

Symbiota Integrations: Exploration of Historical and Current Methods of Data Sharing Across a Decentralized Portal Network and Goals of Extending Interoperability Globally



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Open source software for
creating **themed data**
portals that help people
actively manage and **share**
biodiversity data



Community Data Portals

— — —

- Community driven *Data Commons*
 - Middle level aggregator of Specimen Collections
 - Taxonomic/regional expertise and portal curation
- Content Management (CMS)
 - Online distributed data entry
 - Duplicate specimen matching
 - Batch georeferencing tools
 - Etc.
- Sustainability/shared expense

Taxonomic / Geographic Themed

MYCOLOGY COLLECTIONS PORTAL

Home Explore Crowdsourcing Checklist Projects Other Resources Acknowledgements Log In New Account Settings

Welcome to the Mycology Collections data Portal

The Mycology Collections data Portal (MyCoPortal) is more than just a web site - it is a suite of user-friendly, web-based data access technologies to aid taxonomists, field biologists, ecologists, educators, and citizen scientists in the study of fungal diversity. The data are derived from a network of universities, botanical gardens, museums, and agencies that provide taxonomic, environmental, and specimen-based information. Using the Symbiota (<http://symbiota.org>) system of virtual online floras, these data are directly accessible to dynamically generate geo-referenced species checklists, distribution maps, and interactive identification keys, all linked with a rich collection of digital imagery documenting fungal diversity of North America.



News and Events

- **Microfungal Collections Consortium (MCC)** website now live
- **Index**, a simplified names database, primarily for projecting taxonomic hierarchy for fungal taxa
- **NSF Press Release (#15-092)** - NSF awards fifth round of grants to enhance America's biodiversity collections
- **NSF Press Release (#12-092)** - US National Science Foundation awards support for The Macrofung Collection Consortium, a collaboration of 35 institutions in 24 states for the purpose of databasing some 1.4 million dried scientific specimens of macrofungi (<https://doi.org/10.26037/1>)
- **December 2013** - 1,549,358 occurrence records supplied by 31 different data providers have been integrated into MyCoPortal.
- **NEW** - iMCC records are now part of the Zooniverse project *Notes From Nature*. Please help us by transcribing specimen labels (<https://www.zooniverse.org/projects/notes-from-nature>)
- Image provided by New York Botanical Garden.

Data Usage and Citation

Please join the Mycology Collections Portal as collaborators or regular visitors, and send your feedback to help@mycoportal.org

<https://www.mycportal.org>



Home Search Collections Map Search Checklists Image Search Data Use Policy About CCH Help & Resources

Welcome Edward! My Profile Logout Settings

Welcome to the CCH2 data portal

CCH2 serves data from specimens housed in member herbaria of the **Consortium of California Herbaria (CCH)**. This portal has a worldwide scope and a broad taxonomic basis including vascular plants, bryophytes, algae, fungi, and lichens.

These data are currently growing due to the work of the **California Phenology Thematic Collections Network (CAP-TCN)**; <https://www.capturingcaliforniasflowers.org>. This collaboration of 28 universities, research stations, natural history collections, and botanical gardens aims to capture images, label data, and phenological (i.e., flowering time) data from nearly 1 million herbarium specimens by 2022. Data contained in the CCH2 portal will continue to grow even after this time through the activities of the CCH member institutions.

The CCH2 portal is managed by UC Berkeley and Cal Poly, San Luis Obispo.

For more information about the California Consortium of Herbaria (CCH) see:

<http://ucjeps.berkeley.edu/consortium/about.html>

Using CCH2 data:

Please refer to our [Data Use Policy](#). The Consortium of California Herbaria asks that users not redistribute data obtained from this site. However, links or references to this site may be freely posted. If you have any questions about this policy, please contact Jason Alexander (jason_alexander@berkeley.edu) or Katie Pearson (katiepearso@calpoly.edu).

More California specimen data may be found at the following portals:

- Only California vascular plants, linked to the statewide Jepson eFlora project: [CCH1 Portal](#)
- Bryophytes: [Consortium of North American Bryophyte Herbaria](#)
- Fungi: [Mycology Collections Portal \(MyCoPortal\)](#)
- Lichens: [Consortium of North American Lichen Herbaria](#)
- Macroalgae: [Macroalgal Herbarium Consortium](#)
- Pteridophytes: [Pteridophyte Collections Consortium](#)



Powered by

<https://cch2.org>

SEINet Portal Network



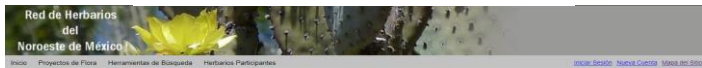
Welcome to the Consortium of Midwest Herbaria

While focused around the Great Lakes drainage basin, the region includes the six states that border the western Great Lakes: Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. 132 herbaria are listed in [Index Herbariorum](#) ([Thiers, B. \(continuously updated\)](#)) from this region; we hope to eventually make data available from a majority of those collections.

The [Great Lakes basin](#) includes 34% of North American surface fresh water and includes a mixture of habitat types amidst a landscape that has been highly modified by agricultural and industrial uses and is home to 18% of the US population (US Census Bureau, 2014 estimates). Areas to the south and east of the lakes include lands which form portions of the Mississippi and Ohio River basins, much of this land escaped major glaciation. Plants and communities in the region are diverse, ranging from boreal forest to southern hardwoods, prairies, bogs and fens.

This site is brought to you in collaboration with the [SEINet Portal Network](#). Please send questions or comments to support@midwestherbaria.org.

<https://midwestherbaria.org>



El objetivo de este sitio web es proporcionar al usuario un herbario virtual como una herramienta para consultar la gran biodiversidad de plantas vasculares del Noroeste de México (Baja California, Baja California Sur y Sonora) y de otros estados como Sinaloa, Durango, Chihuahua, y San Luis Potosí, entre otros.

Este portal denominado **Red de Herbarios del Noroeste de México**, es una iniciativa impulsada conjuntamente por la **Universidad de Sonora y la Universidad Estatal de Arizona** y ha sido desarrollado sobre la plataforma de **Symbiota** que es el portal **SEINet** del Sistema Binético. Gracias al apoyo financiero de la agencia gubernamental estadounidense, National Science Foundation (NSF).

Actualmente, cuenta con la participación y colaboración de los herbarios de las siguientes instituciones: Universidad Autónoma de Baja California (BUCA), Centro de Investigaciones Biológicas del Noroeste (CIBNOR), Universidad de Sonora (USON), Universidad Autónoma de Sinaloa (UAS), Herbario Regional CACI-Mazatlan (IRCAM), Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional Unidad Durango (CIDIIR), así como otros herbarios del noroeste de México que han incorporado recientemente como SIFUBI, JAAJ, BUCO, CIBUC, UAS, ICS y UNLH, entre otros.

La **Red de Herbarios del Noroeste de México** es algo más que un sitio web, es un conjunto de tecnologías de acceso a datos y una red distribuida de instituciones y museos de colecciones científicas que proporcionan información sobre la diversidad vegetal.

En las **páginas de análisis de Symbiota** (información) podrá conocer más sobre las características y capacidades de este sitio web.

Si requiere más información sobre la **Red de Herbarios del Noroeste de México**, puede consultar el siguiente artículo donde se discute el origen y evolución de este consorcio de herbarios mexicanos, describiendo también las consultas que se pueden realizar en el portal de una manera general.

Sánchez-Escalante, José Jesús, Edward E. Gilbert, 2018. Red de herbarios del noroeste de México: Un esfuerzo colaborativo entre botánicos mexicanos. *Anales de la Academia Mexicana de Ciencias* 2018, Vol. 3 (2), 21-36. [Nota Curta](#). [Regístrate](#) como un usuario regular y envía por favor tus comentarios y opiniones a sanchez@ciqa.ucon.uson.mx.

Las menciones sobre como citar los datos obtenidos desde este sitio web, los puede obtener desde la página **Directrices sobre cómo citar** [aquí](#) en **aseptación de los datos**.

En el margen derecho aparece el campo **Resumen de Datos**, donde se pueden consultar los datos primarios por medio de alguna categoría taxonómica como familia, género o nombre científico. Para efectuar búsquedas por nombre común véase la opción "Colecciones" en la sección "Herramientas de Búsqueda" del menú principal.



<https://herbanwmex.net>



Welcome to SEINet

The SEINet data portal was created to serve as a gateway to distributed data resources of interest to the environmental research community within Arizona and New Mexico. Through a common web interface, we offer tools to locate, access and work with a variety of data. SEINet is more than just a web site. It is a suite of data access technologies and a distributed network of collectors, museums and agencies that provide environmental information.

Join SEINet as a regular visitor and please send your feedback to support@midwestherbaria.org. Visit the Data Usage Policy page for information on how to cite data obtained from this web resource.

List some of the other regional data portals that are fellow members of the SEINet Portal Network:

- Consortium of Midwest Herbaria
- Consortium of Southern Rocky Mountain Herbaria
- Intermountain Regional Herbarium Network
- Midwestern Bioregion Ecoregions (MIRE)
- Mid-Atlantic Herbaria Consortium
- North American Network of Small Herbaria
- North Great Plains Herbaria
- Red de Herbarios del Noroeste de México (northwest Mexico)
- SERNEC (Southwest USA)
- Texas-Oklahoma Regional Consortium of Herbaria (TORCH)

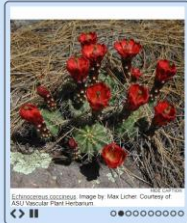
<https://swbiodiversity.org>



Welcome to the Consortium of Southern Rocky Mountain Herbaria

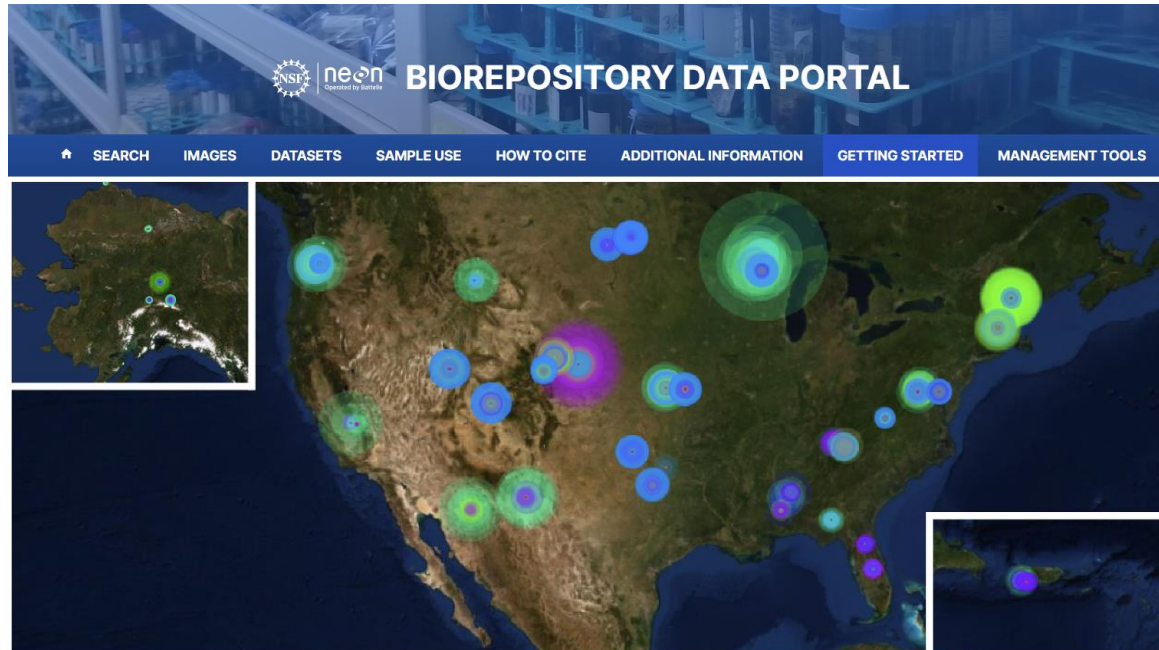
The Consortium of Southern Rocky Mountain Herbaria consists of collections from the Middle and Southern Rocky Mountain States including Colorado, Idaho, Montana and Wyoming. The rugged and expansive terrain of the Southern Rocky Mountains (SoRM) supports plant species of different geographic origins, evolutionary histories, and ecological affinities. Species from the high peaks and adjacent high plains grow in varied habitats and represent neither the most biodiverse nor most endemic flora in the United States, but rather one of the most narrowly adapted floras, typical of steep environmental gradients and life in extreme environments.

While the primary mission of the portal is to bring together collections from within the Southern Rocky Mountain Region, we are also working to facilitate contributions of data from the Southern Rockies by collectors from outside of the region. Digitization within the Consortium of Southern Rocky Mountain Herbaria is currently funded by an ARDC TCM project with the goal of bringing together roughly 1.7 million specimens from the greater Southern Rocky Mountain region. Data come from a combination of existing and newly digitized collections. The SoRM TCM is a collaborative effort across the Consortium of Southern Rocky Mountain Herbaria, the New England Vascular Plant Network (BRU, HUH, YU), the Northern Great Plains Herbaria (BHSIC, CSDCN), the Arizona-New Mexico Network (ASC, ASU, NAVA, SJNM, UNM) and the Mid-Atlantic Network (MVA).



<https://www.soroherbaria.org>

Project Themed



Samples available in the portal (Aug 2019), collected in Alaska (top left), Continental US (center), and Puerto Rico (bottom right). Colors indicate different collection types. Circle sizes indicate quantity of samples per collection in a given locality.

Project Themed

INDIAN RIVER LAGOON
SPECIES INVENTORY

Contact Us Log In New Account Sitemap

HOME THE INDIAN RIVER LAGOON HABITATS THREATS BIODIVERSITY DATA EXPLORER TUTORIALS STEWARDSHIP TAKE A TOUR DONATE

Scientific Name Common Name Advanced Search

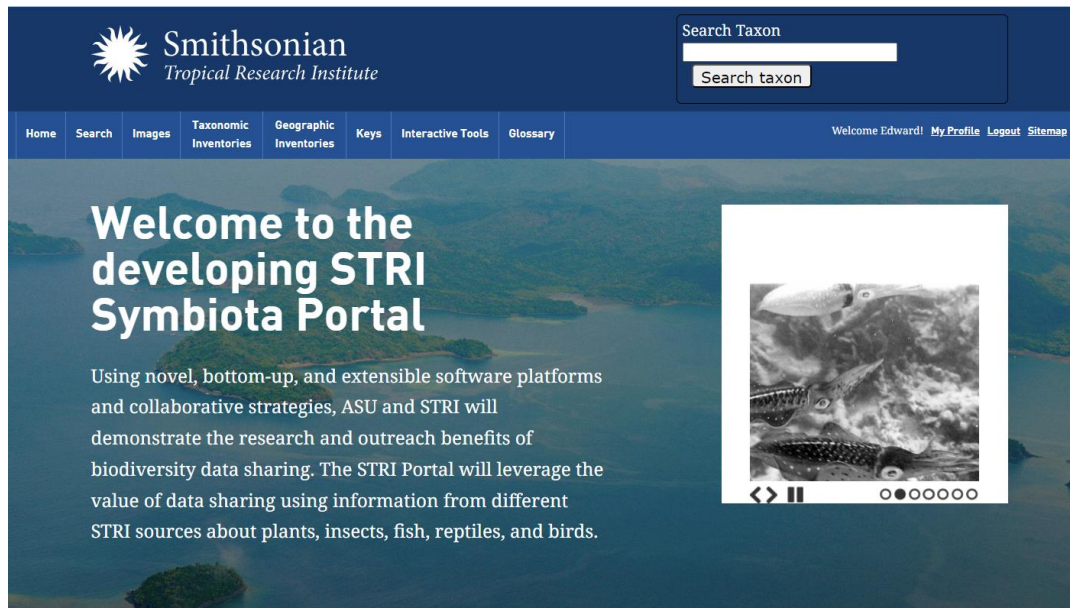
Common Name

Search the Inventory

The Indian River Lagoon Species Inventory is a dynamic and growing research resource and ecological encyclopedia that documents the biodiversity of the 156-mile long estuary system along Florida's Atlantic coast.

<https://irlspecies.org/index.php>
<https://greentheorystudio.com>

Institutional Themed



Smithsonian
Tropical Research Institute

Search Taxon


Search taxon

Home Search Images Taxonomic Inventories Geographic Inventories Keys Interactive Tools Glossary

Welcome Edward! [My Profile](#) [Logout](#) [Sitemap](#)

Welcome to the developing STRI Symbiota Portal

Using novel, bottom-up, and extensible software platforms and collaborative strategies, ASU and STRI will demonstrate the research and outreach benefits of biodiversity data sharing. The STRI Portal will leverage the value of data sharing using information from different STRI sources about plants, insects, fish, reptiles, and birds.



Currently, the portal provides access to specimen records and related geo-spatial data.

Soon, we hope to incor
sequence data and pr

<https://panamabiota.org/stri/>

Amphibian of the Day



- Vertebrate Collections



- Gabon portal
- Guatemala
- Panama
- Minnesota Biodiversity Atlas



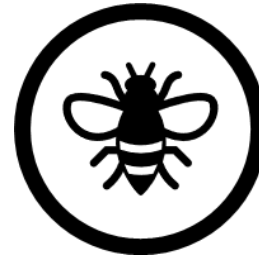
- Bryophyte Portal
- CCH2
- PteridoPortal
- SEINet - 15 regional portals!
- Neotropical Plants



- InvertEBase
- STRI Marine Portal

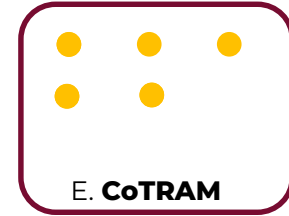
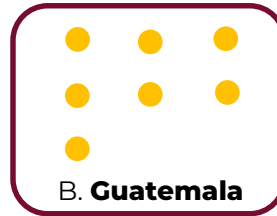
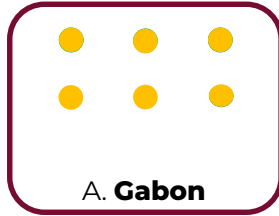


- Lichen Portal
- MyCoPortal



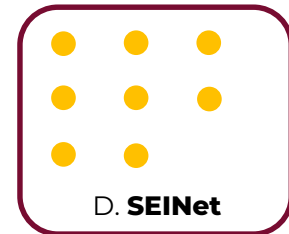
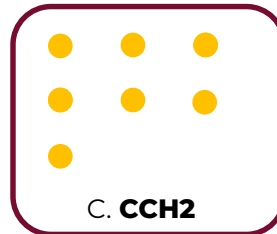
- Bee Library
- Ecdysis

Independent, Themed Communities Portals

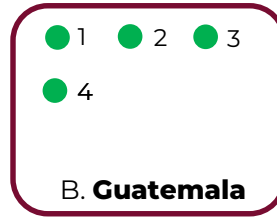
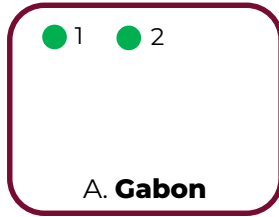


Decentralized network Mid-level data aggregators

A: Gabon Biodiversity Portal
B: Guatemala Biodiversity Portal
C: Consortium of California Herbaria - CCH2
D: SEINet Portal Network
E: Cooperative Taxonomic Resource for American Myrtaceae - CoTRAM

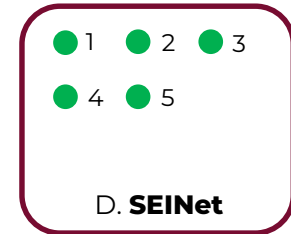
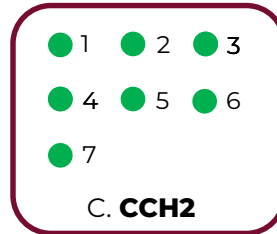


Live Managed Collections



● "Live-Managed" Collection

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Robust Import and Export Capabilities

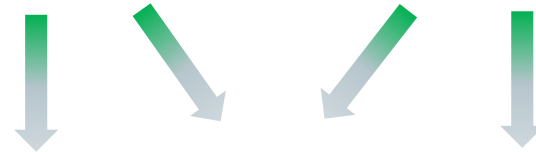
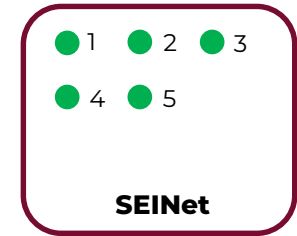
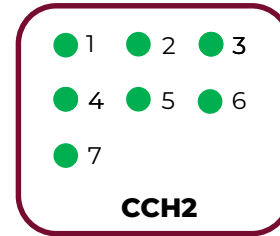
- Import

- IPT / DwC-Archive
- Delimited text (CSV, TAB)
- DiGIR
- Saved import profiles

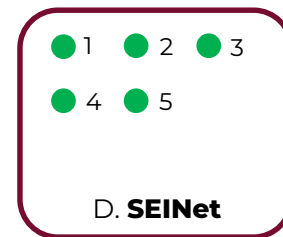
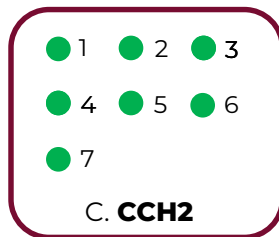
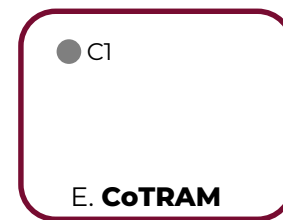
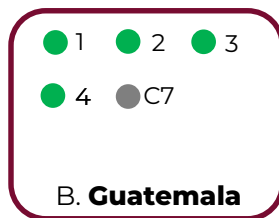
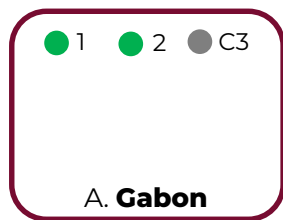
- Export

- DwC-Archive
- Delimited text (CSV, TAB)
- API
- Custom filtering

- Flexible



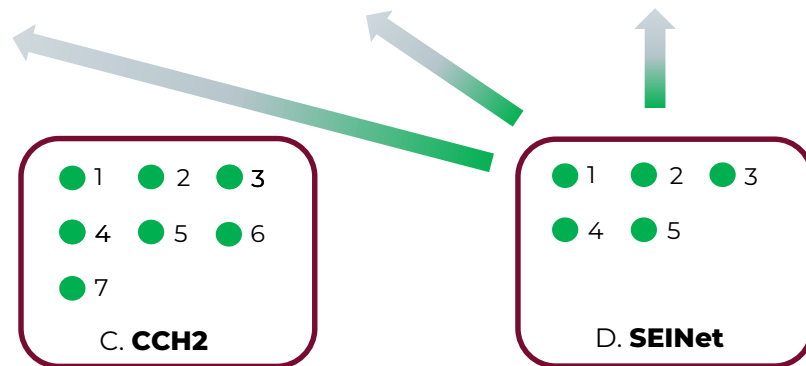
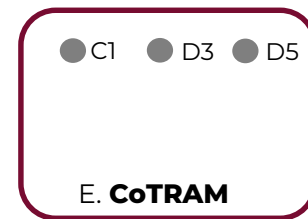
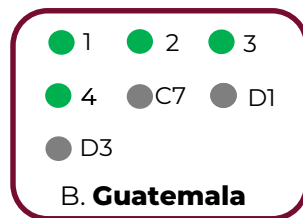
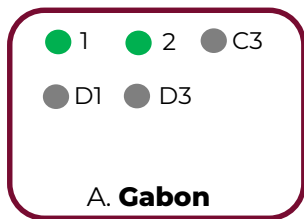
Snapshot Datasets Imported from Live Collections



- “Live-Managed” Collection
- Internal “Snapshot” Collection

A: Gabon Biodiversity Portal
B: Guatemala Biodiversity Portal
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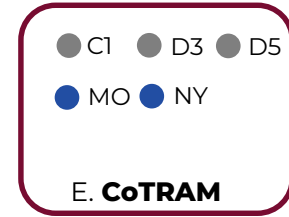
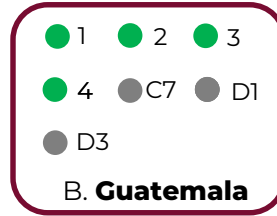
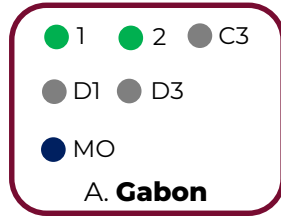
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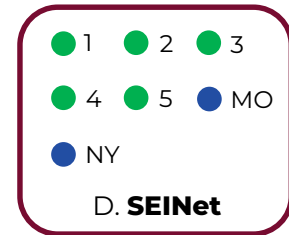
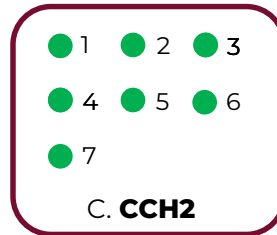
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External Managed Snapshot Collections



- "Live-Managed" Collection
- Internal "Snapshot" Collection
- External "Snapshot" Collection

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Challenges of a Centralized Infrastructure



The image shows a screenshot of a web page from Biodiversity Data Journal. The page has a dark blue header with the journal's logo and navigation links: Home, Articles, About, About Pensoft, Books, E-Books, and Blog. Below the header, there is a green 'Forum Paper' label and the article's metadata: 'Biodiversity Data Journal 7: e33679' and the DOI link 'https://doi.org/10.3897/BDJ.7.e33679 (08 Mar 2019)'. The main title of the article is 'Connecting data and expertise: a new alliance for biodiversity knowledge'. Below the title, the authors are listed: Donald Hobern, Brigitte Baptiste, Kyle Copas, Robert Guralnick, Andrea Hahn, Edwin van Huis, Eun-Shik Kim, Melodie McGeoch, Isayvani Naicker, Laetitia Navarro, Daniel Noesgaard, Michelle Price, Andrew Rodrigues, Dmitry Schigel, Carolyn A. Sheffield, and John Wiczorek. The section 'Abstract' is followed by a paragraph of text discussing the progress in digitising historical knowledge and the challenges in biodiversity data management, such as imbalances in regional engagement, uneven progress in data mobilisation, and the lack of stable persistent identifiers.

Biodiversity Data Journal

Home Articles About About Pensoft Books E-Books Blog

Forum Paper Biodiversity Data Journal 7: e33679
<https://doi.org/10.3897/BDJ.7.e33679> (08 Mar 2019)

Connecting data and expertise: a new alliance for biodiversity knowledge

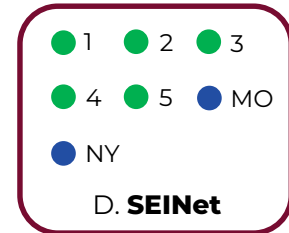
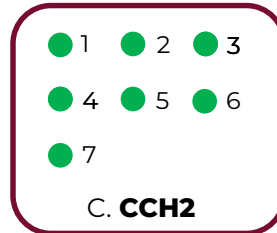
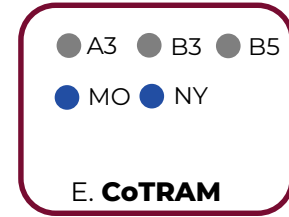
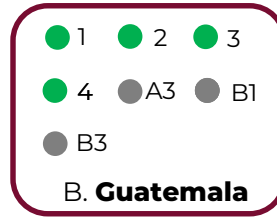
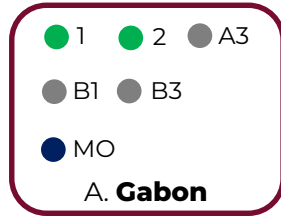
▼ Donald Hobern, Brigitte Baptiste, Kyle Copas, Robert Guralnick, Andrea Hahn, Edwin van Huis, Eun-Shik Kim, Melodie McGeoch, Isayvani Naicker, Laetitia Navarro, Daniel Noesgaard, Michelle Price, Andrew Rodrigues, Dmitry Schigel, Carolyn A. Sheffield, John Wiczorek

Abstract ▲

There has been major progress over the last two decades in digitising historical knowledge of biodiversity and in making biodiversity data freely and openly accessible. Interlocking efforts bring together international partnerships and networks, national, regional and institutional projects and investments and countless individual contributors, spanning diverse biological and environmental research domains, government agencies and non-governmental organisations, citizen science and commercial enterprise. However, current efforts remain inefficient and inadequate to address the global need for accurate data on the world's species and on changing patterns and trends in biodiversity. Significant challenges include imbalances in regional engagement in biodiversity informatics activity, uneven progress in data mobilisation and sharing, the lack of stable persistent identifiers for data records, redundant and incompatible processes for cleaning and interpreting data and the absence of functional mechanisms for knowledgeable experts to curate and improve data.

Community Access ⇔ Engagement ⇔ Quality ⇔ Trust ⇔ Use & Impact

External Managed Snapshot Collections



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Symbiota API ^{2.0} OAS3

<https://biorepo.neonscience.org/portal/api/docs>

[Contact Symbiota Support Hub Team](#)

Servers

../



GET /api/v2/collection



GET /api/v2/collection/{identifier}



GET /api/v2/installation



GET /api/v2/installation/{identifier}



GET /api/v2/installation/ping



GET /api/v2/installation/{identifier}/touch



GET /api/v2/installation/{identifier}/occurrence



Index Propagation - Portal Handshake



1. Hi, here is my info, please add me to your index (aka phonebook)
2. Gladly, here is my info, please add me to your phonebook
3. Let's share photobooks!
4. Each portal then initiates handshakes with all portals that they have not yet added to their photobook

Scientific Name:

[Search Portals](#)


[Display Details for All Portals](#)

African Herbaria Community Portal 


URL: <https://serv.biokic.asu.edu/africa/plantae>
Status: Success, online!
GUID: 847d4036-ef22-4c25-ac75-733fdaa5c046
Manager: egbot@asu.edu
Software version: 3.0.13
[Display Full Details](#)
Searching... 221 occurrences
[Query Results](#)
[Simple Map](#)
[Dynamic Map](#)
[Download Results](#)

Bee Library 

URL: <https://library.big-bee.net/portal>
Status: Success, online!
GUID: eee23760-e01a-4f79-97c3-cf9f4cb0876b
Manager: seltmann@ucsb.edu
Software version: 3.0.10
[Display Full Details](#)
Searching... 0 occurrences

Biodiversidad de Guatemala 

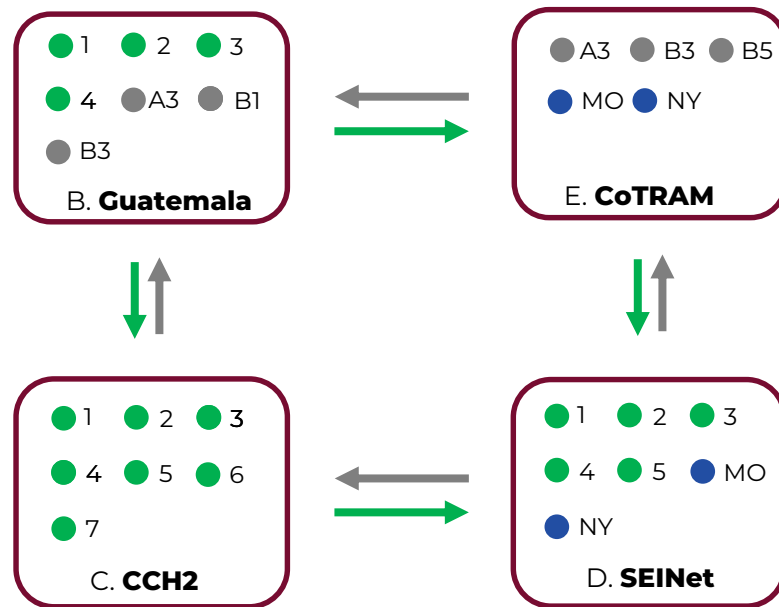
URL: <https://biodiversidad.gt/portal>
Status: Success, online!
GUID: adac6833-7ea4-4169-8a25-b5cd5dc96dc9
Manager: sorellana@asu.edu
Software version: 3.0.13
[Display Full Details](#)
Searching... 32 occurrences
[Query Results](#)
[Simple Map](#)
[Dynamic Map](#)
[Download Results](#)

CCH2 Portal 

URL: <https://cch2.org/portal>
Status: Success, online!
GUID: e49fea90-c2e1-46c0-ab72-ff9a7bb12c05

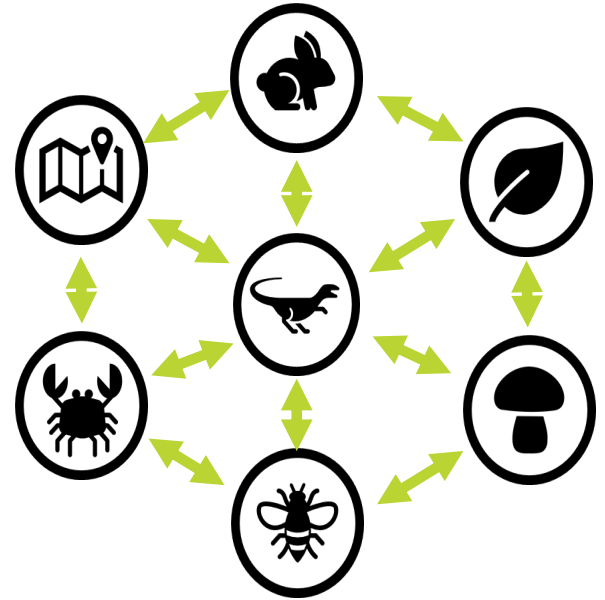
Distinction between Live and Snapshot becomes blurred

- Bi-directional Synchronization
- Live => Snapshot
 - Contract previously agreed upon
 - Applied automatically
 - Record-to-record Synchronization
- Snapshot => Live
 - Negotiation/Approval needed
 - Assisted filtered-pull

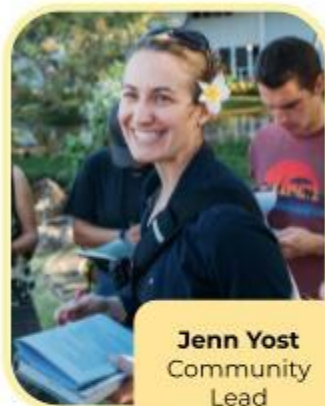


Coordinated Decentralized Data Network

- Portal represents Data Commons
 - Communities of expertise
- API globalizes the decentralized network
- Decentralize, yet connected
- Features in the works – 3.1 roll out
 - Streamline portal-to-portal publications
 - Efficient data transfers
 - Cross portal searches
 - Cross portal mapping



Symbiota Support Hub Team



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CAL POLY