Preliminary checklist and occurrences of arthropod´s selected groups (Cerambycoidea, Formicidae, Opiliones, Araneae, Odonata and Mantodea) from the Caribbean of Colombia.

Programme:BID
Project ID: BID-CA2020-036-INS
Project lead organization: Universidad del Atlantico
Project implementation period:1/8/2021 - 30/6/2023
Report approved: 22/8/2023

Final Narrative Report

Executive Summary

During the development of this project we manage to complete all our activities and deliverables on time, gathering important information about the biodiversity of the selected groups present in the Caribbean of Colombia. With this information, it was not only possible to obtain the checklist and occurrences of the specimens, but in the development of these lists, we were able to find species that represent new distribution records for the Caribbean departments and even for Colombia. In many cases, we also identified new species that will be described in upcoming months. In general, we were able to produce relevant information about these organisms typically unknown in Colombia. Also, during these two years it has faced several unpredictable situations such as the pandemic, and administrative delays in the release of the funds, which make us face a particular context at the end of the project. During the last months we worked extremely hard in order to deliver the results on time, because we were a little behind schedule for the situations mentioned before. However, this was a lesson about the importance of teamwork, that was essential in order to achieve all the proposed results. Also, the communication and internal organization of the team was key in order to close this project successfully, we stayed in constant communication and we set dates for delivering the results. In addition, it is important to consider for future projects and research that some groups may be more difficult to identify than others, and that is something to have into account when choosing to work with them and setting a expected number of records, that may not be reached because of taxonomic problems the group already has that can not be solved in a short time frame. Nevertheless, we accomplish in most cases, more records than the ones we initially proposed, and in the development of this project to train and challenge ourselves in the taxonomic area of these important arthropods. We faced a lot of unexpected challenges, some of them out of our control, however, we overcame them and succeeded in finishing our activities and delivering our results as we expected from the beginning. This the closure of a project that, without doubts, had opened a window to many research to come, in post-project activities we expect to communicate our results to scientific and local communities through congress, meetings, and symposium, to publish our results in scientific journals, and to develop a more ambitious project that may include not only the Caribbean but reach to fill the gap of knowledge of these groups in Colombia.

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

All initially proposed activities were performed entirely. Although there were delays due to inconveniences in the delivery of the funds, they were developed satisfactorily.

The visits to review the national collections of arthropods (Araneae, Cerambycoidea, Formicidae, Mantodea, Odonata and Opiliones), and the preparation and publication of the checklists and lists of occurrences of the arthropod species of the aforementioned groups, allow us to contribute to the taxonomic information and the geographical registry of these organisms that until now were poorly studied, and in some cases were not reported and were protected in the collections of universities and institutes. These activities were accomplished totally and allowed us to expand and complement the information that was already registered in the SIB Colombia for some groups and enter new records. After completing our lists, all gathered information will be shared with the respective collections, when data curation by BiD Colombia is completed.

A new activity that we develop was the visit to an international collection, the collection of Cerambycidae fo the Museu de Zoologia da Universidade de Sao Paulo (Brazil), as we had not spend all the funds by the time, and we wanted to use this opportunity to revise the material that is deposited there from the Caribbean of Colombia and otherwise would not be disclosed.

In addition, the introductory courses on entomology and the wonderful world of arachnids had a positive and significant impact on the attendees. Because it allowed them to know and expand their knowledge of these groups of arthropods, awakening interest in their study and exchanging information with experts. The workshop about SiB Colombia was also successful as the attendees learned about the GBIF network, how to access biodiversity data and how to publish the biodiversity information that may be obtained through different sources and make it free and available for anyone that needs it.

Completed activities

Activity: Revision of national collections of arthropods (Araneae, Cerambycoidea, Formicidae, Mantodea, Odonata and Opiliones)

Description: The main biological collections of museums and institutions in the country, which contain material from the Caribbean region of Colombia will be revised. It will be identified to the lower taxonomic level as possible for each group. To cover as much information as possible, regional collections will be priorized (e.g. Universidad del Atlántico, Universidad del Magdalena), as well as the biggest ones in Colombia (e.g. Instituto de Ciencias Naturales Universidad Nacional de Colombia, Instituto de Investigación en Recursos Biológicos “Alexander von Humboldt”).
Start Date - End Date: 3/2/2022 - 23/6/2023
Verification Sources: Attachment 7

Activity: Preparation and publication of checklists of regional species of the studied groups from the Caribbean of Colombia (Araneae, Coleoptera, Formicidae, Mantodea, Odonata and Opiliones).

Description: The families and species (if applicable) identified when revising the collections will be tabulated and published with its distribution for departments of the Caribbean region on specialized journals.
Start Date - End Date: 2/2/2023 - 23/6/2023
Verification Sources: The preparation and publication of checklist can be verified by the publication of the following dataset: https://www.gbif.org/dataset/6a3b0365-8103-4068-a9ba-462c56f2a509

All other dataset can be found in the deliverables section.

Activity: Preparation and publication of occurrence data of regional species of the studied groups from the Caribbean of Colombia (Araneae, Cerambycoidea, Formicidae, Mantodea, Odonata and Opiliones).

Description: The occurrence data, collected when revising national collections, will be tabulated and published with its distribution for departments of the Caribbean region on specialized journals.
Start Date - End Date: 2/2/2022 - 23/6/2023
Verification Sources: The preparation and publication of occurrence data can be verified by the generation of occurrence list in Attachment 8. This information was upload as extension "type and specimen" in the deliverables. For the occurrence list of other groups see deliverables section.

Activity: Course “Introduction to entomology”

Description: It will be dictated a course of basic entomology with the participation of experts on the major groups of Insecta. The course will be aimed to graduate and post-graduate students with an interest in entomology and it will have a theorical and laboratory component. It will be hosted in the

Universidad del Atlántico (Colombia).
Start Date - End Date: 7/2/2023 - 12/2/2023
Verification Sources: Attachment 9

Activity: Course “The wonderful world of arachnids”

Description: It will be dictated a course of basic arachnology with the purpose of teaching young students the major characters to identify the most common orders of arachnids. The course will be aimed to high school students with an interest in taxonomy and ecology of arachnids, the course will have a theorical and laboratory component. It will be hosted in the Universidad del Atlántico (Colombia). This activity will address the social appropriation of knowledge by encouraging new generations to recognize the importance of biodiversity and the ecosystemic services that arachnids provide.
Start Date - End Date: 3/3/2023 - 4/3/2023
Verification Sources: Attachment 10

Activity: Digitalization and publication of compiled data, from national collections, of the Caribbean arthropods studied (Araneae, Cerambycoidea, Formicidae, Mantodea, Odonata and Opiliones).

Description: The compiled information obtained by the identification of the selected groups, from the Caribbean of Colombia, will be digitalized and shared with the owners (national collections), as well as published in the GBIF database.
Start Date - End Date: 3/2/2022 - 23/6/2023
Verification Sources: The sharing of the compiled data with the curators can be verified in the email send to the curator of the MZUSP with the interest information (Attachment 11).

Activity: Workshop “SIB Colombia: como acceder a nuestra biodiversidad".

Description: A workshop about the biodiversity information registered on the database SIB Colombia will be held. The course will be aimed to general public with an interest in the biodiversity of the Caribbean of Colombia. The objective will be to present the database SIB Colombia as a useful tool to access biodiversity information of the region, as well as disseminate the contained information. It will be hosted by Universidad del Atlántico (Colombia) and lead by the member Miguel Stand.
Start Date - End Date: 29/6/2023 - 29/6/2023
Verification Sources: Attachment 12

Report on Deliverables

Deliverables - Summary

All initially proposed deliverables were delivered on time. Also, this was affected by the delays due to inconveniences regarding the funds, however they were delivered sucessfully.

All checklist were completed and submitted to the IPT of Biodiversidad of SiB Colombia, one is already published via GBIF, the others are currently under data quality control by the SiB Colombia. For this reason, in some cases, the link provided correspond to the IPT of Biodiversidad because as SiB Colombia manage a high demand of data curation request, they did not migrated the data at the time of this report. In the case of the occurrences, after agreement with the regional support team, this was delivered as an extension of the checklist as type and specimens. For this reason, in the production of deliverables section, both checklist and ocurrence (As extensions) will be mentioned together and not as two dataset apart. The occurrences will be shared (if not already) with each collection that will independently upload the information gathered during this project.

Both richness maps and the webpage of Cerambycidae were sucessfully accomplished and the details are uploaded in the attachments.

Deliverables produced by the project

Dataset deliverables

Checklist of the species of longhorned beetles (Cerambycidae and Disteniidae) in the Caribbean of Colombia
Dataset type: Checklist
Dataset scope: It will be generated a list of the species of Cerambycidae and Disteniidae present in the Caribbean of Colombia with their distribution for department. Data on the temporal and altitudinal distribution will also be taken.
Number of records: 304
Data holder: National collections
Data host institution: National collections

% complete: 100%
Status update: The final checklist contains a total amount of 304 species, with 1835 occurrences registered as type and specimen extension.
DOI: 10.15472/vaaef4
Expected date of publication:

Checklist of the Formicidae in Atlántico and Montes de María (Bolívar)
Dataset type: Checklist
Dataset scope: It will be generated a species list of Formicidae from the department of Atlántico and the mountain range “Montes de María” in Bolivar. New reports generated in this work will be listed as well as the previous reports in literature.
Number of records: 170
Data holder: National collections
Data host institution: National collections
% complete: 100%
Status update: A total of 130 taxa were compiled at the end of the project, with 270 occurrences registered as type and specimen extension. In order to gather more information, specimens from departments in the Caribbean other than Atlántico and Bolívar were included.
DOI: https://ipt.biodiversidad.co/sib/resource?r=formicidae_checklist
Expected date of publication:

Preliminary checklist of Odonata from the Colombian Caribbean
Dataset type: Checklist
Dataset scope: It will be generated a species list of Odonata from the Colombian Caribbean with their distribution for each department. New reports generated in this work will be listed as well as the previous reports in literature.
Number of records: 111
Data holder: National collections
Data host institution: National collections
% complete: 100%
Status update: At the end of this project, the Odonata checklist contain 111 records, and 413 occurrences registered as type and specimen extension.
DOI: https://ipt.biodiversidad.co/sib/resource?r=odonata_checklist
Expected date of publication:

Preliminary checklist of Mantodea in the Caribbean of Colombia
Dataset type: Checklist
Dataset scope: It will be generated a list of the species of Mantodea present in the Caribbean of Colombia with their distribution for each department.
Number of records: 21
Data holder: National collections
Data host institution: National collections
% complete: 100%
Status update: At the end of the project, the Mantodea group gathered a total of 21 records in the checklist and 54 occurrences registered as type and specimen extension
DOI: https://ipt.biodiversidad.co/sib/resource?r=mantodea_checklist
Expected date of publication:

Preliminary checklist of Opiliones in the Caribbean of Colombia.
Dataset type: Checklist
Dataset scope: It will be generated a list of the species of Opiliones present in the Caribbean of Colombia and it will be provided distribution information for each department.
Number of records: 30
Data holder: National collections
Data host institution: National collections
% complete: 100%
Status update: At the end of the project, the checklist of Opiliones finishes with 30 records, and 49 occurrences registered as type and specimen extension.
DOI: https://ipt.biodiversidad.co/sib/resource?r=opiliones_checklist
Expected date of publication:

Preliminary checklist of spiders in the Caribbean of Colombia.
Dataset type: Checklist
Dataset scope: It will be generated a list of the species of spiders present in the Caribbean of Colombia and it will be provided the distribution information for each department.
Number of records: 102
Data holder: National collections
Data host institution: National collections
% complete: 100%

Status update: At the end of the project, it was gathered 102 records of spiders in the checklist and 165 records of occurrences that were registered as type and specimen extension.
DOI: https://ipt.biodiversidad.co/sib/resource?r=araneae_checklist
Expected date of publication:

Other deliverables

Richness map of Longhorned beetles in the Caribbean of Colombia.
Description: It was designed a map which shows the richest departments in the Caribbean of Colombia in terms of Cerambycidae species.
% complete: 100%
Status update: The map was sucessfully developed and it was developed a single map for both Cerambycidae and Disteniidae as the latter was not abundant.
Sources of verification: Attachment 2

Webpage of the Cerambycidae of the Caribbean of Colombia
Description: It was designed a webpage containing information on which subfamilies, tribes and species are registered for the Caribbean of Colombia. The webpage also contain pictures of some of the species, the known distribution and will contain published papers with information of Cerambycidae in the region.
% complete: 100%
Status update: The webpage was sucessfully created and is currently under updating
Sources of verification: https://sites.google.com/view/cerambycol/inicio?authuser=0

Richness map of species of Formicidae from Atlántico and Montes de María (Bolívar).
Description: It was designed a map of the species of Formicidae which shows the distribution of ants in the Caribbean, especially in the department of Atlántico and the mountain range Montes de María in Bolívar.
% complete: 100%
Status update: The map was sucessfully created.
Sources of verification: Attachment 3

Richness map of endangered species of Odonata from the Colombian Caribbean.
Description: It was designed a map of species of Odonata evaluated as Vulnerable, Endangered, Critically Endangered, and Extinct in the IUCN Red List from the Colombian Caribbean that can be used to initiate conservation works.
% complete: 100%
Status update: The map was sucessfully created.
Sources of verification: Attachment 4

Richness map of species of Mantodea in the Caribbean of Colombia.
Description: It was designed a distribution map of species of Mantodea which shows the richest departments in the Caribbean of Colombia with respect to this group.
% complete: 100%
Status update: The map was sucessfully created
Sources of verification: Attachment 6

Richness map of species of Opiliones in the Caribbean of Colombia.
Description: It was designed a map of families of Opiliones which will show the richest departments in the Caribbean of Colombia with respect to this group.
% complete: 100%
Status update: The map was succesfully created
Sources of verification: Attachment 6

Events

Theoretical-Practical Course on Entomology.

Dates: 2023-02-07 - 2023-02-11
Organizing institution: Neoptera Research group, University of Atlántico, Global Biodiversity Information Facility - GBIF, European Union
Country: Colombia
Number of participants: 30
Comments: During four days, the entomology theoretical and practical course was performed, on the Lepidoptera, Hymenoptera, Odonata, Mantodea, Coleoptera and Diptera groups. On the first day, field activities were carried out in order to show the attendees the insect capture traps, on the following days theoretical and practical workshops were carried out for the aforementioned groups.

The attendees took advantage of the experience provided by the entomology theoretical-practical course to obtain more information about their interest group and exchange information with the experts, solved doubts and concerns and some, due to the pandemic, had their first field trip and contact with the capture methods used to collect insects.

Website or sources of verification: Attachment 9

Events

Theoretical-Practical Course on Arachnology

Dates: 2023-03-03 - 2023-03-04
Organizing institution: Neoptera Research group, University of Atlántico, Global Biodiversity Information Facility - GBIF, European Union
Country: Colombia
Number of participants: 10
Comments: This academic event consisted of two sessions. The first was theoretical about the different groups such as spiders, scorpions, pseudoscorpions, opiliones and others, where attendees learned about taxonomy, local fauna and the state of the Tropical Dry Forest. For its part, the second session consisted of putting the acquired knowledge into practice, where the students learned about the different capture techniques used for the group such as Winkler traps, pitfall, foliage disturbance and manual capture, as well as the requirements for its preservation in biological collections and its identification with taxonomic keys. They also recognized the necessary laboratory elements to work with this group such as stereoscopes, Petri dishes, entomological tweezers, and more.
Website or sources of verification: Attachment 10

Events

Workshop SiB Colombia: Como acceder a nuestra biodiversidad.

Dates: 2023-06-29 - 2023-06-29
Organizing institution: Neoptera Research group, University of Atlántico, Global Biodiversity Information Facility - GBIF, European Union
Country: Colombia
Number of participants: 12
Comments: This academic event consisted in one session where the team of the project first clarify about what GBIF, SiB Colombia and BID Caribbean is, in order to divulge about these entities, and then using the project implementation as example showed the process of publishing biodiversity data through this programs and nets. The public consisted of biology students that learned about these programs for the first time and aroused an interest in participating in these kinds of projects in their future. They also learned to recognize the importance behind this kind of work, as they evidenced that biodiversity information that is gathered by many sources will be helpful if is available and free-access in order to make environmental protection and politics.
Website or sources of verification: Attachment 12

Communications and visibility

Our main communication media has been the publication of all the datasets in the SiB Colombia IPT of Biodiversidad, that will eventually migrate to GBIF webpage. In addition to this source, we have accomplished to bring visibility to the project by contacting a local newspaper, who shared our participation in the project to the local community through its website: https://www.elheraldo.co/region-caribe/investigadores-colombianos-ganan-convocatoria-de-la-union-europea-840547?fbclid=IwAR3gqRs-5swDdDoSyH2ca621UXCYHap66OTTNbvLPCkDiX6fzLeiYk10ZbU, as well as through its different social networks: Instagram, Twitter and Facebook.
The results obtained were also shared with the different community members through the courses on insects and arachnids. The first had undergraduate students from the biology program as assistants, and biologist as lecturer. Furthermore, the secondary education sector received the course on arachnids, which consisted of two sessions. The first was theoretical and the second session consisted of putting into practice the acquired knowledge, where students knew the different capture techniques used for the group as well as the requirements for its preservation in biological collections and their identification with taxonomic keys. T¿This type of course contributes significantly to the comprehensive training of young people at school and undergraduate age, introducing new investigative perspectives that allow the student to explore a new area of study such as taxonomy. The inclusion of local specialized staff in the topics to be addressed allows attendees to verify that it is possible to do science in their environment. We therefore consider that this pedagogical experience was beneficial to strengthen the investigative spirit of the new generations.
This was also accomplished by the SIB workshop carried out at Universidad del Atlántico in order to share with graduate students the importance of digital worldwide databases and how to use the SIB

platform for networking and collaboration with other researchers.
Last but not least, the results of an specific group (Cerambycidae) is shared with the scientific community by the webpage Cerambycol (https://sites.google.com/view/cerambycol/inicio?authuser=0) where all the results are communicated in a dynamic more attractive way (photographic catalog and distribution maps). The webpage is still under development and will include many more information in the upcoming years.
As for the communication that will happen after the end of the project, this will be done by publication of this data in scientific journals as well as, in events. The manuscripts for publication are currently under development and the divulgation in events will start in the SOCOLEN entomology congress, where part of the results gathered by this project will be presented (See attachment 1. Abstract acceptance).
We will like to request the adding of the Cerambycidae webpage in our project webpage (link: https://sites.google.com/view/cerambycol/inicio?authuser=0), and also, we would like to request the uploading of the distribution maps to the project page (See attachment 2, attachment 3, attachment 4, attachment 5, attachment 6)

Monitoring and evaluation

Final Evaluation

As planned in our proposal we developed monthly or bi-monthly meetings among the members of the project. In each meeting each member exposed their developed activities and the problems faced in the period. At the end of each meeting, we tried to propose possible solutions for each problem. This was definitely a strength in our project, that the internal communication never stopped and was key in the achievements of the project. Our communication impacted positively the development of the project, and therefore, the outputs that surged from the performed activities, delivering the results on time and with a high-quality mark. Another strength that it is possible to identify is the great academic network that each team member has, because it was easy to contact with other collections and be accepted to revise in short time notice, as the pandemic and funds problems did not allow the team to contact the curators before. Lastly, it is important to outstand the responsibility of our team members, as they were set with due dates to deliver results, and every time they accomplished them.
As we mentioned in the midterm report, the main weakness/problem faced so far, and which has affected the entire project, is the delay in receiving the funds. This delay has prevented most of the members of the group from being able to start visiting the planned collections at the proposed times, as well as developing the scheduled courses. This problem was aggravated by the COVID pandemic, because all activities in the administration of the university remained stopped for a while and when they returned, attendance was only remote making communication difficult. With this difficulty, the main change to the original plans was the dates of the visits to the collections and the development of the courses. However, we take this opportunity to learn that we should always have alternative sources in case this situation happens that will allow the project to continue against all difficulties. Also, we learned to work under pressure and against time, without compromising the quality of the work.
Despite this delay, all of the initially proposed collections have already been visited, which has allowed us to publish all the proposed deliverables through SiB Colombia, and carry out the proposed courses (entomology and arachnology).

Best Practices and Lessons learned

It is really important to consider the great work that the GBIF support team did during the development of this project, the secretariat, the financial controller, the coordination team and the regional support team, were always available to solve questions, help us with all difficulties faced during the process, to provide the support that we needed in every stage of the project development, since the funds release, to the curation and publication of the data, they were an integral team in terms of support and management. Also, they always answered on time, and we are sure that the success of this project would not be possible if we haven't had the support of the GBIF team.
As in life, the best practices are always to learn from the difficulties. This project had many difficulties in its implementation due to the impact of the COVID-19 pandemic in the administrative offices of the Universidad del Atlántico. These difficulties allowed us to improve work efficiency, since we have less time than initially estimated to accomplish some activities without diminishing the quality of the results. This will surely help us to develop high quality projects in our professional and academic future. Also, during the development of the project and the divulgation of the courses, the team was able to establish academic interchange with many biologist students from Colombia that developed an interest for the biodiversity of arthropods in local regions, and this is without doubts one of most successful, unexpected outcomes from our project, and that it can be built on, because these young people are the ones that will be performing this kind of projects in the future, and having the passion, and understanding of why this duty is important, may be the greatest accomplishment of all.
Another valuable practice learned with this project is the standardization of the information for future labels in the specimens of the collection, since the Darwin Core standard is widely used nationally and

internationally, therefore, from now on, this standard will continue to be used in the collection, in order to facilitate the mobilization of data with other researchers or research centers.
Last but not least, teamwork is definitely a main lesson that may be applied to other context, because in this project we demonstrated that only with teamwork great results can be achieved, as for example the development of different groups dataset, which was only achieved because we were able to gather together experts in all groups.
This project was such an amazing experience for each one of the team members, it helped us grow as scientists, professionals and also human beings, because it developed our sense of responsibility, duty, our capacity to face change, to overcome difficulties, and to never quit. As recommendations for the GBIF group if possible is to have into account that there are some situations that are out the control of everyone (as administrative delays by the university), and so if the project is directly managed by a person, and not necessary an institution, the project will not be compromised by the bureaucracy of the institution.

Post Project activities

Some activities proposed in the medium term related to the project are: (1) continue with field trips that enrich the number of specimens and localities in the entomological and arachnological collections of the Universidad del Atlántico, (2) take advantage of this valuable information that we are generating to carry out research in taxonomy, ecology, genetics and pedagogy for conservation purposes, (3) publish all of this research that comes from the results of this project in scientific journals to share the main findings with the scientific community, and finally, (4) publicize the summary of the diversity of insects and arachnids of the Colombian Caribbean to the community through symposiums and national congresses, this in order to highlighting the importance of the collections of the Universidad del Atlántico as one of the most important at national level in the context of the Colombian Caribbean.

Sustainability

Sustainability Plans

This project laid the foundations for the digitization of the entomological and arachnological collections of the Universidad del Atlántico, and also the strengthening of the collections of the Universidad del Atlántico as reference of Caribbean fauna in Colombia. This is very useful for students and researchers who want to visit the collection for academic purposes, since it facilitates the access and analysis of the information in the collection. In this way, this project ensures that in a short-term collaboration with researchers will be done, as it was an opportunity to enhance our collection and establish the interinstitutional network that we expect will develop into future projects and publications. Also, this project laid the basis of taxonomic work that must be done in this groups, as we revised the collections we found taxonomic problems that otherwise would not be detected, and in the future we will work on them, with taxonomic revisions, descriptions of new species, and update in the known distribution, and perhaps endemisms of the species analyzed in this project. Also, with this biodiversity information, on a long-term basis, we will be able to establish endangered species and use this information in order to protect the ecosystems that are threatened in the Caribbean region of Colombia, such as the tropical dry forest. Lastly, one of the most important thing that we learned from this project is that we are capable of developing this kind of work, and we will continue to make this kind of studies comprising other groups and perhaps other regions of Colombia.

Impact of COVID-19 pandemic on project implementation

As we already commented above, there were delays in the transfer and receiving of the funds, and this was mainly affected by the COVID-19 pandemic because all administrative processes in the University were done remotely and there was no personal attention, making the communication with the financial department particularly hard, which affected the transfer of the funds due to incorrect information of the bank details. Despite all of this, we were able to reorganize the schedule and, in the second year of the project, we managed to carry out all the proposed objectives and deliverables.


GBIF