

Biodiversity data mobilization in natural history state collections of the Dominican Republic

Programme:BID

Project ID: BID-CA2020-031-NAC

Project lead organization:Instituto de Investigaciones Botánicas y Zoológicas, Universidad Autónoma de Santo Domingo

Project implementation period:1/8/2021 - 30/6/2023

Report approved: 11/7/2023

Final Narrative Report

Executive Summary

The implementation of this project with a national perspective was a great challenge that has produced great results. From the Instituto de Investigaciones Botánicas y Zoológicas Prof. Rafael M. Moscoso and the Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marcano", we joined forces so that our biological collections, Dominican natural heritage, would reach a good state of functionality derived from the accessibility to the data, the curation of the collections and the training of their personnel.

This, for us as a team, has been a successful project. The most obvious achievements refer to the training of staff in the digitization and mobilization of biodiversity data to the Symbiota database in its different portals and its subsequent publication to the GBIF portal (except those uploaded via IPT). We have managed to publish 20 datasets (15 of occurrences and 4 of checklists) corresponding to about 11 895 records (11 438 of occurrences and 457 of checklists). Both institutions have GBIF publisher permissions; all collections are registered in GRciColl; we achieved two badges in biodiversity data mobilization and we have trained for the project about 18 people between students and researcher curators of the collections of both institutions.

The support from the Biodiversity Knowledge Integration Center through Dr. Nico Franz and Samanta Orellana facilitating access to the Symbiota portals, the creation of the profiles of all the collections and the necessary training has propelled us to an advanced position. From here, new tasks and commitments arise that we intend to continue to develop. It is our responsibility to ensure that the knowledge gained and the inter-institutional relationships that have been forged translate into major new goals related to the publication of new datasets and the continued growth of our databases. Continued support from the BID team, our strategy of continuous monitoring and close collaboration among the project teams, stand as the basis for achieving these goals. We look forward to collaborating with other Dominican institutions that also manage natural history collections.

Progress against milestones

Has your project completed all planned activities?: Yes

Has your project produced all deliverables: Yes

Report on Activities

Summary of the implementation of the project activities

Achievements

All the proposed activities have been completed, including these important achievements to date:

1. Integration of the teams from both institutions in a satisfactory manner.

2. IIBZ and the Museum have credentials as data publishers in GBIF. Both through Symbiota and IPT.
3. All committed datasets are published. (in part, see explanation further)
4. Two team members have been certified to serve as trainers in data mobilization and publishing. (Mid-term goal)
5. Activities validating the workshops for the project team and data users have been executed.
6. The project has been presented to the local scientific community. As well as the progress and practice of using data from biological collections in the documentation of Dominican biota.
7. Digitization of an important part of the records committed to both institutions.
8. 20 collection profiles and datasets have been generated in Symbiota's portals (CSVColl, Ecdysis and Neotropical Flora).

Determination and organization of specimens took much longer than expected and extended until practically the end of the project for several datasets of the IIBZ. This was due to the fact that some collections were not fully curated. The curation process was long and tedious because it also included training students. In other cases, a variation of the selected taxonomic group was made, as in the case of the entomological collection, which finally only included a selection of the beetle family Chrysomelidae. Other datasets were very complex, such as the sampling event dataset, and required the participation of several taxonomists.

The impact of the taxonomic work on the project resulted in an increased degree of difficulty in processing the specimen data and, therefore, the datasets. A complete taxonomic update was necessary, especially for datasets based on old records (plants from Father Miguel Fuertes or collections with specimens from Eugenio Marcano).

At date, the Museum deliverables were all published at GBIF but there is a delayed on a specific update regarding the Arachnids collection MNHNSD dataset due to curatorial inconvenient, and to another institutional situation where the person responsible for this dataset suddenly earned the responsibility of his department (due to the resignation of the previous manager), resulting in a great reduction of the time available for the dataset and provoking the actual delay. Nevertheless, we expect to have the update ready by July 5, 2023, and it should be published to GBIF from Symbiota by July 12, 2023. A second dataset (Herpetological collection MNHNSD) though it is already published, it will be the only dataset below the committed number of registers. This situation originated by the poor data quality of the registers, which could not be confirmed on time, and to some cataloguing issues that showed during the implementation of the project. Because of this, we are doing harder efforts to publish the arachnids' dataset update since it will help to complement the number of registers in the herpetological dataset.

Workshop and training on digitization. The first workshop was postponed as a result of restrictions on presential meetings due to the COVID-19 pandemic. For this reason, initially staff from each institution were trained by instructors Oniel Alvarez (IIBZ) and Gabriel De los Santos (Museo) who had already taken the workshop on enhancing data mobilization and publication capabilities. These virtual trainings were maintained until health conditions became favorable.

We attended the workshop "Introduction to the Digitization of Biological Collections with the Symbiota platform" (October 28, 2021) at the XXIV Congress of the Mesoamerican Society for Biology and Conservation-EI Salvador (online). We also participated in the course "Publication of biodiversity data with IPT" (17-18 March 2022) and "Biodiversity data cleaning with OpenRefine" (9 -10 December 2022, as part of the project Extending knowledge on biodiversity data quality and publication in the Spanish-speaking community, Capacity Enhancement Support Programme, GBIF.

Regular meetings were scheduled with Samanta Orellana (Arizona State University - Biodiversity Knowledge Integration Center) to train IIBZ and Museum staff in the digitization of collections in Symbiota profiles. As a result of this work, all the necessary profiles were created for the management of the collections and the datasets that required it. For the datasets uploaded to GBIF through the IPT, institutional credentials were assigned (April 1, 2023) to publish the data, one person for the Museum and one for the IIBZ.

On March 4, 2022 we held a presential full teams meeting where we verified that all staff properly handled the data quality verification procedures and were able to upload the data through the Symbiota profiles. A close connection was maintained with the project mentor, Leonardo Buitrago, who guided us through the entire project, step by step.

Completed activities

Activity: BID Capacity Enhancement workshop – Data mobilization and

publication

Description: A mandatory workshop for representant of the project on data mobilization. Midterm goal achieved

Start Date - End Date: 3/8/2021 - 6/8/2021

Verification Sources: Certification obtained attached:

(1) Biodiversity Data Mobilization, Basic Badge. Oniel Álvarez-Abreu

(2) Biodiversity Data Mobilization, Advanced Badge. Gabriel de los Santos

Activity: Biodiversity data mobilization plan

Description: Mandatory milestone attached to the Early progress report. A data mobilization plan was designed for both dataholder institutions.a data mobilization plan was created for both institutions. Each instituton had to work at its own pace according to the general schedule and the particularities of each institution.

Start Date - End Date: 16/8/2021 - 29/10/2021

Verification Sources: Photographs of meetings.

Activity: Determination and organization of specimens

Description: Specimens of the different collections were determined to the lowest taxonomical level in order to have an accurate baseline of information for genera and species distributions. This process take more time than previously assigned.

Start Date - End Date: 2/8/2021 - 28/4/2023

Verification Sources: Photos of team making taxonomic work

Activity: Workshop and training on digitization

Description: The workshop was postponed as a result of the handling of the COVID-19 situation. Personal from each institution were trained by instructors Oniel Alvarez (IIBZ) and Gabriel De los Santos (Museum). Several virtual meetings and workshops complemented the training. On March 4, 2022, when sanitary conditions permitted, a presential meeting was held with the complete team of the Museum and IIBZ

Start Date - End Date: 4/3/2022 - 4/3/2022

Verification Sources: Photos of activities

Activity: Digitization of specimens

Description: Specimens and labels of all ccurrences datasets were digitized and their information were

incorporated to the corresponding databases

Start Date - End Date: 20/9/2021 - 28/4/2023

Verification Sources: Published datasets

Activity: Gain certification at BID Capacity Enhancement Workshop

Description: Two person from the project team have completed the certification process following the first BID Capacity Enhancement workshop

Start Date - End Date: 1/10/2021 - 31/5/2022

Verification Sources: Badges:

Biodiversity Data Mobilization - Gabriel de los Santos

Biodiversity Data Mobilization – Oniel Álvarez Abreu

Activity: Midterm Report

Description: Midterm report of scheduled activities completed

Start Date - End Date: 25/5/2022 - 31/5/2022

Verification Sources: Midterm report published on project portal. <https://www.gbif.org/project/BID-CA2020-031-NAC/mobilizing-natural-history-collections-of-the-dominican-republic>

Activity: Input of the collection data from the Museum into the Museum database

Description: This activity initially presented technical difficulties initially, but eventually all the datasets committed by the Museum were uploaded to their corresponding profiles in Symbiota portals

Start Date - End Date: 1/11/2021 - 29/6/2023

Verification Sources: Profiles of the Museum's collections in the respective Symbiota portals:

CSVColl and Ecdysis,

Activity: Migration of the Museum collections data to GBIF

Description: This activity was delayed due to technical problems with the Museum's database. But understanding the advantages of working with Symbiota, as IIBZ was doing, the Museum initiated collaboration with the Arizona State University - Biodiversity Knowledge Integration Center to upload the data first in the respective portals of the Symbiota platform and then mobilize them to GBIF

(occurrences). The catalogs were uploaded directly by IPT. All committed datasets have been uploaded to GBIF. Some variations in the number of records offered have changed.

Start Date - End Date: 3/1/2022 - 28/6/2023

Verification Sources: Datasets from Museum published on GBIF

Activity: Publication of at least one dataset through GBIF.org

Description: Two datasets were published on GBIF before midterm report deadline, one by the Museum and the other by the IIBZ. This was a midterm goal.

Start Date - End Date: 31/3/2022 - 31/5/2022

Verification Sources: Midterm narrative report for the project on GBIF portal.

<https://www.gbif.org/project/BID-CA2020-031-NAC/mobilizing-natural-history-collections-of-the-dominican-republic>

Activity: Workshop for data users

Description: Workshop for potential users and data holders from public and private institutions, such as universities and botanical gardens

Start Date - End Date: 14/4/2023 - 14/4/2023

Verification Sources: Photos, several links to the publication in social networks, invoice for consumables, agenda and several presentations uploaded to the project portal in GBIF in the final report.

Activity: Final report

Description: 1. Completion of all activities 2. Production of all deliverables

Start Date - End Date: 31/5/2023 - 30/6/2023

Verification Sources: All deliverables published on GBIF

Report on Deliverables

Deliverables - Summary

The project committed to the delivery of 15 datasets and 5 checklists. We believe that this has been an extraordinary result for the team, especially considering that we had no experience in managing and publishing biodiversity data under the Darwin Core Standard. Although there are still two datasets to be delivered, we feel very satisfied with the work done. It is important to note that we selected datasets of the three types: occurrences, checklists and sampling events. This allowed us to gain experience and skills in handling different types of data. The total number of occurrence records amounts to a total of 11,438, from 11 taxonomic groups, plus species records in the five checklists with a total of 437 species, mainly plants.

No new deliverables were generated as part of the project. However, below are cited several works in progress that will later result in new deliverables.

5. To date, only two datasets have not been completed, but we intend to publish them as soon as possible. There are several reasons for this delay. One has to do with the fact that the person designated for this task moved from the institution, so new personnel had to be trained to complete the work. Data cleaning in OpenRefine and georeferencing became more complex as data was taken from tags by different people. For another dataset too many records (the entire collection) were offered and could not be completed. An important thing to point out regarding the selection of data to publish is that it is necessary to have experience before choosing the type of deliverables we want. We have the case of the Museum's type specimen dataset that was submitted as both an occurrence and checklist dataset. In the end, we understood that this partitioning of the information did not make sense, which, while maintaining the number of committed datasets, in practice is confusing for the users and a waste of time for the project members. For this reason and understanding (which we explained to our mentor) that it is better to publish the data in the best possible way, choosing quality instead of quantity and adhering to the standards proposed in GBIF (<https://www.gbif.org/dataset-classes>).

Deliverables produced by the project

Dataset deliverables

Aristolochiaceae, Asteraceae, Bromeliaceae, Fabaceae y Myrtaceae de la colección del Herbario USD, Santo Domingo, República Dominicana

Dataset type: Occurrences

Dataset scope: The families Aristolochiaceae, Asteraceae, Bromeliaceae, Fabaceae and Myrtaceae from the USD Herbarium collection. This dataset has specimens collected between 5 October 1936 and 15 May 2004, by recognized explorers and botanists.

Number of records: 1,032
Data holder: Instituto de Investigaciones Botánicas y Zoológicas
Data host institution: Symbiota Support Hub
% complete: 100%
Status update: Published on GBIF
DOI: <https://doi.org/10.15468/ed9hcv>
Expected date of publication:

Chrysomelidae from the entomological collection of the IIBZ

Dataset type: Occurrences
Dataset scope: Occurrences of the Chrysomelidae collection of the Instituto de Investigaciones Botánicas y Zoológicas. The geographic representation covers mainly the Dominican Republic. Occasional records from Haiti may be added at a later date. The geographic range covered dates from 1958 to the present.
Number of records: 2,013
Data holder: Instituto de Investigaciones Botánicas y Zoológicas
Data host institution: Symbiota, Ecdysis portal
% complete: 100%
Status update: Published on GBIF
DOI: <https://doi.org/10.15468/62wzfw>
Expected date of publication:

Macroinvertebrados acuáticos bioindicadores de calidad de agua utilizados en la calibración de los índices BMWP-RD e IBF-RD para ríos de República Dominicana

Dataset type: Sampling Event
Dataset scope: This dataset contains records of aquatic macroinvertebrates collected in rivers and mountain streams in several watersheds of the Cordillera Central, Constanza municipality, La Vega province, Dominican Republic. These represent partial data from the project "Adaptation of the Biological Monitoring Working Party (BMWP) and Biotic Index of Families (IBF) indices for the Dominican Republic and their use as a tool for monitoring the biological quality of freshwater bodies".
Number of records: 503
Data holder: Instituto de Investigaciones Botánicas y Zoológicas
Data host institution: GBIF Secretariat
% complete: 100%
Status update: Published on GBIF
DOI: <https://doi.org/10.15468/wugdac>
Expected date of publication:

Diversidad de hormigas (Hymenoptera: Formicidae) en dos parques urbanos de la República Dominicana

Dataset type: Occurrences
Dataset scope: Ants collected using various sampling techniques in urban parks in Santo Domingo city, Dominican Republic (FONDOCyT research project on ant as a model in biodiversity assessment in urban areas)
Number of records: 963
Data holder: Instituto de Investigaciones Botánicas y Zoológicas
Data host institution: Symbiota, Ecdysis portal
% complete: 100%
Status update: Published on GBIF
DOI: <https://doi.org/10.15468/h6453y>
Expected date of publication:

Insectos asociados a las sabanas de montañas altas de República Dominicana

Dataset type: Occurrences
Dataset scope: Insects associated to high elevation savannah of *Danthonia domingensis* in four protected areas from Dominican Republic collected between 2014-2015. (FONDOCyT research project)
Number of records: 504
Data holder: Instituto de Investigaciones Botánicas y Zoológicas
Data host institution: Symbiota Support Hub
% complete: 100%
Status update: Published on GBIF
DOI: <https://doi.org/10.15468/t23a3f>
Expected date of publication:

Colección malacológica del Instituto de Investigaciones Botánicas y Zoológicas Prof. Rafael M. Moscoso de 1957 a 2000

Dataset type: Occurrences
Dataset scope: Land and freshwater snails and bivalves from historical and actual malacological

collection of IIBZ (1958-2000)

Number of records: 396

Data holder: Instituto de Investigaciones Botánicas y Zoológicas

Data host institution: Symbiota Support Hub

% complete: 100%

Status update: Published on GBIF

DOI: <https://doi.org/10.15468/w8hzh5>

Expected date of publication:

Museo Nacional de Historia Natural “Prof. Eugenio de Jesús Marcano” - Colección de Murciélagos

Dataset type: Occurrences

Dataset scope: Occurrence data of bats collected in Dominican Republic from 1970s to date.

Number of records: 493

Data holder: Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marcano"

Data host institution: Symbiota Support Hub

% complete: 100%

Status update: Published on GBIF

DOI: <https://doi.org/10.15468/hf48pd>

Expected date of publication:

Museo Nacional de Historia Natural “Prof. Eugenio de Jesús Marcano” - Colección de Tipos

Dataset type: Occurrences

Dataset scope: The collection of types of the Museo Nacional de Historia Natural “Prof. Eugenio de Jesús Marcano” (MNHNSD-TIPOS) houses 628 specimens, belonging to 22 orders, 56 families, 99 genera and 178 species of amphibians, arachnids, crustaceans, fishes, insects, mollusks, myriapods, nematodes, and reptiles. These registers include one turtle’s and four insects’ fossil species.

Number of records: 614

Data holder: Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marcano"

Data host institution: GBIF Secretariat

% complete: 100%

Status update: Published on GBIF

DOI: <https://doi.org/10.15468/rnx55w>

Expected date of publication:

Museo Nacional de Historia Natural “Prof. Eugenio de Jesús Marcano” - Colección de Ortópteros

Dataset type: Occurrences

Dataset scope: The Orthoptera collection of the Museo Nacional de Historia Natural “Prof. Eugenio de Jesús Marcano” (MNHNSD-ORTH) houses around 1 240 specimens; these specimens belong to 7 families, 24 genera and 25 species, of which 13 are endemics from Hispaniola Island.

Number of records: 626

Data holder: Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marcano"

Data host institution: Symbiota Support Hub

% complete: 100%

Status update: Published on GBIF

DOI: <https://doi.org/10.15468/vdw6bc>

Expected date of publication:

Colección del Padre Fuertes, Herbario USD

Dataset type: Occurrences

Dataset scope: almost 500 specimens collected by father Miguel Fuertes deposited at Herbarium USD

Number of records: 501

Data holder: Instituto de Investigaciones Botánicas y Zoológicas

Data host institution: Symbiota Support Hub

% complete: 100%

Status update: Published on GBIF

DOI: <https://doi.org/10.15468/d7cdp6>

Expected date of publication:

Catálogo de isotipos del Herbario USD

Dataset type: Checklist

Dataset scope: Catalog of isotype specimens deposited in the USD Herbarium. This list of species is based on records documented by Father Miguel Fuertes between 1910 and 1912, mainly in the southwestern region of the Dominican Republic (Azua and Barahona Provinces), that were part of the type series used to describe new species by great botanists such as Ignatz Urban.

Number of records: 72

Data holder: Instituto de Investigaciones Botánicas y Zoológicas

Data host institution: GBIF Secretariat
% complete: 100%
Status update: Published on GBIF
DOI: <https://doi.org/10.15468/et8x54>
Expected date of publication:

Hormigas en áreas urbanas de Santo Domingo

Dataset type: Checklist
Dataset scope: Checklist of ants species from two urban areas in Santo Domingo
Number of records: 43
Data holder: Instituto de Investigaciones Botánicas y Zoológicas
Data host institution: GBIF Secretariat
% complete: 100%
Status update: Published on GBIF
DOI: <https://doi.org/10.15468/x4p3m7>
Expected date of publication:

Catálogo de peces del Parque Nacional Lago Enriquillo e Isla Cabritos, República Dominicana

Dataset type: Checklist
Dataset scope: Checklist of fish species from the Lago Enriquillo
Number of records: 11
Data holder: Instituto de Investigaciones Botánicas y Zoológicas
Data host institution: GBIF Secretariat
% complete: 100%
Status update: Published on GBIF
DOI: <https://doi.org/10.15468/dhcxjc>
Expected date of publication:

Catálogo de especies recolectadas por el Padre Fuertes depositadas en el Herbario USD

Dataset type: Checklist
Dataset scope: Checklist with 331 species of plants collected by Father Miguel Domingo Fuertes Loren between 1910 and 1912, in the southern region of the Dominican Republic
Number of records: 331
Data holder: Instituto de Investigaciones Botánicas y Zoológicas
Data host institution: GBIF Secretariat
% complete: 100%
Status update: Published on GBIF
DOI: <https://doi.org/10.15468/q3hjwp>
Expected date of publication:

Peces del Lago Enriquillo

Dataset type: Occurrences
Dataset scope: This dataset presents the records of fishes associated with Lago Enriquillo National Park and related aquifers. The data correspond to the project "Effects of recent changes due to the flooding of Lake Enriquillo on fish communities and evaluation of species with potential for regional consumption".
Number of records: 115
Data holder: Instituto de Investigaciones Botánicas y Zoológicas
Data host institution: Symbiota Support Hub
% complete: 100%
Status update: Published on GBIF
DOI: <https://doi.org/10.15468/ymv7n5>
Expected date of publication:

Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marciano" - Colección Herpetológica

Dataset type: Occurrences
Dataset scope: Herpetological collection of the Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marciano" (MNHNSD-HERP)
Number of records: 825
Data holder: Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marciano"
Data host institution: Symbiota Support Hub
% complete: 100%
Status update: Published on GBIF
DOI: <https://doi.org/10.15468/nzyatg>
Expected date of publication:

Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marciano" - Colección de Aves

Dataset type: Occurrences

Dataset scope: Bird' collection of the Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marcano" (MNHNSD-AVES)

Number of records: 510

Data holder: Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marcano"

Data host institution: Symbiota Support Hub

% complete: 100%

Status update: Published on GBIF

DOI: <https://doi.org/10.15468/zmbpj5>

Expected date of publication:

Odonata

Dataset type: Occurrences

Dataset scope: Actual specimens of adult Odonata from the IIBZ Entomology Collection included in the paper <http://www.scielo.org.co/pdf/acbi/v41n11/0304-3584-acbi-41-111-72.pdf>

Number of records: 1,533

Data holder: Instituto de Investigaciones Botánicas y Zoológicas

Data host institution: Symbiota Support Hub

% complete: 100%

Status update: Pending of review by Leonardo Buitrago

DOI: <https://doi.org/10.15468/a9p72m>

Expected date of publication: 2023-06-29

Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marcano" - Colección de Arácnidos

Dataset type: Occurrences

Dataset scope: Arachnids collection of the Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marcano" (MNHNSD-ARACH)

Number of records: 810

Data holder: Museo Nacional de Historia Natural "Prof. Eugenio de Jesús Marcano"

Data host institution: Symbiota Support Hub

% complete: 50%

Status update: Incompleted

DOI: <https://doi.org/10.15468/v9pt63>

Expected date of publication: 2023-06-30

Other deliverables

Events

Project BID-GBIF (BID-CA2020-031-NAC) Work Meeting

Dates: 2022-03-04 - 2022-03-04

Organizing institution: Instituto de Investigaciones Botánicas y Zoológicas, UASD

Country: Dominican Republic

Number of participants: 22

Comments: This meeting was held with both teams of the IIBZ and the Museum. The idea was to formally introduce the project among the members and explain the goals and purposes to be achieved. The participants from each institution received important information from each coordinator about the role of each member of the project. The progress of the project up to that moment was explained.

Website or sources of verification: Work meeting presentation and photographs. Summaries of project workshops and meetings

Events

Workshop for data users

Dates: 2023-04-14 - 2023-04-14

Organizing institution: Instituto de Investigaciones Botánicas y Zoológicas, UASD

Country: Dominican Republic

Number of participants: 46

Comments: The workshop was attended by 12 institutions representing state institutions (several departments of the Ministry of the Environment), private universities, the National Botanical Garden, and the Botanical Garden of Santiago.

Website or sources of verification: Workshop presentations and photographs. Summaries of project workshops and meetings

Events

Meeting with personnel of the National Botanical Garden

Dates: 2023-05-08 - 2023-05-08

Organizing institution: Instituto de Investigaciones Botánicas y Zoológicas, UASD

Country: Dominican Republic

Number of participants: 12

Comments: Meeting with the Director of the National Botanical Garden, Agronomist Pedro Nolasco Suárez Espino and the personnel of the Botany and Horticulture Departments to discuss the possibility of publishing data from the JBSD Herbarium on the GBIF portal.

Website or sources of verification: Photos. Summaries of project workshops and meetings

Communications and visibility

See document attached.

Monitoring and evaluation

Final Evaluation

- Evaluation of the project activities and their outputs/deliverables: Workshops: They were not necessarily done as planned, but in the end the actions taken delivered the expected results. Collections: IIBZ-Museum-Symbiota: all the necessary profiles were generated for the Museum and IIBZ collections (20 profiles).

Staff training. We obtained two certifications and also trained some 17 people on the Darwin Core Standard, data cleaning using OpenRefine and on georeferencing tools. This positions us well to generate new projects based on our collections.

- Indications and reasons for any changes which have been made to the project's original plans, and actions to follow-up:

The original plans were modified somewhat due to several factors. In this sense, the workshops were reconfigured and changes were made to the deliverables. All the training activities taken online and the accompaniment by the local trainers allowed us to achieve the proposed goals. There were some changes in the deliverables, we decided to merge two deliverables, basically because lacking experience in the nature of datasets, we proposed several that it was better to present as one, either as a checklist or as an occurrence. We intended to cover too much because we thought it was easier to process from our knowledge based on traditional scientific collections to the DwC standard. Practically all the names of the datasets were changed to those that could clearly identify their scopes. In some cases, the number of records involved was reduced because the quality of the original data and the time available to process the information and bring it up to standard was no longer possible. This will require more work in the future.

- Comments on the project implementation, and its efficiency and effectiveness, strength and weaknesses:

The project implementation was great considering that we did not receive the physical visit of any mentor, which would have greatly helped to improve the human resources development for the project. Continuous monitoring of the progress of activities and staff became our main strength. In addition to consulting the mentors frequently.

The large number of project members and their heterogeneous backgrounds demanded extra work effort for all of us. Under other circumstances, a smaller staff and, of course, more realistic goals would be better. This situation, which at first glance appears to be a weakness, in the long run gave us a good basis for moving forward.

We are very grateful for the support provided throughout the project by our mentors, especially the team of the Biodiversity Knowledge Integration Center, through Dr. Nico Franz and Samanta Orellana, M.Sc. (See attached letter from Symbiota team).

Regarding the support from GBIF, fortunately, we have had the magnificent collaboration of the mentor, Leonardo Buitrago, who with affable treatment has guided us through those unknown paths of biodiversity data standardization and helped us to stay within the scheduled delivery times. I think it was in the financial part that we had more doubts, we would have preferred that the mentor also had the necessary knowledge and authority to clarify the doubts.

- Conclusions from your experience during the implementation of the project and recommendations for the GBIF Secretariat or the community to reinforce the success of the project:

We consider that this has been the most important experience we have had in terms of the management of our collections: functional database, digitization of specimens, public profiles (visibility)

and trained personnel. This is an invaluable result considering that we are dealing with two national institutions with a long history of work. Collaboration has been the backbone of these achievements.

Within the framework of the project, the accompaniment to the institutions that are integrated to work under the new standards should be much closer and more frequent from GBIF. We would think that the nodes that are close in terms of culture and language could accompany the proponents. This connection between curators of biological collections and those who work with the standardization and use of data should be strengthened in our region. We already foresee new opportunities for collaboration at the local level and we believe that much more support will be needed for other institutions that manage collections to begin their journey towards better management standards.

Best Practices and Lessons learned

Frequent meetings with the team and continuous review of the work plan gave us good results and we believe they are necessary to keep the team cohesive. Change strategies to address problems when necessary.

Understand the concerns of collection managers and try to answer their questions. There are institutional aspects that must be taken into account when developing the project, so points of coincidence must be found.

Post Project activities

Post-project activities go in several directions:

First, the management of the biological collections of the IIBZ and the Museum; second, those related to the publication of new datasets; third, the strengthening of biodiversity data management and analysis capacities for conservation decision making.

Some short, medium and long term achievements are listed below. Some may apply particularly to only one of the institutions participating in the project.

1. Complete the large datasets corresponding to FONDOCYT-funded projects, namely, Lake Enriquillo Fish, Savanna Insects, Aquatic Macroinvertebrates, and Urban Park Ants.
2. Organize new datasets to be uploaded to GBIF. For example, those pertaining to soil arthropods of urban parks of Santo Domingo are in the list.
3. Prepare a document together with the School of Biology for the incorporation of management and standardization of biodiversity data, mobilization and use of data in the curriculum of the Bachelor's Degree in Biology.
4. Finalize the incorporation of standardization of the institute's collections data management in the institute's Collections Management Manual. This is a common goal for the Museum, generate a new edition of the institutional curatorial procedures manual, as well as the implementation of the knowledge acquired regarding data cleaning, standardization and data quality in the internal databasing procedures.
5. Strengthen collaboration with other national institutions that manage biological collections. In this sense, we will continue the conversations initiated with the Dr. Rafael M. Moscoso National Botanical Garden (see attached photos of the meeting) in order to incorporate biodiversity data management standards for the JBSD Herbarium, which is the largest in the country and is the national herbarium. We hope to be able to collaborate in the training of their staff in the Darwin Core standard, the publication of data in GBIF and the management of their database.
6. We are promoting the creation of a National Biodiversity Portal of the Dominican Republic that will allow the visibility of the country's natural history collections, as well as serve as a channel for biodiversity data management at the national level.

Sustainability

Sustainability Plans

We believe that the sustainability plan proposed in the proposal, based on institutional strengthening and collaboration resulting in well-trained staff and standards integrated into the procedural manuals for collection management, are the basis for the successful management of collections. These strengths will translate into increased capacity to generate new research projects and, at the institutional level, to enhance the protection of collections and data. The impact of the project, in a broad sense, addresses one of the initial dreams we had, which was to make the collections of our institutions more visible. In the GBIF portal, the measurement of the use of our data is easily available. Also, through the publications that result from the data shared as scientific articles or other types of publications. At the national level, we hope that this project will become a model for other entities working with scientific collections. If this happens, it will be one of the greatest successes of this project.

Impact of COVID-19 pandemic on project implementation

As mentioned in the midterm report, due to the COVID-19 pandemic, the initial meetings and training of the work teams were held virtually and then we moved to in-person meetings to facilitate the exchange of ideas and problem solving. The pandemic delayed the first scheduled workshop (Workshop and training for the digitization of collections) which was scheduled for September 2021. As a result, the team ended up being trained by personnel certified for such purposes (Oniel Alvarez and Gabriel de los Santos). We believe that it would have been much easier and more fluid and would have facilitated decision making on the management of the datasets and the budget.

GBIF leads the Biodiversity Information for Development (BID), a programme funded by the European Union. The programme provides supplementary support for activities addressing the needs of regional researchers and policymakers through mobilization and use of biodiversity data.

