, Jo' has been entered into the search bar. The results table displays 2,286,018,069 results, with the first few rows shown below:

Scientific name	Country or area	Coordinates	Month & year	Occurrence status	Basin
<i>Rytidosperma racemosum</i> (R.Br.) Connor & ...	Australia	35.2S, 149.0E	2023 January	Present	Hum
<i>Lerista apoda</i> Storr, 1976	Australia	17.9S, 122.3E	2023 January	Present	Hum
<i>Regulus regulus</i> (Linnaeus, 1758)	Denmark	55.3N, 10.8E	2023 January	Present	Hum
<i>Sorghum leiocladum</i> (Hack.) C.E.Hubb.	Australia	36.2S, 149.0E	2023 January	Present	Hum
<i>Arctocephalus forsteri</i> (Lesson, 1828)	Australia	34.9S, 135.7E	2023 January	Present	Hum
<i>Chroicocephalus ridibundus</i> (Linnaeus, 1766)	United Kingdom of Great ...	52.6N, 0.7W	2023 January	Present	Hum
<i>Callitris glauophylla</i> J.Thompson & L.A.S.J..	Australia	32.5S, 146.7E	2023 January	Present	Hum
<i>Lycopodium fastigiatum</i> R.Br.	Australia	35.5S, 148.8E	2023 January	Present	Hum
<i>Parus major</i> Linnaeus, 1758	Russian Federation	55.9N, 38.1E	2023 January	Present	Hum
<i>Dendrocopos major</i> (Linnaeus, 1758)	Russian Federation	55.9N, 38.1E	2023 January	Present	Hum
<i>Pica pica</i> (Linnaeus, 1758)	Russian Federation	55.9N, 38.1E	2023 January	Present	Hum
<i>Corvus cornix</i> Linnaeus, 1758	Russian Federation	55.9N, 38.1E	2023 January	Present	Hum
<i>Passer montanus</i> (Linnaeus, 1758)	Russian Federation	55.9N, 38.1E	2023 January	Present	Hum
<i>Commelinia cyanea</i> R.Br.	Australia	34.9S, 150.8E	2023 January	Present	Hum
<i>Chroicocephalus novaehollandiae</i> (Stephen...)	Australia	33.7S, 136.9E	2023 January	Present	Hum
<i>Plagiochila asplenoides</i> (L.) Dumort.	Denmark	55.2N, 9.4E	2023 January	Present	Hum
<i>Sericornis frontalis</i> (Vigors & Horsfield, 1827)	Australia	34.6S, 150.4E	2023 January	Present	Hum

The sidebar on the left shows various filters and facets, including 'Continent', 'Issues and flags', 'Media type', 'Publisher', 'Hosting organization', 'Institution code', 'Institution', 'Collection code', 'Collection', 'Catalogue number', 'Type status', 'IUCN Global Red List Category', 'Recorded by', and 'Publishing country or area'. The 'Recorded by' facet is currently expanded, showing several entries for 'Hart, John'.

Robert Traub (entomologist, fleas). Which of the following specimens got collected or identified by Robert Traub? (From Search at GBIF). What will you need to do to figure this out? How do identifiers (if shared with GBIF) change finding his work?

Scientific name	Country or area	Coordinates	Month & year
<i>Rytidosperma racemosum</i> (R.Br.) Connor & ...	Australia	35.2S, 149.0E	2023 January
<i>Lerista apoda</i> Storr, 1976	Australia	17.9S, 122.3E	2023 January
<i>Regulus regulus</i> (Linnaeus, 1758)	Denmark	55.3N, 10.8E	2023 January
<i>Sorghum leiocladum</i> (Hack.) C.E.Hubb.	Australia	36.2S, 149.0E	2023 January
<i>Arctocephalus forsteri</i> (Lesson, 1828)	Australia	34.9S, 135.7E	2023 January
<i>Chroicocephalus ridibundus</i> (Linnaeus, 1766)	United Kingdom of Great ...	52.6N, 0.7W	2023 January
<i>Callitris glauophylla</i> J.Thompson & L.A.S.J...	Australia	32.5S, 146.7E	2023 January
<i>Lycopodium fastigiatum</i> R.Br.	Australia	35.5S, 148.8E	2023 January
<i>Parus major</i> Linnaeus, 1758	Russian Federation	55.9N, 38.1E	2023 January
<i>Dendrocopos major</i> (Linnaeus, 1758)	Russian Federation	55.9N, 38.1E	2023 January
<i>Pica pica</i> (Linnaeus, 1758)	Russian Federation	55.9N, 38.1E	2023 January
<i>Corvus cornix</i> Linnaeus, 1758	Russian Federation	55.9N, 38.1E	2023 January
<i>Passer montanus</i> (Linnaeus, 1758)	Russian Federation	55.9N, 38.1E	2023 January
<i>Commelina cyanea</i> R.Br.	Australia	34.9S, 150.8E	2023 January
<i>Chroicocephalus novaehollandiae</i> (Stephen...)	Australia	33.7S, 136.9E	2023 January
<i>Plagiochila asplenoides</i> (L.) Dumort.	Denmark	55.2N, 9.4E	2023 January
<i>Sericornis frontalis</i> (Vigors & Horsfield, 1827)	Australia	34.6S, 150.4E	2023 January
<i>Eleocharis</i> R.Br.	Australia	35.2S, 149.1E	2023 January
<i>Muntiacus reevesi</i> (Ogilby, 1839)	United Kingdom of Great ...	51.9N, 1.6W	2023 January
<i>Strix aluco</i> Linnaeus, 1758	Denmark	55.9N, 10.1E	2023 January

Today's Bionomia adventure, part I.

We've prepared a curated list of names for you to pick from. These people are deceased. We've checked to see if they have a wikidata page and that they are in Bionomia. [Note: in a longer workshop, we show you how to create wikidata pages when needed, for deceased collectors or those identifying specimens, when they don't have one yet. See [Workshops](#) and [Help Documents](#) at Bionomia for more about this].

1. Log into Bionomia. You'll need your ORCID to do this.
2. From the Google Spreadsheet [LINK], please pick someone to work on. Add your initials in the Google Spreadsheet to claim that person to work on.
 - a. After the workshop, please note you can continue this work, selecting people to help, as you choose. More about how / where to do this in Bionomia later in this document.

- b. You can also add someone, if you discover either a living or deceased person who needs to be added. You'll need their ORCID or Wikidata Q number to do this. Go to "[Add Someone](#)" to add their ORCID or Wikidata Q number to Bionomia.

Mary Smith

Search ▾

By Country Specimens New People Latest Recipients Add Someone

Couldn't find someone?

- Living:** Ask them to create an ORCID account with a publicly available name. If they assign themselves one or more of the keywords *taxonomy, taxonomist, mycology, zoology, entomology, botany, systematics, phylogenetics, biodiversity* to their ORCID account, Bionomia will add them the following day
- Deceased:** Search on Wikidata and ensure they have a death date and there is a value for any of the properties: *IPNI, Harvard Index of Botanists, Entomologists of the World, ZooBank Author ID, BHL Creator ID, Stuttgart Database of Scientific Illustrators ID, Zürich Herbaria collector ID*. Bionomia will also add them by the following day.

Add a Person

Add ORCID Identifier or Wikidata Q Number

Q1234567

Add

3. To find them in Bionomia, either click the [LINK] in the Google Spreadsheet or enter their "name string" in the Search field.

Mary Smith

Get started ▾ Your profile

Today's Featured Collectors

BRAUN, Paul Jean-Charles Collected Heterogastridae and identified Buprestidae 4 specimens claimed	von Mering, Sabine Collected Caryophyllaceae and identified Juncaginaceae 1,388 specimens claimed	de Souza, Lesley Collected Characidae and identified Characidae 4,374 specimens claimed
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4. Next, "claim" their specimens for them. You will be able to assert the specimen was collected or identified by them, or both. Note you can do this record-by-record or in bulk.
- Sometimes, with knowledge you have, you'll be able to assert quite easily if the proposed person goes with the specimen record you are reviewing. Other times, you will need to spend some time searching various resources to learn more about the person and their work. What resources you go to first, will vary with your personal knowledge, the resources you have at hand, and the facts presented to you via the specimen record, any attached images, and what you might find say, at wikidata or in their ORCID profile.
 - If all records on a given page are collected, identified, or "both" for the same person, you can use the Bulk Assignment options at the top (or bottom) of each page.

- c. **Bulk Attributions**. IF there are MANY specimen records with the name string to claim, you can download a file (a "CSV") with these records and claim them in the file. Then you upload the file back into Bionomia.
- d. If you can be (reasonably) certain the person DID NOT collect or ID the given specimen, it's very helpful if you will select "Not them" on the far right (in the screenshot).

Ursula Eberhardt

<https://orcid.org/0000-0003-1221-7074>

State Museum of Natural History Stuttgart, Stuttgart, Baden-Württemberg, DE

Profile is not public Refresh

Scientific Name	Collected By	Identified By	Date Collected	Date Identified	Family	Institution	Catalog Number	Type Status	Basis Of Record	Not the
Hebeloma subfastigiale	Murrill	Henry Beker & Ursula Eberhardt	1938-01-08	2018-09	Hymenogastraceae	TENN-F	TENN-F-037584	isotype	PRESERVED_SPECIMEN	<input type="checkbox"/>
Hebeloma neurophyllum	N.C.	Henry Beker & Ursula Eberhardt	1906-10-18	2018-09	Hymenogastraceae	TENN-F	TENN-F-037531	isotype	PRESERVED_SPECIMEN	<input type="checkbox"/>
Hebeloma subaustrale	G.F. Weber	Henry Beker & Ursula Eberhardt	1941-10-30	2018-09	Hymenogastraceae	TENN-F	TENN-F-021177	isotype	PRESERVED_SPECIMEN	<input type="checkbox"/>
Hebeloma longisporum	W.A. Murrill	Henry Beker & Ursula Eberhardt	1938-10-29	2018-09	Hymenogastraceae	TENN-F	TENN-F-021141	isotype	PRESERVED_SPECIMEN	<input type="checkbox"/>
Hebeloma pallidifolium	W.A. Murrill	Henry Beker & Ursula Eberhardt	1944-11-19	2018-09	Inocybaceae	TENN-F	TENN-F-021175	isotype	PRESERVED_SPECIMEN	<input type="checkbox"/>
Hebeloma praefarinaceum	W.A. Murrill	Henry Beker & Ursula Eberhardt	1938-01-14	2018-09	Hymenogastraceae	TENN-F	TENN-F-021176	isotype	PRESERVED_SPECIMEN	<input type="checkbox"/>

- 5. When you have "claimed" as many as you can be certain about, please make their profiles public (see above screenshot for where to click). (IF you happen to be working on a living person, you can attribute their specimens but you cannot make their profiles public. Only they can do this).
 - a. Skip those for which you cannot be reasonably certain.
- 6. If, as you learn about a person, you realize you can attribute more of their specimens OR you realize you misattributed a specimen, you can take care of these. You can go back to help attribute any time - see "Reclaim Ignored." And note the "Fix Attributions" tab to make changes to any given assertion.

Today's Bionomia adventure, part II.

1. If you collect or identify specimens AND these records are in GBIF, please work on claiming your own specimens and make your profile public. The options for doing this are the same as above.
 - a. If you don't yet do this work or you do but your specimen / identification work is not yet at GBIF, please do try out claiming specimens for more folks on our list or find others of interest to you (e. g. by taxonomic group or country perhaps). Thank you!
2. Once you've claimed your own specimens, you can publish your dataset to Zenodo to increase its use and discoverability and hence your scientific impact. You can teach others to do this as well. From [Bionomia how-it-works](#), here's how:
 - a. From the settings panel in your account, you may connect with [Zenodo](#) in two clicks using your ORCID credentials. Once you make this *set-it-and-forget-it* connection, Bionomia pushes your specimen data into this industry-recognized, stable, long-term archive and mints a new DataCite DOI. Your Zenodo token is cached in Bionomia and every week on your behalf, a new version of your specimen data is pushed to the archive *when you make new claims*. You will also receive a DataCite DOI badge on your Bionomia profile page and a formatted citation for your professional resume. The versioned data packages stored in Zenodo each consists of a csv file and a JSON-LD document, preparing the way for future Linked Data integrations. If you accept DataCite as a trusted organization in your ORCID account, you will receive a new formatted work entry there for your specimen dataset.
 - b. Here's an example of what this will look like in Bionomia and at Zenodo:

The screenshot shows a Bionomia user profile for K. Samanta Orellana. At the top, there is a navigation bar with links for Profiles, Scribes, Organizations, Datasets, Articles, Countries, Families, Agent Strings, Help Others, and a dropdown menu. Below the navigation bar is a photo of the user and their name, K. Samanta Orellana. To the right of the photo is a summary box containing statistics: 536 specimens collected from at least 4 countries, 3,037 specimens identified from at least 46 countries, 50,151 specimens attributed to 116 people, and 25 specimens used in 5 works. This summary box is highlighted with an orange border. Further down the page are sections for 'Collected From' and 'Identified From', each with 'Map' and 'List' tabs. Under 'Collected From', there is a world map where several countries are shaded in blue. Under 'Identified From', there is another world map where many more countries are shaded in blue. At the bottom left, there is a citation box: 'Orellana, K. Samanta. 2023. Natural history specimens collected and/or identified and deposited. [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.3942155>'. At the very bottom of the page are links for 'Help Attribute', 'Refresh stats', and 'Refresh'.

Continued, the example of what this Bionomia Profile and resulting dataset will look like in Zenodo.

The screenshot shows a Zenodo dataset page. At the top, there's a search bar, an upload button, and a communities section. Below the header, the date 'March 6, 2023' is displayed. The main title is 'Natural history specimens collected and/or identified and deposited.' Below the title, it says 'K. Samanta Orellana' and provides a link to their ORCID profile. A note states: 'Natural history specimen data collected and/or identified by K. Samanta Orellana, <https://orcid.org/0000-0002-4098-5823>. Claims were made on Bionomia, <https://bionomia.net> using specimen data from the Global Biodiversity Information Facility, <https://gbif.org>'.

Preview: This section contains a table showing four records (occurrences) with columns: action, gbifID, datasetKey, license, occurrenceID, and basisOfRecord. The table is highlighted with an orange border.

action	gbifID	datasetKey	license	occurrenceID	basisOfRecord
recorded	865243555	13b70480-bd69-11dd-b15f-b8a03c50a862	CC_BY_4.0	CAS:ANTWEB:casent0614010	PRESERVE
recorded	865243536	13b70480-bd69-11dd-b15f-b8a03c50a862	CC_BY_4.0	CAS:ANTWEB:casent0614009	PRESERVE
recorded	865243146	13b70480-bd69-11dd-b15f-b8a03c50a862	CC_BY_4.0	CAS:ANTWEB:casent0613993	PRESERVE
recorded	865243126	13b70480-bd69-11dd-	CC_BY_4.0	CAS:ANTWEB:casent0614042	PRESERVE

Files (4.6 MB): This section lists two files: '0000-0002-4098-5823.csv' (1.2 MB) and '0000-0002-4098-5823.json' (3.4 MB). Each file has a 'Preview' and 'Download' button.

Citations (0): This section shows that there are no citations. It includes a search bar and a note: 'Cite all versions? You can cite all versions by using the DOI 10.5281/zenodo.3942155. This DOI represents all versions, and will always resolve to the latest one. [Read more](#)'.

Share: Buttons for sharing on various platforms (Mendeley, Zotero, BibTeX, etc.) are shown.

Cite as: The citation information is: K. Samanta Orellana. (2023). Natural history specimens collected and/or identified and deposited. [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.7703182>

Export: Options for exporting the data in various formats: BibTeX, CSL, DataCite, Dublin Core, DCAT, JSON, JSON-LD, GeoJSON, MARCXML, and Mendeley.

Statistics: Shows 640 views and 536 downloads. A 'See more details...' link is available.

Indexed in: OpenAIRE

Publication date: March 6, 2023

DOI: DOI 10.5281/zenodo.7703182

Keyword(s): specimen, natural history, taxonomy

License (for files): Creative Commons Zero v1.0 Universal

3. Next, take some time to explore the Bionomia Profile menu bar for yourself or others you've helped today
 - a. Specialties: see family-level groups of specimens collected or identified
 - b. Network: if you or others collect with others, and all of you have specimens claimed, you'll see related people
 - c. Deposited At: with this feature, discover where the specimens currently reside
 - d. Specimens: see all the specimen records currently attributed to a given person
 - e. Science Enabled: discover all papers using GBIF datasets that contain/ed at least one specimen for the person whose Bionomia record you are perusing.
 - f. People Helped: for your own profile, this tab shows you whose specimens you worked on attributing.

K. Samanta Orellana

Samanta Orellana; K. Samanta Orellana Arévalo
Entomology, Taxonomy, Systematics, Anthribidae

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Orellana, K. Samanta. 2023. Natural history specimens collected and/or identified and deposited. [Data set]. Zenodo. https://doi.org/10.5281/zenodo.3942155

DOI: 10.5281/zenodo.3942155

Overview **Specialties** **Network** **Deposited At** **Specimens** **Science Enabled** **People Helped**

536 specimens collected from at least 4 countries
3,037 specimens identified from at least 46 countries
50,151 specimens attributed to 116 people
25 specimens used in 5 works

Progress 100%

Collected From

Identified From

4. In the **Bionomia top-menu bar**
 - a. Profiles: peruse and search for others of interest who have existing profiles in Bionomia
 - b. Scribes: see who is doing work in Bionomia to help others
 - c. **Organizations:** discover what is known about GBIF-published specimens and people and related publications for a given organization
 - i. Is your organization in the list?

K. Samanta Orellana

Samanta Orellana; K. Samanta Orellana Arévalo
Entomology, Taxonomy, Systematics, Anthribidae

https://orcid.org/0000-0002-4098-5823
Arizona State University, Tempe, AZ, US
Guatemala • United States

Orellana, K. Samanta. 2023. Natural history specimens collected and/or identified and deposited. [Data set]. Zenodo. https://doi.org/10.5281/zenodo.3942155

DOI: 10.5281/zenodo.3942155

Overview **Specialties** **Network** **Deposited At** **Specimens** **Science Enabled** **People Helped**

536 specimens collected from at least 4 countries
3,037 specimens identified from at least 46 countries
50,151 specimens attributed to 116 people
25 specimens used in 5 works

Progress 100%

4. (continued from the prior page) In the Bionomia top-menu bar - an **Organization Example**. Is your Organization in the list? Keep going to discover what you can now learn about collectors and identification experts and specimens for a given organization.

The screenshot shows the Bionomia website's 'Organizations' page. At the top, there is a navigation bar with links for Profiles, Scribes, Organizations, Datasets, Articles, Countries, Families, Agent Strings, Help Others, and a user icon. Below the navigation bar, the page title is 'Organizations' and it displays '7,658 organizations from ORCID accounts and Wikidata entries'. A search bar contains the text 'California' and a 'Search' button. The main content area shows a grid of organization cards. A green header bar at the top of the grid indicates '88 search results for California' and includes a 'Remove' link. The cards list various organizations, each with a thumbnail image, the organization name, its location, and the number of members. Some organizations listed include the University of Southern California, California State University Fullerton, California State University Los Angeles, University of California Office of the President, University of California Los Angeles College of Letters and Science, California State Polytechnic University Pomona, University of California Davis Bodega Marine Laboratory, University of California Davis Department of Entomology, University of California San Diego Health Sciences, California State University Monterey Bay, California Academy of Sciences Entomology, California Botanic Garden, California Digital Library, University of California Santa Barbara Department of Ecology Evolution and Marine Biology, and California State University Long Beach.

Organization	Location	Members
University of Southern California	Los Angeles, CA, US	2 members
California State University, Fullerton	Fullerton, CA, US	1 member
California State University, Los Angeles	Los Angeles, CA, US	1 member
University of California Office of the President	Oakland, CA, US	0 members
University of California Los Angeles College of Letters and Science	Los Angeles, CA, US	0 members
California State Polytechnic University, Pomona	Pomona, CA, US	0 members
University of California Davis Bodega Marine Laboratory	Bodega Bay, CA, US	0 members
University of California Davis Department of Entomology	Davis, CA, US	0 members
University of California San Diego Health Sciences	La Jolla, CA, US	1 member
California State University, Monterey Bay	Seaside, CA, US	0 members
California Academy of Sciences Entomology	San Francisco, CA, US	0 members
California Botanic Garden	Claremont, CA, US	1 member
California Digital Library	Oakland, CA, US	0 members
University of California Santa Barbara Department of Ecology Evolution and Marine Biology	Santa Barbara, CA, US	0 members
California State University Long Beach	Long Beach, CA, US	0 members

Profiles Scribes Organizations Datasets Articles Countries Families Agent Strings Help Others

University of California, Davis

Davis, CA, US
<http://www.ucdavis.edu/>





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<http://www.wikidata.org/entity/Q129421>



Current Previous Metrics Science Enabled

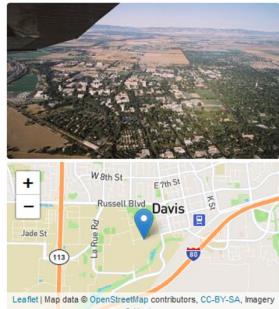
20 current members

Blaimer, Bonnie	Boles, Sara	Bond, Jason
 specimens claimed	 specimens claimed	 Collected Araneidae and identified Rhinocricidae
 specimens claimed	 specimens claimed	 528 specimens claimed
De La Cruz, Susan	Dean, Ellen	Eisen, Jonathan A.
 specimens claimed	 specimens claimed	 specimens claimed
Gepts, Paul	Godwin, Rebecca	Harris, Linda J.
United States	 specimens claimed	 specimens claimed
 specimens claimed	 specimens claimed	 specimens claimed
Korneyev, Severyn	Letana, Socrates	Motani, Ryosuke
Ukraine	 specimens claimed	 1 specimen claimed
 specimens claimed	 specimens claimed	
Muona, Jyrki	Mäntynen, Sari	Perez, Adrian
Collected Vespidae and identified Leioididae	 specimens claimed	 specimens claimed
 11 specimens claimed	 specimens claimed	
Prudic, Kathleen	Ross-Ibarra, Jeffrey	Schardl, Christopher
United States	 specimens claimed	 specimens claimed
Collected Nymphalidae and identified Nymphalidae	Collected Asteraceae and identified Euphorbiaceae	
 10 specimens claimed	 827 specimens claimed	 specimens claimed

University of California, Davis

Davis, CA, US

<http://www.ucdavis.edu/>



<http://www.wikidata.org/entity/Q129421>

Refresh

Current Previous Metrics Science Enabled

104 past members

Ahmed Ibrahim, Mohamed Ahmed
United States; Egypt

0 specimens claimed

Alhaddad, Hasan

0 specimens claimed

Amerine, Maynard
* 1911 – March 11, 1998 +
United States

0 specimens claimed

Armbruster, William Scott

0 specimens claimed

Atkinson, Emily

United States

0 specimens claimed

Axelrod, Daniel I.

* July 16, 1910 – June 02, 1998 +
United States

0 specimens claimed

Bapst, David

0 specimens claimed

Barbour, Michael G.

* February 24, 1942 – January 07, 2020 +
United States

0 specimens claimed

Berg, Rolf Yngvar

* December 02, 1925 – August 25, 2018 +
Norway

Collected Cyperaceae and identified
Cystopteridaceae

13,560 specimens claimed

Bohart, Richard M.

* September 28, 1913 – February 01, 2007 +
United States

Collected Andrenidae and identified
Eumenidae

1,432 specimens claimed

Boles, Sara

0 specimens claimed

Bracken, Matthew

0 specimens claimed

Branstetter, Michael

Collected Staphylinidae and identified
Formicidae

8,264 specimens claimed

Brewer, Steven

United States

Collected Fabaceae and identified
Fabaceae

3,349 specimens claimed

Budke, Jessica

United States

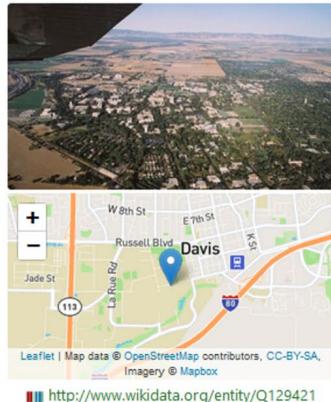
Collected Pottiaceae and identified
Bryaceae

71 specimens claimed

University of California, Davis

Davis, CA, US

<http://www.ucdavis.edu/>



Refresh

Current Previous Metrics Science Enabled

Impact on Activities in Other Organizations

Current and previous personnel have claimed or were attributed specimens now curated at the following organizations while affiliated with University of California, Davis.

All Years ▾

Specimens Collected

46 organizations

Organization	Specimens Collected
KU	7,406
CAS	4,105
USDA-ARS	669
UCD	636
MCZ	460
MSB	403
MO	315
YPM	183
Bioversity	149
EMEC	75
F	53
USF	46
NHMUK	44
CASC	42
FMNH	39
UCBME	34
AD	31
SAM	31
Museo Nacional de Costa Rica (MNCR)	21
TAMU	19

Specimens Identified

19 organizations

Organization	Specimens Identified
YPM	840
UCD	665
MCZ	420
MO	220
INHS	102
USF	43
UNM	16
UCM	11
TEX	9
TTU	5
KU	4
UCSC	4
FMNH	2
F	2
AMNH	1
ASU	1
TENN	1
MNHN	1
CAS	1

Profiles Scribes Organizations Datasets Articles Countries Families Agent Strings Help Others

University of California, Davis

Davis, CA, US
<http://www.ucdavis.edu/>



Science Enabled

140 publications used specimen data downloaded from GBIF based on specimens collected or identified by current and previous personnel while affiliated with University of California, Davis

Emiroğlu, Ö., S. Aksu, S. Başkurt, J. R. Britton, and A. S. Tarkan. 2023. Predicting how climate change and globally invasive piscivorous fishes will interact to threaten populations of endemic fishes in a freshwater biodiversity hotspot. Biological Invasions. <https://doi.org/10.1007/s10530-023-03016-4>

Freshwater ecosystems are highly vulnerable to the detrimental impacts of both biological invasions and climate change. Piscivorous alien fishes drive populations of small-bodied native fishes to extinction and warming is already driving extreme temperature events in lakes and rivers globally. Here, we use Ecological Niche Modelling (ENM) to predict how climate change will alter the geographical space of six alien fishes and five native fish genera (which include multiple endemic species) in Turkey, a hotspot of freshwater fish diversity. The models predicted that the geographical space of the alien fishes already present in Turkey would generally increase (including pikeperch *Sander lucioperca* and perch *Perca fluviatilis*), but with the most substantial increases in largemouth bass *Micropterus salmoides*, a species not yet present in Turkey but that is invasive in countries nearby and is highly popular for sport angling. For the native fish genera, general predictions were for reduced geographical space, especially in the south and east of the country, suggesting the endemic species will become increasingly imperilled in future. Their populations will also be at increasing risk of deleterious impacts from the alien piscivores as the

d. Datasets

Profiles Scribes Organizations Datasets Articles Countries Families Agent Strings Help Others

Datasets

22 157 datasets from GBIF

Butterflies of Brazil Search

has dwc:recordedByID or dwc:identifiedByID

"Biodiversidad en el valle de Cuatro Ciénegas". (Arañas)	"Biodiversidad en el valle de Cuatro Ciénegas". (Curculiónidos)	"Biodiversidad en el valle de Cuatro Ciénegas". (Hormigas)
"Biodiversidad en el valle de Cuatro Ciénegas". (Insectos y reptiles)	"Biodiversidad en el valle de Cuatro Ciénegas". (Sólfugos)	"Biodiversidad en el valle de Cuatro Ciénegas". (Vegetación)
"Biodiversidad en el valle de Cuatro Ciénegas". (Ácaros acuáticos)	'Genus X 2' finally named: discovery of males of Clavomicrus gen. n. in the Philippines (Coleoptera: Staphylinidae: Scydmaeninae)	'Monster Scydmaenus' of Australia: revision of subgenus Corbulifer Franz (Coleoptera: Staphylinidae: Scydmaeninae)
(3) Sea Surface Temperature (SST) reconstructed from the percentage of Neogloboquadrina pachyderma sinistral in sediment core MD02-2488 during the period 50-140 ka	(Appendix 1) Coral analysis and isostatic rebound effects from different Holes of IODP Expedition 310	(Appendix 1) Stable oxygen isotope record of Globigerina bulloides, and abundances of Neogloboquadrina pachyderma and ice-rafter debris in sediment core MD95-2042
(Appendix 1a) Abundance and stable oxygen and carbon isotope ratios of Globigerinoides ruber in the Holocene section of sediment core GeoTu_SL096	(Appendix 1b) Abundance and stable oxygen and carbon isotope ratios of Globigerinoides ruber in the Holocene section of ODP Hole 160-964A	(Appendix 1c) Abundance and stable oxygen and carbon isotope ratios of Globigerinoides ruber from MIS 11 of sediment core GeoTu_SL096
(Appendix 1d) Abundance and stable oxygen and carbon isotope ratios of Globigerinoides ruber from MIS 11 of ODP Hole 160-964A	(Appendix 2) Absolute abundance of nannofossils in ODP Hole 183-1135A	(Appendix 2) Abundances of Neogloboquadrina pachyderma and ice-rafter debris in sediment core SU81-18

e. Articles

Profiles Scribes Organizations Datasets Articles Countries Families Agent Strings Help Others

Articles

2,400 articles that cited downloads from GBIF

Evolution and systematics of... Search

Hou, J., J. Xiang, D. Li, and X. Liu. 2023. Prediction of Potential Suitable Distribution Areas of *Quasipaa spinosa* in China Based on MaxEnt Optimization Model. *Biology* 12: 366. <https://doi.org/10.3390/biology12030366>

ENETWILD-consortium, S. Illanas, S. Croft, G. C. Smith, J. Vicente, J. A. Blanco-Aguiar, M. Scandura, et al. 2023. Wild carnivore occurrence and models of hunting yield abundance at European scale: first models for red fox and badger. *EFSA Supporting Publications* 20. <https://doi.org/10.2903/sp.efsa.2023.en-7894>

Gafna, D. J., J. A. Obando, J. M. Kalwij, K. Dolos, and S. Schmidlein. 2023. Climate change impacts on the availability of anti-malarial plants in Kenya. *Climate Change Ecology* 5: 100070. <https://doi.org/10.1016/j.ecochg.2023.100070>

Hidalgo-García, J. A., R. Luna-Reyes, A. G. Clause, R. A. Carbajal-Márquez, J. J. Sigala-Rodríguez, and L. A. Muñoz-Alonso. 2023. Confirmation of the presence of the Striped Lizard Eater, *Mastigodryas dorsalis* (Bocourt, 1890) (Squamata, Colubridae), in Mexico. *Check List* 19: 115–125. <https://doi.org/10.15560/19.1.115>

Szabo, J. K., L. R. Forti, and C. T. Callaghan. 2023. Large biodiversity datasets conform to Benford's law: Implications for assessing sampling heterogeneity. *Biological Conservation* 280: 109982. <https://doi.org/10.1016/j.biocon.2023.109982>

Yang, M., H. Zhao, X. Xian, R. Wang, N. Yang, L. Chen, and W. Liu. 2023. Assessing risk from invasive alien plants in China: Reconstructing invasion history and estimating distribution patterns of *Lolium temulentum* and *Aegilops tauschii*. *Frontiers in Plant Science* 14. <https://doi.org/10.3389/fpls.2023.1113567>

Silva, C. P., D. N. López, P. I. Naulin, and S. A. Estay. 2023. Can suitability indices predict plant growth in the invaded range? The case of *Acacias* species. *Frontiers in Plant Science* 14. <https://doi.org/10.3389/fpls.2023.1125019>

Emiroğlu, Ö., S. Aksu, S. Başkurt, J. R. Britton, and A. S. Tarkan. 2023. Predicting how climate change and globally invasive piscivorous fishes will interact to threaten populations of endemic fishes in a freshwater biodiversity hotspot. *Biological Invasions*. <https://doi.org/10.1007/s10530-023-03016-4>

Vicente, S., H. Trindade, C. Mágua, and J. J. Le Roux. 2023. Genetic analyses reveal a complex introduction history of the globally invasive tree *Acacia longifolia*. *NeoBiota* 82: 89–117. <https://doi.org/10.3897/neobiota.82.87455>

Monchamp, M.-E., Z. E. Taranu, R. E. Garner, T. Rehill, O. Morissette, L. L. Iversen, V. Fugère, et al. 2023. Prioritizing taxa for genetic reference database development to advance inland water conservation. *Biological Conservation* 280: 109963. <https://doi.org/10.1016/j.biocon.2023.109963>

Emmett, A. M., J. K. Scott, B. L. Webber, A. A. Severn-Ellis, and K. L. Bell. 2023. Combining multiple lines of evidence to elucidate the origin and introduction pathway of bitou bush (*Chrysanthemoides monilifera*) in Australia. *Biological Invasions*. <https://doi.org/10.1007/s10530-023-03020-2>

f Countries: from countries stated in ORCID accounts and Wikidata entries or specimen records in GBIF

Countries
From countries stated in ORCID accounts and Wikidata entries or specimen records in GBIF

[Map](#) [List](#)

g. Families: 18,059 taxonomic Families from specimen data in GBIF

The screenshot shows the GBIF Taxonomic Families page. At the top, there's a navigation bar with various icons and a "Help Others" link. Below it is a search bar labeled "Taxon Family" with a "Search" button. A message indicates "18,059 taxonomic Families from specimen data in GBIF". The main content area is titled "Random Samples" and lists 18,059 families. Each family entry includes a small icon representing its taxonomic group and the family name.

Taxon Family
Carnidae
Clypeasteridae
Diastylidae
Interatheriidae
Trichochidae
Hoplolaimidae
Nyctitheriidae
Psilidae
Hydrodictyaceae
Phoxocephalidae
Deinotheriidae
Eophliantidae
Scombridae
Limopsidae
Tecophilaeaceae
Rhodaliidae
Eneopteridae
Campylobacteraceae
Cainiaceae
Lithoglyptidae
Plagiochilaceae
Baptornithidae
Geryoniidae
Psyllidae
Balsaminaceae
Labridae
Myriopathidae
Illiidae
Aphanopsidaceae
Gelidiaceae
Rotaliidae
Acipenseridae
Glyceridae
Umbilicariaceae
Alestidae
Bodonidae
Anacardiaceae
Megachasmidae
Cavosteliaceae
Tetrigidae
Zeidae
Placenticeratidae
Cyclopidae
Saleniidae

h. Agent Strings: 2,392,829 raw strings from parsed collector and determiner names in specimen data from GBIF.

- i. The “From gbifIDs” tab contains a textarea box to paste and submit a list of GBIF occurrence ids, which will produce a unique list of parsed agent strings with a download. The intention here is to leverage the robust search and download capabilities in GBIF to help establish some context. For example, if you were interested in malacologists in WWII, you might create a search filter on GBIF that could include a taxonomic name, a range of dates, or even a geographic location. With a download in-hand, you can then paste the resultant list of gbifIDs here in this textarea box to create a unique list of parsed agent strings. This might be useful to help organize base materials for a small working session with colleagues with questions in mind such as: “Do we know who these malacologists were with these particular agent strings? What’s the breadth of variability in how malacologists’ agent strings are represented across institutions? Do we know who these people were that had these agent strings? Are there entries for them in wikidata?”

The screenshot shows a search interface for agent strings. At the top, there's a navigation bar with icons for file operations and a "Help Others" link. Below it is a title "Agent String Search" and a subtitle "2,392,829 raw strings from parsed collector and determiner names in specimen data from GBIF". A search input field contains "Daniel H. Janzen" and a green "Search" button. Below the search area are two tabs: "Random Samples or Results" (selected) and "From gbifIDs". The main content area displays a list of names, each with a small green checkmark icon to its left. The names are paired in columns:

Lau, A. Imada	Hermann, A.J.
Žeepř, B.	Boldrini, Ilsi lob
Büel, Ernst Sulgen	Trebicki, P.
Dollman, Hereward C.	Landqvist, A.
Gremaud, Gregory	Dianos
Rice, Kathleen	Stimpson, A.L.
Seberg, K.	Amir, Goleman
Fullmer, E.	Osler, Graham
Hohrin	Scr, B. Engelstad
Kirschbaum, Hayden	Berga, P. Boscú
Rice, Robin	Emil, Rostrup Frederik Georg
Vanderbilt	Osmaston, G.H.
Joinville	Walden, N.W.
Meyer, Earl	Berg, O.K.
Hendon, Blake	Bourassa, Marcel
Rentai, A.	Vizcaino, Luisa
Zimmerman, Elizabeth H.	Sak, S.
Hyesuk, Kang	Cementerio
Pankiw, N.	Gyjt
Kercher	Belmont, L.P.
Nunes, J.B.S.	Joash
Gentry, Sep	Queiróz, C.B.

5. Now, you might be wondering how else you might access the data for a given collection. There are other products and services available at Bionomia. You might want, for example, to get all people identifiers currently known for people who have specimens in your collection. In your research or outreach or administrative work to show impact, you may find Bionomia data useful and would like these data in other formats. We will briefly review select items listed here that you can explore at the bottom of all Bionomia pages.

The footer navigation menu includes the following links:

Resources	Tools	Policies	About
Help Documents	Parse Names	Privacy Policy	How it Works
Workshops	Reconcile Names	Terms of Service	Rationale
Downloads	For Developers		History
For Data Managers	Integrations		Statistics
On This Day			Acknowledgments

On the right side, there are three social media icons: GitHub, Twitter, and a circular logo with a stylized 'B'.

- a. Frictionless data packages: giving you a zipped data file for a given (person? organization?) etc.
 - b. You might want the People IDs to get them back into your local CMS. They can then be shared with future records on export, using the Darwin Core standard terms: dwc:identifiedByID and dwc:recordedByID
 - c. For much of this data, it's also possible to use the Bionomia API
 - d. Other tools, like OpenRefine, can also be used in your digitization workflows to find out if Bionomia has information or a possible match for you to check, for a given name string.
6. Frictionless Data Package Example. For work done (e.g. specimens attributed) on a given dataset, you can export (download) files that have been packaged up together in a "zipped" file for you to use. Here is what you will find. For this example
 - a. Go to The [Lord Fairfax Community College Herbarium Dataset](#) (LFCC)
 - b. Notice 4 tabs (People, Visualizations, Scribes, Agent Strings)
 - i. People: 4 in this case, associated with LFCC who have specimens in this dataset
 - ii. Visualizations: note this feature builds timelines for individuals and their specimens so you can see when they were / are active. It also will show you where specimens might be claimed outside the realm of possibilities (e.g. before or after their existence on the planet)
 - iii. Scribes: find out who has worked on claiming some of the specimens in this dataset
 - iv. Agent Strings: a cool place to see all the distinct name strings for this dataset. This can be a great starting point for ways to look for others to work on and for planning to harmonize and assign identifiers for name strings in one's local database.

Frictionless Data Package Example -- Continued ...

This screenshot shows the Lord Fairfax Community College Herbarium dataset on GBIF.org. The page includes a navigation bar with links to Profiles, Scribes, Organizations, Datasets, Articles, Countries, Families, Agent Strings, Help Others, and user account options. Below the navigation is a header for the dataset, which is identified by its URL: <https://gbif.org/dataset/cfbdc726-cd55-4d58-a6db-9aebe037a6d9>. A green progress bar at the top right indicates the status of the dataset. On the right side of the page, there is a button labeled "Frictionless Data". The main content area displays four individuals who have claimed or attributed specimens: Artz, Lena C.; Sheik, Matthew; Weeks, Andrea; and Stewart, Ralph Randles.

- c. Next, look to the far right and note the button “Frictionless Data”. (See the left of <https://bionomia.net/collection-data-managers> for more information about what these contain).

This screenshot shows the same dataset page as above, but the "Frictionless Data" button has been clicked, revealing a detailed list of files included in the data package. The list includes:

- Descriptor (JSON)**
- Users (csv, zip)**
- Problem Collector Dates (csv, zip)**
- Occurrences (csv, zip)**
- Attributions (csv, zip)**
- Articles (csv, zip)**
- Article Occurrences (csv, zip)**

The page also shows the creation date: Created 2023-03-06 03:38:16 UTC.

- i. Hover over the button to reveal what is in this data package.

1. **Descriptor:** this file describes what is in the data package and is in Java Script Object Notation format (JSON). You can open this in a spreadsheet or OpenRefine, for example, or in Firefox you can read it as well. Using this descriptor package you have two options
 - a. You can get a zip file that contains all the files mentioned next. OR
 - b. You can get a link to just one of the following files to make it perhaps easier to grasp -- at the start -- exactly what you are looking at.
2. **Users:** this “comma separated file” (CSV) contains a list of unique people that were attributed or have claimed specimen records as their own in your dataset. It also contains their full names, aliases, [ORCID](#) IDs or [Wikidata](#) Q numbers plus birth and death dates for the latter.

A	B	C	D	E	F	G	H	I	J	K	L	M
1	id	name	familyName	particle	givenName	alternateName	sameAs	orcid				
2	2866	Andrea Weeks	Weeks	Andrea			https://orcid.org/0000-0002-0000-4541	0000-0002-0000-4541				
3	92668	Matthew Sheik	Sheik	Matthew			https://orcid.org/0000-0002-9496-6898	0000-0002-9496-6898				
4	13540	Ralph Randles Stewart	Stewart	Ralph Randles Stewart	"Ralph R Stewart", "R.R. Stewart", "Ralph R Stewart"]		http://www.wikidata.org/entity/Q3695274	Q3695274	1890-04-15	day		1993-11-06
5	53746	Lena C. Artz	Artz	Lena C.	["Artz", "Lena Artz", "Lena Clemons Artz", "Lena C. Artz"]		http://www.wikidata.org/entity/Q88806344	Q88806344	1891-08-03	day		1976-06-02
6												
7												

3. Problem Collector Dates: contains a list of occurrence records whose eventDate is earlier than a collector's birthDate or later than their deathDate. Bionomia knows about birth and death dates for people via Wikidata. So through comparisons of date ranges, Bionomia can flag specimens attributed to a person where the person wasn't born yet or was deceased on that date. This provides another way in which you can use this information to check your local data. (Note well, the error could be in at least: the wikidata birth or death date, your local date in your database, or on the specimen label). You will have to do some sleuthing to figure out where the actual snafu comes from.
4. [Occurrences](#): These contain a subset of the occurrences data shared with GBIF as Darwin Core terms for which a claim or an attribution has been made in Bionomia. Unclaimed or unattributed records are not present here.
5. Attributions: [this file is a join table](#) for the other two csv files and also contains columns for who made the attribution, their ORCID ID, and a timestamp for when they made the attribution. [Download from the link](#) to see this example:

A	B	C	D	E	F	G
user_id	occurrence_id	identifiedBy	recordedBy	createdBy	createdByURI	createdDateTime
1	2866	3357420483 https://orcid.org/0000-0002-0000-4541	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:28:37+00:00	
2	2866	3357420669 https://orcid.org/0000-0002-0000-4541	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:28:37+00:00	
3	2866	3357420720 https://orcid.org/0000-0002-0000-4541	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:28:37+00:00	
4	2866	3357420799 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:27+00:00	
5	92668	3357420814 https://orcid.org/0000-0002-9496-6898	Siobhan Leachman	https://orcid.org/0000-0002-5398-7721	2021-10-17T20:03:12+00:00	
6	13540	3357420814 https://orcid.org/0000-0002-9496-6898	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:23:09+00:00	
7	2866	3357421034 https://orcid.org/0000-0002-0000-4541	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:23:09+00:00	
8	2866	3357421366 https://orcid.org/0000-0002-0000-4541	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:28:37+00:00	
9	92668	3357421424 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:25+00:00	
10	92668	3357421426 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:25+00:00	
11	2866	3357421693 https://orcid.org/0000-0002-0000-4541	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:23:09+00:00	
12	92668	3357421766 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:37+00:00	
13	92668	3357421840 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:37+00:00	
14	2866	3357421850 https://orcid.org/0000-0002-0000-4541	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:28:37+00:00	
15	92668	3357421901 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:37+00:00	
16	92668	3357421903 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:37+00:00	
17	92668	3357421928 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:37+00:00	
18	2866	3357422034 https://orcid.org/0000-0002-0000-4541	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:28:37+00:00	
19	2866	3357422038 https://orcid.org/0000-0002-0000-4541	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:28:37+00:00	
20	92668	3357422153 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:37+00:00	
21	2866	3357422336 https://orcid.org/0000-0002-0000-4541	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:23:09+00:00	
22	92668	3357422570 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:37+00:00	
23	92668	3357422921 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:37+00:00	
24	92668	3357423008 https://orcid.org/0000-0002-9496-6898	Matthew Sheik	https://orcid.org/0000-0002-9496-6898	2022-08-30T17:19:37+00:00	
25	2866	3357423013 https://orcid.org/0000-0002-0000-4541	Kyle Copas	https://orcid.org/0000-0002-6590-599X	2022-07-06T12:28:37+00:00	

6. [Articles](#): These are a list of articles GBIF has tracked at the dataset level, but more granularly tracked here at the level of the occurrence.
7. Article Occurrences: This is a join table between the articles and the occurrences so you can better deduce which record was used in which published work.
7. Perhaps you would like to expand the reach to others who would like to help but who speak / work in other languages besides English. Bionomia has been partially translated into Spanish, German, French, and Portuguese. See [translate.bionomia.net](#)

Example of a Curatorial Use-Case in Bionomia

The curator of LFCC was surprised to see someone had attributed a specimen to Ralph Randles Stewart within the [Lord Fairfax Community College Herbarium Dataset](#) (LFCC) of Bionomia. Stewart is known for his lifetime of work in Pakistan in the mid 20th century, whereas LFCC is a regional collection from rural Virginia USA that was established in the 1970's by Professor Robert Simpson, who trained at the University of Michigan. Using Bionomia and Wikipedia tools, make your own determination about how credible this attribution might be:

- 1) Which specimen was this? Where and when was it collected?
- 2) Read the brief Wikipedia biography of Ralph Randles Stewart.
- 3) Do you think this is a credible attribution? What would you do next to test your hypothesis?
- 4) If not a credible attribution, how might you fix it in Bionomia?

Resources you may find useful (add others that you know of / discover)

- FreeBMD <https://www.freebmd.org.uk/>
 - FamilySearch <https://www.familysearch.org/en/>
 - PapersPast <https://paperspast.natlib.govt.nz/newspapers>
 - DigitalNZ <https://digitalnz.org/>
 - Find a grave <https://www.findagrave.com/>
 - Ancestry (if you have an account, or free access via your public library)
-
- Internet Archive <https://archive.org/>
 - Biodiversity Heritage Library <https://www.biodiversitylibrary.org/>
 - Zoobank <http://zoobank.org/>
 - ORCID <https://orcid.org/>
 - Wikidata https://www.wikidata.org/wiki/Wikidata:Main_Page
 - Bionomia <https://bionomia.net/>

More resources

- BEMON (<https://www.bemon.loven.gu.se>)
- Cushman Foundation for Foraminiferal Research (<https://cushmanfoundation.org/PersonifyEbusiness/Awards-Grants/General-Awards>)
- GSA Memorials (<https://www.geosociety.org/gsa/pubs/memorials.aspx>)
- JSTOR (<https://www.jstor.org/>)
- National Academy Memoirs (<http://www.nasonline.org/publications/biographical-memoirs>)
- PapersPast (<https://paperspast.natlib.govt.nz/newspapers>)
- IPNI (<https://www.ipni.org/>)
- Taxonomic Literature 2 (<https://www.sil.si.edu/DigitalCollections/tl-2/search.cfm>)
- Zoobank (<https://zoobank.org>)
- Harvard Botanists (https://kiki.huh.harvard.edu/databases/botanist_index.html)
- Melanesian botanical collectors (<http://nationaalherbarium.nl/FMCollectors/>)
- Australian Botanical Collectors and Illustrators (<https://www.anbg.gov.au/bot-biog/bot-biog-A.html>)

Questions.

About Sleuthing, broadly speaking.

1. Anyone have experience with wikidata? And if yes, what have you worked on?
2. What collection management software do any of you have experience with?
3. If you've worked in collections, what kind?
4. Anyone have digitization experience? Please share how you now think Bionomia can help you do this work?
5. Anyone have OpenRefine experience? If yes, how did you / do you use it?
6. Anyone have georeferencing experience?
7. Do we have genealogists in the group?

Document metadata: how-to directions that reiterate workshop workflow (e.g. topics such as historical attribution, claiming ones specimens, reporting institutional metrics, importing unique collector ID's back into your institution's DB) as a post-workshop resource to facilitate re-use and community understanding and engagement with this work.

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