

Data mobilization for key entomological groups across the Caribbean Region of Colombia

Programme: BID

Project ID: BID-CA2020-045-NAC

Project lead organization: Universidad del Magdalena, Vicerrectoría de Investigación

Project implementation period: 10/7/2021 - 30/6/2023

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Final Narrative Report

Executive Summary

This project sought to mobilize entomological records from the Colombian Caribbean coast, deposited in five national and three regional collections, for a goal of 12,230 total mobilized records. The implementation of the project was accomplished in three main stages: i) Socialization of the project, standardization of protocols, and personnel training, ii) Specimen organization, preparation and cataloging, and iii) Publication of datasets and socialization of outcomes.

The socialization of the project was carried out, initially, with deployments on web portals and social networks (e.g., www.unimagdalena.edu.co/presentacionPublicacion/VerNoticia/151116, twitter.com/Unimagdalena/status/1421078658102571013). Likewise, the project was formally presented to the academic community during an introductory workshop. Training sessions for data entry were developed for the personnel in charge of mobilizing the data. As a result of cataloging activities, 31 datasets were created and 23 previously published were updated in the Global Biodiversity Information Facility (GBIF), including 16,471 mobilized records. Before the execution of this work, there were 40,705 records of insects from the Colombian Caribbean region published in GBIF (associated with catalog numbers in biological collections), a number that increased considerably thanks to the results of this project (40,5%). Thus, the main goal of this project was to increase the representation of cataloged records of insects from the Colombian Caribbean, which by 2021 was 9,6% of the records published for Colombia. Currently, with the results of this project and others, the number of cataloged records of insects from the Colombian Caribbean amounts to 67,334, which corresponds to 11% of the total for the country (1,091,995).

Taxonomically, most of the newly published records are concentrated in the orders Coleoptera (6884), Lepidoptera (3023), Diptera (2276), Hymenoptera (2174). The taxonomic refinement of the mobilized records reached high levels, with 66% of the records being at least identified to genus, which is unusual for entomological datasets in highly biodiverse countries (Figure 1: 11_Figures_main_results attached file). However, identifications to genus and species are concentrated in groups that have traditionally made more progress in their taxonomic study for the country and the region (e.g., Coleoptera (Scarabaeoidea), Hymenoptera (Formicidae), Lepidoptera), so it is still necessary to join efforts to improve the taxonomic resolution in entomological collections as one of the main activities post-project.

In terms of the geographic coverage, the mobilized records cover the entire Colombian Caribbean. The department of Magdalena concentrates the largest number of records (9,574), especially in the Sierra Nevada de Santa Marta massif, followed by Sucre (3,004) and Bolívar (1,673) (Figures 2 and 3: 11_Figures_main_results attached file). The departments of Cesar (437) and Atlántico (568) presented the lowest number of published records, possibly due to the smaller territorial extension of the department of Atlántico (3,386 km²) and the absence of entomological collections or biology programs in Cesar. However, this general pattern does not mean that the departments with the largest number of records are well explored or represented. As can be seen in Figure 4, most of the departments have few municipalities that concentrate the records, corresponding to the departmental capitals, where the Universities are located. Thus, the largest number of records in the department of Magdalena is concentrated in Santa Marta, and is related to the existence of the oldest entomological collection for the Caribbean (Universidad del Magdalena, see next section). In fact, most of the mobilized records came from the Entomological Collection of the University of Magdalena (Figure 5: 11_Figures_main_results attached file). This collection was also in charge of leading and coordinating the execution of the project. In Figure 5, in which the records published before 2021 and those mobilized in the project are contrasted, some important results can be seen: i) Universidad del

Atlántico Collection mobilized its first publication of entomological records within the framework of the project, ii) CBU CES mobilized records from the Colombian Caribbean for the first time, and iii) all the collections expanded the taxonomic groups for which they have published data (e.g., before this project the U. del Magdalena only had published cataloged data for Hymenoptera and Hemiptera, and now has records for more than 14 orders).

The project brought together 23 people from nine Colombian institutions and two from the United States (U. del Magdalena, U. del Atlántico, U. de Sucre, U. CES, U. de Antioquia, U. Nacional, IAvH, Museum of Texas Tech University, and Pennsylvania State University). In total, the main events activities of the project included: two workshops (training and dissemination of results, with 17 and 38 attendees), a keynote talk (46 attendees), and participation in two events (IV National Meeting of Museums of Science, Natural History and Biological Collections, Bogotá, Colombia and remotely at the Entomological Collections Network, Vancouver, Canada). The results of the project were shared in the workshop "Mobilization of data from biological collections: a joint commitment to know and manage our biodiversity", in which decision makers participated (delegates from National Natural Parks, environmental corporations, administrative staff from collections in the region) and general audience. All these activities yield positive results on the dynamics and strategies of data publication of the participating institutions. Likewise, three manuscripts were prepared (two accepted for publication and one submitted), in which the main results of the project are presented. In one of the manuscripts a protocol is proposed for imaging in entomological collections, since the need to generate photographs that allow the taxonomic refinement of the records was one of the main recommendations of the project. On the other hand, the main manuscript shows the impact of the project in terms of the number of records mobilized (compared with previously existing records for the Colombian Caribbean region), taxonomic refinement, the increase in records published per entomological collection, and the geographic coverage of the mobilized records. All these products and results derived from the project will become important tools to improve practices and processes in entomological collections from Colombia (including protocols for data mobilization, quality control and image generation), as well as guide the design of digitalization strategies and taxonomic refinement. Thus, for example, taxonomic refinement varies among insect orders, depending on the collection. To plan specialist tours (which have already been done in Colombia), it is convenient to know which groups need more attention in which collections.

Because of the way that each institution manages awards and hires personnel, the greatest challenge was in terms of funding administration, to be able to distribute resources in a timely manner to participant institutions. Thanks to solid collaboration among coordinators, and existing resources from the GBIF node in Colombia, the implementation of data recording ran relatively smoothly throughout the project. In relation to this, one of the goals of the project was to create a profile for each collection in the ecdysis portal (<https://ecdysis.org/>); a Symbiota portal to manage data from arthropod collections), as a way to consolidate biodiversity data from the Caribbean region of Colombia. Unfortunately, partly because of the individual dynamics and rules at each participant institution, only collections at Universidad del Magdalena and U. CES are now migrating records to their ecdysis profiles.

This project marked the incursion of several collections into data mobilization and digitization activities. Consequently, various activities that started with the project will be continued. The main of these activities are the mobilization of data and the taxonomic refinement of the records, since many specimens are still stored as bulk samples in the different collections. This material needs to be processed to extract different groups and then be able to mobilize the records. On the other hand, the staff that participated in the project received training that must be maintained over time, in order to keep the best curatorial and data digitization practices up to date. Finally, the greatest legacy of this project will be, over time, the creation of the Colombian Caribbean Biodiversity Portal, which we hope will become a diversity data hub for this region, useful for scientists, decision makers, and educators (at all levels).

Progress against milestones

Has your project completed all planned activities?: No

Has your project produced all deliverables: No

Rationale: The project deliverables comprised, originally, publication of 36 datasets on GBIF, holding a meeting to socialize project outcomes, and three main publications: i) catalogs of selected insect groups from the Caribbean region of Colombia, ii) Manual for entomological specimen imaging, and iii) Evaluation of the impact of directed efforts to digitize specimens. Unfortunately, the delay in the mobilization and publication of records hampered the preparation of the manuscripts. However, there are two manuscripts accepted for publication (Passalidae (Coleoptera, Scarabaeoidea) from the Caribbean coast of Colombia: synopsis, key, and new species description, Zookeys and Generation of high-resolution digital images of arthropods: solutions designed for Latin American collections,

Intropica) and one submitted (Towards the systematization of entomological collections in Colombia: a bet for enhancing the knowledge about the insects from the Caribbean region, Biota Colombiana).

Report on Activities

Summary of the implementation of the project activities

Nine main activities were established in the project. All of them have been completed, with the exception of one that has only been partially achieved (Set up a databasing system (Symbiota) for each participant collection). Each of the activities is reviewed below, indicating the achievements.

1. *Specimen organization, preparation and cataloging.* At each participant collection, specimens from the Colombian Caribbean were separated, curated, and organized. In this phase, the origin of the specimens was corroborated and sets of batches of different orders of insects that were deposited as miscellaneous, products of general sampling were reviewed.

2. *Establishing and implementation of standards and workflows.* Through meetings between representatives of SiB-Colombia (Dairo Escobar and Camila Plata), representatives of GBIF (Leonardo Buitrago), and collection curators, a workflow was established that allowed the digitization and publication of the records.

3. *Set up a databasing system (Symbiota) and training of collections managers.* Training was carried out with Symbiota personnel and other specialists (see Report Attachments number 3). However, most collections have not incorporated Symbiota as their databasing system. Only the U. Magdalena and U. CES collections have profiles in Ecdysis, the Symbiota portal for arthropod collections, and plan, as a post-project activity, to migrate data to this portal.

4. *Training of data entry personnel.* A workshop for training personnel in data entry was held, in which representatives of SiB-Colombia, Symbiota, and Jennifer Girón explained step by step the activities related to the cataloging, digitization, and publication of records.

5. *Digitization of regional collections: data and imaging.* The digitization of collections housed in universities in the Colombian Caribbean (here called regional collections) advanced with very good results, since the target numbers of records were widely exceeded. Thus, for the three regional collections it was initially proposed to mobilize 13 datasets and 7,950 records (U. Magdalena, 4,900; U. Atlántico, 1,150; U. Sucre, 1,900); we published 12,271 records in 31 datasets, 54% more than the expected number of records. Another important achievement, accomplished with this activity, was that the Universidad del Atlántico published records in GBIF for the first time, the Universidad de Sucre did so for the first time for Coleoptera, and the Universidad del Magdalena for multiple orders (e.g., Mantodea, Orthoptera, Blattodea, Thysanoptera, Plecoptera, Dermaptera, Neuroptera, Trichoptera, Phasmatodea, Megaloptera, Siphonaptera, Phthiraptera, Psocoptera, Mecoptera).

6. *Digitization of Caribbean specimens at national collections: data and imaging.* For national collections, 4,280 records and 23 datasets were initially expected to be mobilized. In the end, 4,200 records and 23 data sets were published. In this case, the goal was not fully achieved because there were no more specimens of the target groups in the respective collections. With this activity, the Universidad CES published in GBIF records from the Caribbean coast for the first time, and Universidad de Antioquia and Universidad Javeriana published their first records of Lepidoptera from this region.

7. *Identification: virtual identification sessions with specialists.* This activity was developed for Coleoptera (Passalidae, Scarabaeidae, and Curculionidae) and Lepidoptera. Thanks to this, taxonomic refinement was achieved in these groups, especially at the Universidad del Magdalena. It is expected to continue with this activity after the end of the project.

8. *Preparation of data papers.* Four manuscripts have been produced within the framework of the project. The first of them "Passalidae (Coleoptera, Scarabaeoidea) from the Caribbean coast of Colombia: synopsis, key, and new species description" has been accepted for publication in Zookeys (ISSN 1313-2970). Likewise, a manuscript entitled "Generation of high-resolution digital images of arthropods: solutions designed for Latin American collections" is accepted for publication in Intropica (ISSN 2389-7864). The third manuscript is "Towards the systematization of entomological collections in Colombia: a bet for enhancing the knowledge about the insects from the Caribbean region" and was submitted on June 30, 2023 to Biota Colombiana (ISSN 2539-200X). Finally, a manuscript entitled "Checklist of butterflies (Lepidoptera) from northern Colombia" is under preparation to be sent to Biodiversity Data Journal (ISSN 1314-2828) for review.

9. *Training in specimen imaging.* A photography workshop of collection specimens was carried out, in

which a specialist from Pennsylvania State University showed the requirements and steps necessary to obtain, process, store, and disseminate images of arthropods. As a result of this activity, a manuscript was submitted. So far, 231 photos have been fully processed for Coleoptera (166 photos, 56 species), Lepidoptera (25 photos, 25 species), and Hemiptera (40 photos, 5 species) (see 9_Activity9_Training in specimen imaging folder, pdf document Photogra_Insects_GBIF). It is expected to continue with this activity, so that it facilitates virtual identification sessions with specialists.

Completed activities

Activity: Specimen organization, preparation and cataloging

Description: Many specimens of the Caribbean region of Colombia are stored as bulk samples in the different collections. This material was processed to extract selected groups and prepared for databasing.

Start Date - End Date: 15/7/2021 - 15/12/2021

Verification Sources: Photographies showing the organization and initial separation of the specimens

Activity: Establishing and implementation of standards and workflows

Description: After consultation meetings with representatives from SiB-Colombia, GIBF and collections, workflows were implemented for specimen processing, labeling, barcoding, databasing and imaging. Each process was documented and became standard practice for the collections.

Start Date - End Date: 15/8/2021 - 15/12/2021

Verification Sources: Screen capture showing meetings between curators, digitizers, and Leonardo Buitrago (from GBIF)

Activity: Training of data entry personnel

Description: Undergraduate students and biologists were trained for entering data into the Darwincore format.

Start Date - End Date: 21/9/2021 - 17/5/2022

Verification Sources: Photographies of the workshop invitations (conferences). Screen capture showing the conference and the number of attendees

Activity: Digitization of local collections: data and imaging

Description: Specimens from the U. Magdalena, U. Sucre and U. del Atlántico collections were cataloged and digitized. Then, going through a quality control by Sib-Colombia, the records were published in GBIF, exceeding the number of records and sets originally proposed.

Start Date - End Date: 16/8/2021 - 29/6/2023

Verification Sources: Datasets published (see deliverables)

Activity: Digitization of Caribbean specimens at national collections: data and imaging.

Description: A team of digitizers processed Caribbean holdings at partner national collections: Universidad Nacional de Colombia, Universidad Javeriana, Universidad de Antioquia, Universidad CES, and IAvH.

Start Date - End Date: 15/3/2022 - 31/5/2023

Verification Sources: Datasets published (see deliverables)

Activity: Identification: virtual identification sessions with specialists

Description: In order to ensure that the digitized information was assigned to the lowest possible taxonomic category, photographs of specimens (Coleoptera and Lepidoptera) were shared with experts. This allowed us to reach higher levels of taxonomic refinement.

Start Date - End Date: 15/2/2023 - 20/6/2023

Verification Sources: Photographs of the specimens

Activity: Preparation of data papers

Description: The datasets produced during this project, with specimen identifications by experts, will become general inventories for the region. Along with the experts involved, and involving undergraduate students (now graduated biologists), these datasets were prepared as data papers to be published in national, open access venues. In total, two manuscripts are accepted, one is submitted and one more is under preparation.

Start Date - End Date: 10/4/2023 - 31/7/2023

Verification Sources: Manuscripts and letters from journals.

Activity: Training in specimen imaging

Description: Staff was trained on how to set up and use the imaging system. This activity was conducted in all institutions except for U. Nacional and U. del Atlántico.

Start Date - End Date: 1/12/2021 - 22/2/2023

Verification Sources: Photographies: workshop and insects

Report on Deliverables

Deliverables - Summary

The project deliverables comprised, originally, publication of 36 datasets (12,230 records) on GBIF, holding a meeting to socialize project outcomes, and three main publications. To this day, 54 datasets were made available through GBIF (31 datasets were created and 23 previously existing were updated, with 16,471 mobilized records), and a meeting with students, academic authorities, collections managers, decision makers, and the general public was held.

The publication of manuscripts is delayed (see 8_Activity8_Preparation_data_papers folder). However, there is two manuscript accepted for publication (see see 8_Activity8_Preparation_data_papers folder: a_Accepted_MS_Passalidae and b_Acceptance_letter_MS_Imaging), one submitted (Towards the systematization of entomological collections in Colombia: a bet for enhancing the knowledge about the insects from the Caribbean region, Biota Colombiana: c_MS_Impact_Biota), and one manuscript (Checklist of butterflies (Lepidoptera) from northern Colombia) is being prepared, expecting to be submitted at the end of July, 2023.

Deliverables produced by the project

Dataset deliverables

Colección de Hymenoptera de la región Caribe en el Centro de Colecciones Científicas de la Universidad del Magdalena

Dataset type: Occurrences

Dataset scope: This dataset contain records for ants, wasps and bees collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia.

Number of records: 564

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: 561 (published), 3 (to be published)

DOI: <https://doi.org/10.15472/rvbe8y>

Expected date of publication: 2023-07-10

Hymenoptera de la Colección entomológica de la Universidad del Atlántico UARC

Dataset type: Occurrences

Dataset scope: This dataset contain records for ants, wasps and bees collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Atlántico.

Number of records: 300

Data holder: Universidad del Atlántico

Data host institution: Universidad del Atlántico

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/uejyo7>

Expected date of publication:

Hymenoptera recolectados en el Caribe colombiano depositados en el ICN

Dataset type: Occurrences

Dataset scope: This dataset contain records for ants, wasps and bees collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad Nacional de Colombia.

Number of records: 699

Data holder: Universidad Nacional de Colombia

Data host institution: Universidad Nacional de Colombia

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/idv4qj>

Expected date of publication:

Hymenópteros (Hymenoptera) recolectados en el Caribe colombiano depositados en el MPUJ

Dataset type: Occurrences

Dataset scope: This dataset contain records for ants, wasps and bees collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad

Javeriana.

Number of records: 149

Data holder: Universidad Javeriana

Data host institution: Universidad Javeriana

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/0rvbrr>

Expected date of publication:

El orden Hymenoptera de la región caribe depositado en la colección de Entomología del Instituto Humboldt (IAvH-E)

Dataset type: Occurrences

Dataset scope: This dataset contain records for ants, wasps and bees collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Instituto Alexander von Humboldt.

Number of records: 400

Data holder: Instituto Alexander von Humboldt

Data host institution: Instituto Alexander von Humboldt

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/gteutu>

Expected date of publication:

Coleoptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset contain records for beetles collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 4,003

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: 2016 (published), 1987 (to be published)

DOI: <https://doi.org/10.15472/9gbyaj>

Expected date of publication: 2023-07-10

Coleoptera recolectados en el Caribe Colombiano depositados en el MZUSU

Dataset type: Occurrences

Dataset scope: This dataset contain records for beetles collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad de Sucre.

Number of records: 681

Data holder: Universidad de Sucre

Data host institution: Universidad de Sucre

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/wojtwp>

Expected date of publication:

Coleoptera de la Colección entomológica de la Universidad del Atlántico UARC

Dataset type: Occurrences

Dataset scope: This dataset contain records for beetles collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Atlántico.

Number of records: 500

Data holder: Universidad del Atlántico

Data host institution: Universidad del Atlántico

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/ufe4ar>

Expected date of publication:

Coleoptera recolectados en el Caribe colombiano depositados en el ICN

Dataset type: Occurrences

Dataset scope: This dataset contain records for beetles collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad Nacional de Colombia.

Number of records: 600

Data holder: Universidad Nacional de Colombia

Data host institution: Universidad Nacional de Colombia
% complete: 100%
Status update: Published
DOI: <https://doi.org/10.15472/jgnopz>
Expected date of publication:

Coleópteros (Coleoptera) recolectados en el Caribe colombiano depositados en el MPUJ

Dataset type: Occurrences
Dataset scope: This dataset contain records for beetles collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad Javeriana.
Number of records: 200
Data holder: Universidad Javeriana
Data host institution: Universidad Javeriana
% complete: 100%
Status update: Published
DOI: <https://doi.org/10.15472/gzuw9q>
Expected date of publication:

El orden Coleoptera de la región caribe depositado en la colección de Entomología del Instituto Humboldt (IAvH-E)

Dataset type: Occurrences
Dataset scope: This dataset contain records for beetles collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Instituto Alexander von Humboldt.
Number of records: 806
Data holder: Instituto Alexander von Humboldt
Data host institution: Instituto Alexander von Humboldt
% complete: 100%
Status update: Published
DOI: <https://doi.org/10.15472/bh2aqz>
Expected date of publication:

Lepidoptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences
Dataset scope: This dataset contain records for butterflies and moths collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.
Number of records: 422
Data holder: Universidad del Magdalena
Data host institution: Universidad del Magdalena
% complete: 100%
Status update: Published
DOI: <https://doi.org/10.15472/w5ie77>
Expected date of publication:

Colección de mariposas (Lepidoptera) del Museo de Zoología de la universidad de Sucre

Dataset type: Occurrences
Dataset scope: This dataset contain records for butterflies and moths collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad de Sucre.
Number of records: 2,122
Data holder: Universidad de Sucre
Data host institution: Universidad de Sucre
% complete: 100%
Status update: Published
DOI: <https://doi.org/10.15472/rlok2i>
Expected date of publication:

Lepidoptera de la Colección entomológica de la Universidad del Atlántico UARC

Dataset type: Occurrences
Dataset scope: This dataset contain records for butterflies and moths collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Atlántico.
Number of records: 200
Data holder: Universidad del Atlántico
Data host institution: Universidad del Atlántico
% complete: 100%
Status update: Published

DOI: <https://doi.org/10.15472/ppdwto>

Expected date of publication:

Lepidópteros (Lepidoptera) recolectados en el Caribe colombiano depositados en el MPUJ

Dataset type: Occurrences

Dataset scope: This dataset contain records for butterflies and moths collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad Javeriana.

Number of records: 100

Data holder: Universidad Javeriana

Data host institution: Universidad Javeriana

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/o7nsam>

Expected date of publication:

El orden Lepidoptera de la región caribe depositado en la colección de Entomología del Instituto Humboldt (IAvH-E)

Dataset type: Occurrences

Dataset scope: This dataset contain records for butterflies and moths collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Instituto Alexander von Humboldt.

Number of records: 155

Data holder: Instituto Alexander von Humboldt

Data host institution: Instituto Alexander von Humboldt

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/totngv>

Expected date of publication:

Hemiptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset contain records for true bugs collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 217

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/aaqv74>

Expected date of publication:

Hemiptera de la Colección entomológica de la Universidad del Atlántico UARC

Dataset type: Occurrences

Dataset scope: This dataset contain records for true bugs collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Atlántico.

Number of records: 150

Data holder: Universidad del Atlántico

Data host institution: Universidad del Atlántico

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/44jhn9>

Expected date of publication:

Hemiptera recolectados en el Caribe colombiano depositados en el ICN

Dataset type: Occurrences

Dataset scope: This dataset contain records for true bugs collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad Nacional de Colombia.

Number of records: 201

Data holder: Universidad Nacional de Colombia

Data host institution: Universidad Nacional de Colombia

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/azjfpq>

Expected date of publication:

Hemípteros (Hemiptera) recolectados en el Caribe colombiano depositados en el MPUJ

Dataset type: Occurrences

Dataset scope: This dataset contain records for true bugs collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad Javeriana.

Number of records: 156

Data holder: Universidad Javeriana

Data host institution: Universidad Javeriana

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/i84y5h>

Expected date of publication:

El orden Hemiptera de la región caribe depositado en la colección de Entomología del Instituto Humboldt (IAvH-E)

Dataset type: Occurrences

Dataset scope: This dataset contain records for true bugs collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Instituto Alexander von Humboldt.

Number of records: 200

Data holder: Instituto Alexander von Humboldt

Data host institution: Instituto Alexander von Humboldt

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/gvdmki>

Expected date of publication:

Ephemeroptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset contain records for Ephemeroptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 144

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/kuldtk>

Expected date of publication:

Diptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset contain records for Diptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 2,000

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/ttlk2d>

Expected date of publication:

Odonata recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset contain records for Odonata collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 133

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/ktodjd>

Expected date of publication:

Himenópteros (Hymenoptera) recolectados en el Caribe colombiano depositados en las CBUCES

Dataset type: Occurrences

Dataset scope: This dataset contain records for ants, wasps and bees collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad CES.

Number of records: 51

Data holder: Universidad CES

Data host institution: Universidad CES

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/lwdwes>

Expected date of publication:

Himenópteros (Hymenoptera) recolectados en el Caribe colombiano depositados en la CEUA-UDEA

Dataset type: Occurrences

Dataset scope: This dataset contain records for ants, wasps and bees collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad de Antioquia.

Number of records: 11

Data holder: Universidad de Antioquia

Data host institution: Universidad de Antioquia

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/jqm2kh>

Expected date of publication:

Coleópteros (Coleoptera) recolectados en el Caribe colombiano depositados en las CBUCES

Dataset type: Occurrences

Dataset scope: This dataset contain records for beetles collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad CES.

Number of records: 47

Data holder: Universidad CES

Data host institution: Universidad CES

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/y0z7hk>

Expected date of publication:

Coleópteros (Coleoptera) recolectados en el Caribe colombiano depositados en la CEUA-UDEA

Dataset type: Occurrences

Dataset scope: This dataset contain records for beetles collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad de Antioquia.

Number of records: 47

Data holder: Universidad de Antioquia

Data host institution: Universidad de Antioquia

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/lwbqde>

Expected date of publication:

Mariposas (Lepidoptera) de la Reserva Natural Sanguaré recolectadas en el marco del curso de Zoología de la Universidad CES

Dataset type: Occurrences

Dataset scope: This dataset contain records for butterflies and moths collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad CES.

Number of records: 23

Data holder: Universidad CES

Data host institution: Universidad CES

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/rru6lw>

Expected date of publication:

Hemípteros (Hemiptera) recolectados en el Caribe colombiano depositados en las CBUCES

Dataset type: Occurrences

Dataset scope: This dataset contain records for true bugs collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad CES.

Number of records: 29

Data holder: Universidad CES
Data host institution: Universidad CES
% complete: 100%
Status update: Published
DOI: <https://doi.org/10.15472/8cb7ju>
Expected date of publication:

Hemípteros (Hemiptera) recolectados en el Caribe colombiano depositados en la CEUA-UDEA

Dataset type: Occurrences
Dataset scope: This dataset contain records for true bugs collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad de Antioquia.
Number of records: 13
Data holder: Universidad de Antioquia
Data host institution: Universidad de Antioquia
% complete: 100%
Status update: Published
DOI: <https://doi.org/10.15472/zobpnw>
Expected date of publication:

Dípteros (Diptera) recolectados en el Caribe Colombiano depositados en las CBUCES

Dataset type: Occurrences
Dataset scope: This dataset contain records for Diptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad CES.
Number of records: 59
Data holder: Universidad CES
Data host institution: Universidad CES
% complete: 100%
Status update: Published
DOI: <https://doi.org/10.15472/lxsn57>
Expected date of publication:

Dípteros (Diptera) recolectados en el Caribe colombiano depositados en la CEUA-UDEA

Dataset type: Occurrences
Dataset scope: This dataset contain records for Diptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad de Antioquia.
Number of records: 210
Data holder: Universidad de Antioquia
Data host institution: Universidad de Antioquia
% complete: 100%
Status update: Published
DOI: <https://doi.org/10.15472/zntsmb>
Expected date of publication:

Libélulas (Odonata) de la Reserva Natural Sanguaré recolectadas en el marco de los cursos de Zoología y Ecología de Poblaciones de la Universidad CES

Dataset type: Occurrences
Dataset scope: This dataset contain records for Odonata collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad CES.
Number of records: 29
Data holder: Universidad CES
Data host institution: Universidad CES
% complete: 100%
Status update: Published
DOI: <https://doi.org/10.15472/mf7a19>
Expected date of publication:

Otros órdenes de insectos recolectados en el Caribe colombiano depositados en la CEUA-UDEA

Dataset type: Occurrences
Dataset scope: This dataset contain records for miscellaneous of insects, including a record of Lepidoptera mobilized as part of the project, hosted at Universidad de Antioquia.
Number of records: 8
Data holder: Universidad de Antioquia
Data host institution: Universidad de Antioquia
% complete: 100%
Status update: Published
DOI: <https://doi.org/10.15472/tojg7d>

Expected date of publication:

Mantodea recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset contain records for Mantodea collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 96

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/fkfauf>

Expected date of publication:

Blattodea recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset contain records for Blattodea collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 248

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: 241 (published), 7 (to be published)

DOI: <https://doi.org/10.15472/hvlxgc>

Expected date of publication: 2023-07-10

Orthoptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset contain records for Orthoptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 206

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: 205 (published), 1 (to be published)

DOI: <https://doi.org/10.15472/2glabb>

Expected date of publication: 2023-07-10

Thysanoptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset will contain records for Thysanoptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 121

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: unpublished

DOI:

Expected date of publication: 2023-07-10

Plecoptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset will contain records for Plecoptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 70

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: unpublished

DOI:

Expected date of publication: 2023-07-10

Dermaptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset will contain records for Dermaptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 22

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: unpublished

DOI:

Expected date of publication: 2023-07-10

Neuroptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset will contain records for Neuroptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 21

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: unpublished

DOI:

Expected date of publication: 2023-07-10

Trichoptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset will contain records for Trichoptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 12

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: unpublished

DOI:

Expected date of publication: 2023-07-10

Phasmatodea recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset will contain records for Phasmatodea collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 10

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: unpublished

DOI:

Expected date of publication: 2023-07-10

Megaloptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset will contain records for Megaloptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 7

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: unpublished

DOI:

Expected date of publication: 2023-07-10

Siphonaptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset will contain records for Siphonaptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 6

Data holder: Universidad del Magdalena
Data host institution: Universidad del Magdalena
% complete: 100%
Status update: unpublished
DOI:
Expected date of publication: 2023-07-10

Phthiraptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences
Dataset scope: This dataset will contain records for Phthiraptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.
Number of records: 6
Data holder: Universidad del Magdalena
Data host institution: Universidad del Magdalena
% complete: 100%
Status update: unpublished
DOI:
Expected date of publication: 2023-07-10

Zygentoma recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences
Dataset scope: This dataset will contain records for Zygentoma collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.
Number of records: 2
Data holder: Universidad del Magdalena
Data host institution: Universidad del Magdalena
% complete: 100%
Status update: unpublished
DOI:
Expected date of publication: 2023-07-10

Mecoptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences
Dataset scope: This dataset will contain records for Mecoptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.
Number of records: 1
Data holder: Universidad del Magdalena
Data host institution: Universidad del Magdalena
% complete: 100%
Status update: unpublished
DOI:
Expected date of publication: 2023-07-10

Embioptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences
Dataset scope: This dataset will contain records for Embioptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.
Number of records: 1
Data holder: Universidad del Magdalena
Data host institution: Universidad del Magdalena
% complete: 100%
Status update: unpublished
DOI:
Expected date of publication: 2023-07-10

Zoraptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences
Dataset scope: This dataset will contain records for Zoraptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.
Number of records: 1
Data holder: Universidad del Magdalena
Data host institution: Universidad del Magdalena
% complete: 100%
Status update: unpublished

DOI:

Expected date of publication: 2023-07-10

Psocodea recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset will contain records for Psocodea collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 1

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: unpublished

DOI:

Expected date of publication: 2023-07-10

Dípteros (Diptera) recolectados en el Caribe colombiano depositados en el MPUJ

Dataset type: Occurrences

Dataset scope: This dataset contain records for Diptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad Javeriana.

Number of records: 7

Data holder: Universidad Javeriana

Data host institution: Universidad Javeriana

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/zsdbyh>

Expected date of publication:

Psocoptera recolectados en el Caribe Colombiano depositados en la CBUMAG

Dataset type: Occurrences

Dataset scope: This dataset will contain records for Psocoptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad del Magdalena.

Number of records: 4

Data holder: Universidad del Magdalena

Data host institution: Universidad del Magdalena

% complete: 100%

Status update: unpublished

DOI:

Expected date of publication: 2023-07-10

Dípteros (Diptera) recolectados en el Caribe colombiano depositados en el MPUJ

Dataset type: Occurrences

Dataset scope: This dataset contain records for Diptera collected in Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre departments of Colombia, hosted at Universidad Javeriana.

Number of records: 7

Data holder: Universidad Javeriana

Data host institution: Universidad Javeriana

% complete: 100%

Status update: Published

DOI: <https://doi.org/10.15472/zsdbyh>

Expected date of publication:

Other deliverables

Events

Workshop of data entry personnel

Dates: 2021-09-21 - 2021-09-23

Organizing institution: Universidad del Magdalena

Country: Colombia

Number of participants: 46

Comments: This event facilitated the general socialization of the project, with a keynote talk by Dr. Christopher Marshall (Oregon, USA) and allowed training in digitization standards for the personnel who would be in charge of mobilizing data.

Website or sources of verification: Photographies: 4_Activity4_Training of data entry personnel folder

Events

Workshop in specimen imaging

Dates: 2021-12-20 - 2021-12-22

Organizing institution: Universidad del Magdalena

Country: Colombia

Number of participants: 5

Comments: In this workshop Camilo Flórez synthesized the requirements and steps necessary to obtain, process, store, and disseminate images of arthropods, proposing solutions of different costs, which can be adjusted to the needs and realities of Latin American entomological collections.

Website or sources of verification: Photographies: 9_Activity9_Training in specimen imaging folder

Events

Workshop Mobilization of data from biological collections: a joint commitment to know and manage our biodiversity

Dates: 2023-06-08 - 2023-06-08

Organizing institution: Universidad del Magdalena, Universidad CES, and Universidad de Sucre

Country: Colombia

Number of participants: 38

Comments: The results of the project were shared in a workshop in which decision makers participated (delegates from National Natural Parks, environmental corporations, administrative staff from collections in the region) and general audience.

Website or sources of verification: Report_Photos: 10_Event_Mobilization_biological_collections

Communications and visibility

The results dissemination strategy has involved two main activities. In the first one, the results have been presented in meetings, congresses, and workshops. The events attended were: IV National Meeting of Museums of Science, Natural History and Biological Collections (Bogotá, Colombia) and, remotely, the Entomological Collections Network (Vancouver, Canada). Likewise, a workshop was organized in which SiB-Colombia personnel, curators, and staff from the collections presented conferences on the importance of publishing records and the results and impacts of the project for knowledge of the Caribbean region's biodiversity, and the strengthening of regional collections.

The other dissemination activity has consisted of the preparation and publication of manuscripts that present the three main aspects on which the project has had an impact (i.e., knowledge of the entomological fauna of the Caribbean, adaptation of systems for the generation of high-resolution images in entomological collections and increase in records and mobilization of data by collections). Thus, three types of manuscripts have been prepared: i) catalogs or checklists of selected entomological groups in the Colombian Caribbean (one accepted, one in preparation), ii) manuscript "Generation of high-resolution digital images of arthropods" (accepted), and ii) manuscript "Towards the systematization of entomological collections in Colombia: a bet for enhancing the knowledge about the insects from the Caribbean region" (submitted).

Monitoring and evaluation

Final Evaluation

The project pursued three main goals: i) increase the published records for insect specimens from the Colombian Caribbean, ii) strengthen the data generation, management and publication capacity of the collections involved, especially the regional ones (U. del Magdalena, U. de Sucre, and U. del Atlántico), and iii) Create cooperation ties that allow increasing, in the future, knowledge of the biodiversity of the Colombian Caribbean.

The project managed to create 31 data sets and update 23 more, for a total of 16,471 published records from eight Colombian collections, numbers that represent an increase of up to 40% of records, if one takes into account that before the execution of this project, there were 40,705 records of insects from the Colombian Caribbean region published in the GBIF, associated with catalog numbers in biological collections. All this work was carried out by at least 23 people who were directly involved

with the project in different capacities (curators, data enters, imagers), and as a consequence of the work that involved mobilizing the cited records, the participant collections, especially the regional ones, created or strengthened their logistics and internal processes aimed at digitizing records, including taking high-resolution photographs. This resulted in several collections and researchers participating for the first time in the publication of data sets in GBIF and in the publication of data papers.

Some results are still incipient; for example, the production of photographs and high taxonomic refinement are still far from common for mobilized records. These are aspects in which the participating collections should channel future efforts. However, the execution of this joint work created cooperative relationships between the participating collections (and new collections, see post-project activities), which will undoubtedly allow maintaining the dynamics of mobilizing records, and thereby promote greater knowledge of biodiversity from the Caribbean.

Best Practices and Lessons learned

The project made it possible to standardize protocols for processing and mobilizing data from biological collections, especially in the regional collections that participated (U. del Magdalena, U. del Atlántico and U. Sucre). Likewise, although it is still under development, the capture of images of specimens that accompany the records and facilitate taxonomic identification (or its corroboration) has been incorporated. On the other hand, the publication of data papers carried out represented the first for many of the project participants and their collections. In short, the workflows, which in many of the collections only included filling in the DarwinCore format, were extended to quality control (internal and by SiB-Colombia), the incorporation of specimen images, the publication of datasets, and the publication of data papers that increase the visibility/utility of mobilized records and collections.

The constant assistance from Leonardo Buitrago (GBIF support) and the SiB-Colombia team was essential for the successful development of the project, allowing progress in the preparation of the datasets and ensuring their optimal quality.

Due to the legal system in Colombia, the development of the project was harmed by the so-called Ley de Garantías (Guarantee Law). According to this law, since presidential elections were held in Colombia on May 29 and June 29 (2022), public entities (such as the Universidad del Magdalena, which managed GBIF resources) cannot contract or make purchases (until August, 2022). For this reason, an inter-administrative agreement had to be established between the Universidad del Magdalena and the Universidad CES (private institution), so that the latter would hire personnel to digitize and coordinate the activities in the collections: Universidad CES, Universidad de Antioquia, Universidad Nacional, Universidad de Antioquia, and Instituto Alexander von Humboldt. For this reason, in the financial report it will be seen that the University of Magdalena transferred some resources to Universidad CES. Fortunately, the actions taken allowed the hiring of personnel and the digitization of records is more advanced than what was budgeted in the calendar of activities of the original proposal.

In the future, the development of similar projects must take into account the general administrative slowness typical of Colombian public institutions. Likewise, although at the time of preparing the original proposal it was discussed with the curators of the collections involved, some aspects were not discussed in depth and this made its implementation difficult. An example of this is the low mobilization of collections to Symbiota, due to logistical (constant access to the Internet) and administrative limitations (each collection is autonomous in deciding whether to join this portal). Likewise, the mobilization through Symbiota was finally seen as an unnecessary extra step, since the records must be published in GBIF through the IPT of SiB-Colombia, to later be transferred to Symbiota. These aspects were unknown at the time of generating the original proposal of the project.

Post Project activities

This project marked the incursion of several collections into data mobilization and digitization activities. Consequently, various activities that started with the project will be continued. The main of these activities are the mobilization of data and the taxonomic refinement of the records, since many specimens are still stored as bulk samples in the different collections. This material needs to be processed to extract different groups and then be able to mobilize the records. On the other hand, the staff that participated in the project received training that must be maintained over time, in order to keep the best curatorial and data digitization practices up to date. Likewise, the experience and knowledge acquired will serve to guide new collections in the management and publication of data; for example, as a product of the project results socialization workshop, a draft understanding was signed between the collections of the U. del Magdalena and the U. de La Guajira (which created its biological collections in April 2023), to establish cooperation bridges (see 12_draft understanding-CBUMAG-MHUG).

As mentioned in previous sections, the project developed, incipiently, the generation of photographs. This activity should be strengthened, since the photographs become a tool to improve the taxonomic resolution in entomological collections (among other utilities), which is one of the main activities post-project. Likewise, these photographs will feed what will be the greatest legacy of this project over time, the creation of the Colombian Caribbean Biodiversity Portal, which we hope will become a diversity data hub for this region, useful for scientists, decision makers, and educators (at all levels).

Sustainability

Sustainability Plans

The execution of the project brought the incorporation of new practices to the collections (for example, standardization of procedures, specimen data entry, georeferencing processes, quality control of DarwinCore files, publication in GBIF, and publication of data papers); these activities produced positive results and have been included in the curatorial protocols of the collections. Likewise, the alliances created during the execution of the project are already being strengthened in other actions and joint projects. For example, the Universidad del Magdalena is currently leading an inventory project (vertebrates and insects) in the Sierra Nevada de Santa Marta. These activities are being supported by the Universidad de Sucre for the sampling, identification and digitization of Lepidoptera, in order to publish a data paper with the results obtained.

Before starting this project, the cataloged records of specimens from the Colombian Caribbean were 9.6% of the records published for Colombia. With the data mobilized, that percentage rose to 11%, which represents a new reference point and will serve as a parameter to monitor progress in the digitization of collections and records in this region.

Impact of COVID-19 pandemic on project implementation

Because of the pandemic, the digitization only slowed down a bit at the beginning of activities (second half of 2021). However, the momentum gained in 2022 made it possible to catch up on the goals. After that, the pandemic did not have a major direct effect on the development of the project.

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.

