



The team from Tooro Botanical Garden (TBG) research and plant conservation department spearheaded the collections and preservation of genome-quality vouchers from the garden living collections. Photo credit: TBG



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GGBN March 2022 Newsletter

- Four GGBN collections were awarded funding last year through the GGBN-GGI awards program, making over 9,000 new tissue or DNA samples discoverable.
- 557,313 new Tissue or DNA samples and voucher data were added to the GGBN Data Portal by GGBN members over the last year.
- GGBN held a virtual symposium on the challenges of biobanking during a pandemic. Presentations were recorded and are available online.
- GGBN’s Task Forces worked virtually to improve all areas of GGBN, including ongoing improvements to the website and document library.
- The TDWG “Genomic Biodiversity” interest group continues development of a data standard for sharing environmental sample data.
- The GGBN Conference to take place in Shenzhen, China has now been postponed until 2025. The next planned conference will be in Aguascalientes, Mexico in 2023.

Formed in October 2011, the Global Genome Biodiversity Network (GGBN) is an international network of institutions that share an interest in long-term preservation of genomic samples representing the diversity of non-human life on Earth.

GGBN provides a platform for biodiversity repositories from across the world to collaborate, ensure consistent quality standards for genomic collections, improve best practices for the preservation and use of such collections, and harmonize the exchange and use of material in accordance with national and international legislation and conventions.




Update From the Executive Committee Chair and Secretariat


We are pleased to share this past year's news and accomplishments with you. Despite the challenges due to Covid-19, we continued to make great strides in the global biobanking community, growing the global community of biodiversity biobanks, providing new genetic samples for research, expanding our resource library, and expanding our standards to meet the needs of our global biodiversity biobanking community. GGBN's membership has grown to include 99 members from across 35 countries and provides data from 29 member collections representing more than 128,000 species of the Earth's biodiversity, from unicellular to multicellular organisms. Today sample data from three million of the approximately 12 to 15 million samples stored in GGBN's collections are available through GGBN. In 2021, four GGBN institutions were awarded funding to make their genetic collections discoverable through the GGBN data portal, including Instituto de Investigación de Recursos Biológicos Alexander von Humboldt/Colombia, National Museum, Federal University of Rio de Janeiro/Brazil, Universidad Nacional de Colombia/Colombia, Universidad Autónoma de Aguascalientes, DNA Bank/Mexico. Members providing data made 557,313 new records discoverable on GGBN in 2021.

GGBN held its first virtual symposium titled "Operating a Biobank during a Pandemic: Facing Challenges during a Period of Heightened Relevance". The symposium allowed the GGBN community to discuss the challenges, adaptations, and opportunities for biobanks that had become apparent during the Covid-19 crisis. Forty-seven participants from the GGBN community attended this event. GGBN members also participated in a MOBILISE workshop on a data standard for loans and permits, attended by over 100 people from more than 20 countries. GGBN continues to grow its strategic partnerships, and established a partner agreement with the Wellcome Sanger Institute to form a strategic alliance in order to facilitate collaborations on activities related to biobanking and biopreservation of samples from the major projects in Sanger's Tree of Life program, including the Darwin Tree of Life and Aquatic Symbiosis Genomics projects.

GGBN continues to improve its best practices and standards for tissue and DNA collections through leadership of the SYNTHESYS+ work package on developing molecular collections standards and processes, and the Biodiversity Information Standards (TDWG) interest group on biodiversity genomics, with a focus on environmental collection sample standards.

We wish everyone a safe and healthy 2022.


Ole Seberg (NHM) / Denmark
Executive Committee Chair


Katharine Barker (NMNH) / United States
Program Manager, Secretariat



Drug Research and Functional Genomics Centre at the Science Campus Braunschweig-Süd, Braunschweig, Germany. Several DSMZ working groups as well as the fully automated storage facility for the DSMZ bioresources are located in this building.

Photo credit: DSMZ

GGBN COUNTS

- 99 Members
- 29 Member Collections Online
- 35 Countries
- 6,258,891 Records
- 4,843 Families
- 35,145 Genera
- 128,442 Species

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2022 Priorities

Communications and Outreach:

- Plan GGBN 2023 Conference
- Expand GGBN online collections
 - * Increase membership from Specify and Symbiota users
 - * Complete open GGI award projects (2018-2021)
- Raise awareness of GGBN
 - * Engage genomic-collections based partners and marginal communities
 - * Plan Latin America Regional Workshop
 - * Plan Nigeria Regional Workshop
 - * Complete publication on benefits of using the data portal (bird use case)
 - * Member recruitment in Australia
 - * Enhance social media platforms

Data Standards:

- Environmental Sample Standards
 - * Follow roadmap with TDWG's Genomics Interest Group
- EU Project: SYNTHESYS+ Work Package NA 3:
 - * Overview and comparison of existing standards for biobanks, identification of missing standards
 - * Workshop on linking restriction information (in legal documents) with specimen and sample data

Policies:

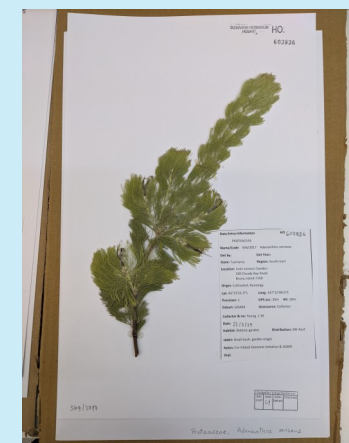
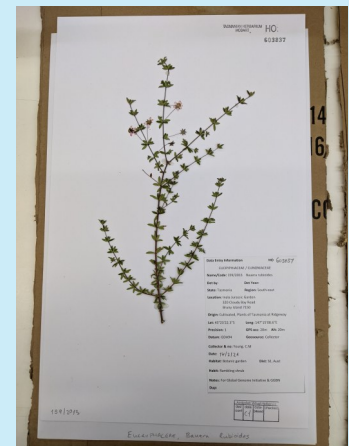
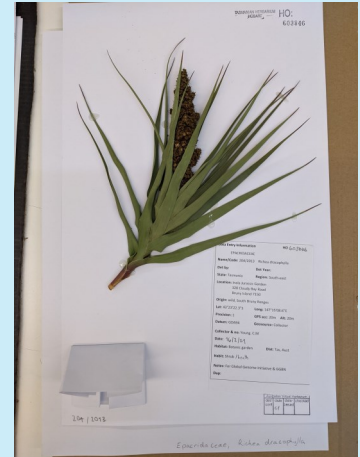
- Permit field implementation across members publishing data to GGBN
- Review strategy for cross-links between GGBN, NCBI, Provider Institutions in light of DSI/CBD discussions
- Continue GGBN representation on digital sequence information discussions

Biobank Procedures:

- Towards end of 2022: Start work on animal cell culture within EU-funded BGE project (ERGA)
- Continue work on fixed tissue animal preservation study when Covid-19 allows
- Work on study on molecular vouchering
- Communicate results of experiment on RNA stabilizers to enable RNA room temperature shipment
- Work towards SOP Handbook/Gap Analysis in Synthesys+ (NA3.1)

Document Library:

- Update Document Library software and continue to expand functionality
- Partner with CryoArks, Darwin Tree of Life Project and ESBB to expand document library content



Herbarium sheets from the Tasmanian Herbarium, Inala Jurassic Garden, Tasmania. Pictured are *Richea dracophylla*, *Bauera rubioides*, and *Adenanthos sericeus*.

Task Force Updates



Data Standards Task Force

Mission: Develop and expand a global data platform for aggregating relevant data sources of genomic samples, vouchers, molecular analysis, publications and images

Significant progress was made in 2021 on the GGBN website redesign, including updates to the home page, sample search pages, and member pages. We hope to complete work and launch the new site design in 2022. If you are interested in helping out, please contact the secretariat. The new drafts can be found at: http://www.ggbn.org/dev_ggbn_portal/.

The Botanical Research Institute of Texas/US will be the first test site for recent SYMBIOTA updates, an online interface that will support the GGBN Darwin Core IPT for other GGBN institutions throughout the world.

The University of Tartu/Estonia continues work on the PLUTO extension. Several research groups in Estonia are collaborating on this project by providing specimens, material samples and extracted DNA-s representing mammals, insects, fishes, plants and soils from various projects.

The TDWG interest group "Genomic Biodiversity" was founded by GGBN and the Genomic Standards Consortium. The interest group will continue work in 2022 on a data standard for sharing environmental sample data. The bimonthly working meetings are open to everyone who has subscribed to the mailing list: <http://lists.tdwg.org/mailman/listinfo/tdwg-gbwg>

Policies Task Force

Mission: Support member organizations' work on Access and Benefits Sharing

GGBN became a signatory of the Digital Sequence Information (DSI) Scientific Network's Open Letter calling on open access for DSI. The letter serves as a formal contribution to the debate on open access to DSI, advocating for a fair and equitable system that will deliver benefit sharing while protecting open access to support research and innovation for biodiversity conservation. The letter emphasizes that without open access to DSI, it will not be possible to achieve the UN Sustainable Development Goals or to implement the Post-2020 Global Biodiversity Framework, as we will not be able to research and develop solutions for the current environmental and health crisis.



Biobank Procedures Task Force

Mission: Improve standard operating procedures at biodiversity biobanks

The China National GeneBank/China team will communicate results of the RNA stabilizers for room temperature shipment study in 2022. Towards the end of 2022, Leibniz Institute for the Analysis of Biodiversity Change (LIB), Museum Koenig Bonn and partners will continue their animal cell culture work, already initiated within the FOGS project, now also as a part of the EU-funded BGE project (ERGA subproject).

LIB received some funding to test whether an increasing number of passages in cell culture accumulates mutations.

The task force will continue to work on the animal fixed tissue preservatives study as soon as Covid-19 allows. The group is looking for volunteers to take over the taxa originally processed at Smithsonian, which are orphaned since GGI funding expired. The University of Guelph/Canada is leading the effort to develop best practices for large biobanks and core facilities in GGBN. A study and opinion paper on molecular vouchering is underway, led by LIB.

Task Force Updates

Communications Task Force

Mission: Recruit new members and disseminate information to raise awareness of the importance of Tissue and DNA sample information and biodiversity repositories

Engaged genomic collections-based partners and marginal communities through GGBN website, listserv and social media. The GGBN listserv includes over 800 subscribers. Over 300 social media and news posts across English, Spanish and Chinese speaking platforms.

Although there are some Covid-19-related delays for GGBN-GGI awardees, we are still working with our 2019 and 2020 GGBN-GGI awardees to publish their samples to the GGBN data portal. Through the 2020 awards program alone, we expect to see nearly 125,000 additional samples this year from our five awardees, two of which are also new GGBN members.

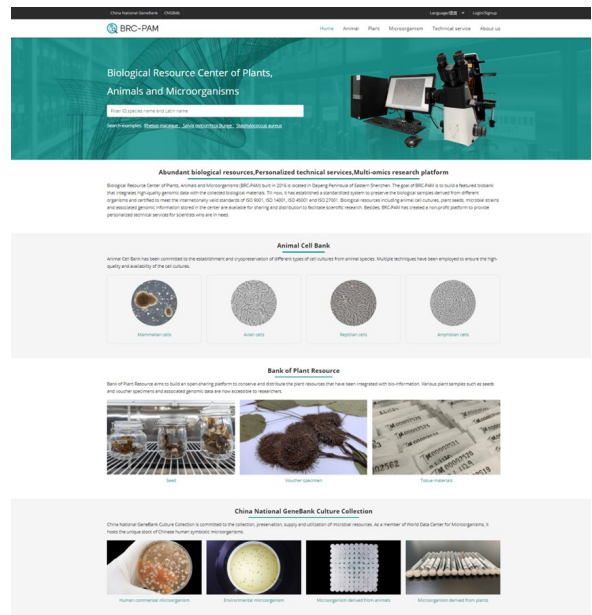
Document Library Task Force

Mission: Development and expansion of an online knowledge exchange platform specific to biodiversity biobanking

The GGBN Document Library Team worked through lockdown upgrading the platform, reviewing and updating Tags, Categories and Sub-Categories, cleaning documents and starting on the functional development wish-list. As of Feb 2021 the library has >700 curated documents for sharing with biodiversity biobankers worldwide.

Following on from MoUs signed in Feb 2020, we are currently working with our new 'Tag Managers' to source, upload and curate documents from key collaborating initiatives including Darwin Tree of Life (DToL), CryoArks (CA), ESBB and SYNTHESIS (Heather Allen for DToL, Kirsty Lloyd for CA, ESBB team (medical/clinical biobanking links), Carolina Corrales and Peter Hollingsworth's team for SYNTHESIS), using the Tags created for these initiatives. New project/initiative 'branded' documentation, e.g. CryoArks and SYNTHESIS SOPs, Handbooks, Lab Procedures and Protocols, Best Practices etc will be made discoverable and accessible via the GGBN document library, and we intend to highlight the most interesting publications on GGBN social media as they are uploaded to the library.

The GGBN Document Library User Guides were translated into Spanish and we began to upload Spanish biodiversity biobanking content.



The China National GeneBank's online portal provides information of over 4,900 shared samples from its collection, including animal cell cultures, plant seeds and microbial strains. <https://db.cngb.org/brc/>

Collections Highlights

As of March 2022, a total of 3.43 million DNA and tissue samples, 204 environmental samples, 28,080 cultures and 2.79 million vouchered specimens representing 52% of all classes, 57% of all orders, 42% of all families, 18% all of all genera and 6% of all species are discoverable through GGBN. A total of 557,313 new records were made discoverable in 2021. See Table 1 for a breakdown on available GGBN DNA and tissue samples for select taxonomic groups. In 2021 GGBN had an average total of 800 visitors and 224-4096 data queries per month (excluding visits on text pages). To date 28 members are providing data to the GGBN data portal (Table 2).

Taxonomic Group	DNA Extracts	Tissues
Plants	61,760	151,869
Fungi	3,708	35
Terrestrial Arthropods (insects, arachnids, millipedes, centipedes, etc.)	1,509,096	138,529
Vertebrates (birds, mammals, amphibians, reptiles, fishes)	53,575	1,361,900
Invertebrates (all animals that aren't terrestrial arthropods or vertebrates)	46,617	55,636

Table 1. Samples available by taxonomic group via the GGBN portal.

Core Member Institution	Records On GGBN
African Centre for DNA Barcoding, University of Johannesburg	13,169
Arctos/Denver Museum of Nature & Science	38,774
Arctos/Museum of Southwestern Biology	611,134
Arctos/University of Alaska Museum of the North	297,752
Arctos/University of California, Berkeley, Museum of Vertebrate Zoology	176,762
Biodiversity Research and Teaching Collections, Texas A&M University	44,711
Botanic Garden and Botanical Museum Berlin-Dahlem	35,193
Centre for Biodiversity Genomics	3,001,030
Centro de Ornitología y Biodiversidad	8,972
Charles University in Prague	8,035
China National GeneBank	235
Denver Botanic Gardens	2,894
Institute of Vertebrate Biology, The Czech Academy of Sciences	9,018
Leibniz Institute DSMZ	37,282
Leibniz Institute for the Analysis of Biodiversity Change, Museum Koenig	21,497
Manaaki Whenua-Landcare Research	8,639
Museo de Zoología, Pontificia Universidad Católica del Ecuador	61,297
Museum für Naturkunde	16,158
National Museum of Natural History	259,154
Natural History Museum of Denmark	1,271
Natural History Museum London	43,829
Natural History Museum of Oslo	422,239
New York Botanical Garden	523
Ocean Genome Legacy	6,490
Rio de Janeiro Botanical Garden	7,718
Royal Botanic Gardens, Kew	3,536
Senckenberg Frankfurt and BiK-F	6,817
University of Kansas Biodiversity Institute	14,247

Table 2. GGBN Core Member institutions that provide data to the portal.

Award Programs

2021 GGBN-GGI Awards

In 2021 four GGBN collections were awarded funding for projects that support the discoverability of new collections through the GGBN's Data Portal. Awardees are given below.

Institution	Country	Samples
Instituto de investigación de recursos Biológicos Alexander von Humboldt	Colombia	4,946
National Museum, Federal University of Rio de Janeiro	Brazil	1,200
Universidad Autónoma de Aguascalientes, DNA Bank (ADNUAA)	Mexico	2,000
Universidad Nacional de Colombia	Colombia	1,200

GGBN-GGI 2022 Award Program

The GGBN Awards Program promotes the discoverability of new collections on GGBN. The 2021 awards program in particular focused on institutions and collections from the global south and from countries with low or middle income, strategically addressing high-level taxonomic gaps in the GGBN Data Portal. Four institutions were funded to make their collections discoverable on the GGBN portal by September 2023, totaling 9,346 samples.

We are happy to announce the 2022 GGBN-GGI Awards Program. The program provides funding for projects that support the discoverability of new genetic collections through the Global Genome Biodiversity Network's Data Portal. The proposal review committee will consider requests for up to 20,000 USD with clearly articulated budget justifications. Priority consideration will be given to proposals that represent institutions and collections 1) from the global south, 2) from countries with a low or middle-income (based on the latest WESP Economy by per capita GNI), and 3) that strategically address high-level taxonomic gaps in the GGBN Data Portal. It is mandatory that all data from funded projects are made available online on the GGBN Portal before 1 September 2024. The submission deadline for 2022 proposals is Monday May 23, 2022.



The Covid-19 Biobank of Oswaldo Cruz Foundation started its activities in December, 2021, with the capacity to store up to one and a half-million samples of human and non-human biological materials (Sars-Cov-2). Website- <https://biobanco-covid19.fiocruz.br/>. Photo credit: Raquel Portugal

Opportunities for Involvement



GGBN is currently seeking Chair and Member nominations for its Task Forces, with active succession planning for chair positions on biobank procedures and document library. GGBN currently has five Task Forces addressing the following areas:

- Data Standards and Data Access for Genomic Samples (Chair: Gabi Droege, Botanic Garden and Botanical Museum Berlin),
- Policies Related to Management and Stewardship of Genomic Samples (Chair: Amber Scholtz, DSMZ),
- Biobank Procedures (Chair: Jonas Astrin, Leibniz Institute for the Analysis of Biodiversity Change, Museum Koenig),
- Document Library (Chair: Jackie Mackenzie-Dodds, Natural History Museum London),
- Communications and Outreach (Chair: Andrew Iloh, NBIC).

For more information on Task Forces, see [Governance](#) and [Terms of Reference](#).

Nominations should be sent to GGBN@si.edu for approval by the Executive Committee.

GGBN is actively working this year to complete the redesign of the website, and we are inviting volunteers to help provide feedback and test mock-ups in the following areas:

- Sample search and display pages (DNA researcher volunteers invited)
- Institutional stats and member pages (GGBN Member volunteers invited)
- Content review, navigational mapping review, and wikipage design (all volunteers welcome)

If you are interested, or to learn more, email GGBN@si.edu.

GGBN is coordinating the TDWG Interest Group “Genomic Biodiversity” to work in particular on improving our data standards. This year’s main topic will be environmental DNA and environmental sample data. For more information, please subscribe to the mailing list:

tdwg-gbwg@lists.tdwg.org and visit the following sites:

<https://www.tdwg.org/community/gbwg/>

<https://github.com/tdwg/gbwg>

Are you planning to participate in an upcoming meeting that reaches the biodiversity biobank community or biodiversity research community? Contact us at GGBN@si.edu to find out how you can represent GGBN.

GGBN Meetings

On June 9, 2021, GGBN held a short virtual symposium entitled “Operating a Biobank During a Pandemic: Facing Challenges During a Period of Heightened Relevance.” Intended to facilitate discussion on the challenges, adaptations, and opportunities related to biobanking during the ongoing Covid-19 pandemic, the meeting featured two keynote talks, 5 ‘lightning talk’ case studies, and breakout discussion sessions. The presentations were recorded and are available on the GGBN YouTube channel.

GGBN continues to monitor the global situation and plans to resume in-person GGBN Conferences when it is safe to do so. The conference in Shenzhen, China (originally postponed from 2020 to March 2022), has again been postponed until 2025. The next planned conference is scheduled for fall 2023 in Aguascalientes, Mexico. In the interim, GGBN will host several virtual workshops in 2022, including regional workshops in Latin America and Nigeria.

Additional details will be made available on the [GGBN website](#) and through GGBN listservs.

GGBN Governance

GGBN welcomed several new members to its Executive Committee in 2021 for the 2022-2024 term, including Gilberto A. Ocampo Acosta, Universidad Autónoma de Aguascalientes, Andrew Iloh, National Biodiversity Information Consortium, Biodiversity Education and Resource Center and Sheda Science and Technology Complex, Amber Hartman Scholz, Leibniz Institute DSMZ, Ren Wang, China National Genebank. The Executive Committee is responsible for overseeing the operations of the Secretariat and Technical Management Offices in implementing the work program and budget. For more information, see [Terms of Reference](#) and [Governance](#).

Membership Update

Since January 2021, ten new members have joined GGBN. These new members include 1) the Royal Botanic Garden of Jordan/Jordan; 2) The Huntington/US; 3) Atlanta Botanical Garden/US; 4) Inala Jurassic Garden/Australia; 5) Core Facility Botanical Garden/Austria; 6) Tooro Botanical Gardens/Uganda; 7) Universidad Nacional de Colombia/Colombia; 8) Jawaharlal Nehru Tropical Botanic Garden and Research Institute/India; 9) Northwestern University Ecological Park and Botanic Gardens/Philippines; 10) Mientrung Institute for Scientific Research/Vietnam.

As of February 2022, there are 99 member institutions. For a complete list of GGBN members, see http://www.ggbn.org/ggbn_portal/members/table.

Interested in joining GGBN as a Member? Find out how here: <https://wiki.ggbn.org/ggbn/Membership>



#	List of Contributing Members 2021	Country
1	Alexander von Humboldt Institute for Research on Biological Resources	CO
2	Arctos	US
3	Association for Farmers Rights Defense	GE
4	Biodiversity Research and Teaching Collections, Texas A&M University	US
5	Bishop Museum	US
6	Botanical Research Institute of Texas	US
7	Botanic Garden and Botanical Museum Berlin	DE
8	CaLeDNA	US
9	Centre for Biodiversity Genomics	CA
10	Centro de Ornitología y Biodiversidad	PE
11	Charles University in Prague	CZ
12	China National GeneBank	CN
13	Core Facility Botanical Garden, Faculty of Life Sciences, University of Vienna	AT
14	Denver Botanic Gardens	US
15	DNA Bank of Vascular Plants, Universidad Autónoma de Aguascalientes	MX
16	FIOCRUZ	BR
17	Hungarian Natural History Museum	HU
18	Inala Jurassic Garden	AU
19	Institute of Vertebrate Biology, The Czech Academy of Sciences	CZ
20	Instituto de Investigaciones Marinas y Costeras Jose Benito Vives de Andreis INVEMAR	CO
21	Jawaharlal Nehru Tropical Botanic Garden and Research Institute	IN
22	Leibniz Institute DSMZ	DE
23	Leibniz Institute for the Analysis of Biodiversity Change, Alexander Museum Koenig	DE
24	Maanaki Whenua Landcare Research	NZ
25	Mientrung Institute for Scientific Research	VN
26	Museo de Zoología, Pontificia Universidad Católica del Ecuador	EC
27	Museum für Naturkunde	DE
28	Museum of Comparative Zoology, Harvard University	US
29	National Institute of Research for Agriculture, Food and Environment	FR
30	National Museum	CZ
31	National Museum of Natural History, Smithsonian Institution	US
32	Natural History Museum and Botanical Garden, University of Tartu	EE
33	Natural History Museum London	UK
34	Natural History Museum of Denmark	DK
35	Natural History Museum of Oslo	NO
36	National Zoological Gardens of South Africa	ZA
37	Northwestern University Ecological Park & Botanic Gardens	PH
38	Ocean Genome Legacy	US
39	Rio de Janeiro Botanical Garden	BR
40	Royal Botanic Gardens, Kew	UK
41	Steinhardt Museum of Natural History	IL
42	Tooro Botanical Gardens	UG
43	Universidad Autónoma de Aguascalientes	MX
44	Universidad Nacional de Colombia	CO
45	University of Kansas Biodiversity Institute	US

Partner Highlights

Biodiversity
Information
Standards
TDWG



CRYOARKS



genomic
STANDARDS consortium



Specify
COLLECTIONS CONSORTIUM

Symbiota

Our partners include non-biodiversity biobanks, governmental agencies, regional and professional associations and other organizations that have an interest in biodiversity biobanks and/or biodiversity informatics. These partners are committed to supporting the goals of GGBN by providing technical expertise and/or participating in GGBN activities. In turn, GGBN representatives are active during annual network meetings, connecting directly with the research community.

Biobanking, Bioinformatics, and Research Partners

[Biodiversity Information Standards \(TDWG\)](#)

[China Biodiversity Conservation and Green Development Foundation \(CBCGDF\)](#)

[CryoArks](#)

[Darwin Tree of Life Project](#)

[Earth Biogenome Project \(EBP\)](#)

[Entomological Collections Network \(ECN\)](#)

[European, Middle Eastern & African Society for Biopreservation and Biobanking \(ESBB\)](#)

[Genomic Standards Consortium \(GSC\)](#)

[Global Biodiversity Information Facility \(GBIF\)](#)

[Global Genome Initiative \(GGI\)](#)

[Global Genome Initiative for Gardens \(GGI-Gardens\)](#)

[International Society for Biological and Environmental Repositories \(ISBER\)](#)

[Specify Collections Consortium \(Specify\)](#)

[Symbiota](#)



Laser scanning identification code during fully automated storage of ampoules with freeze-dried bacteria. Photo credit: DSMZ

GGBN VISION: A global network of well-managed collections of genomic samples from across the Tree of Life, benefiting society through biodiversity research, development, and conservation.

GGBN MISSION: To foster collaborations among biodiversity repositories in order to ensure quality standards, improve best practices, secure interoperability, and harmonize exchange of material in accordance with national and international legislation and conventions.