Neglected insect diversity in the Lost World of Southwest China: Darwin wasps (Hymenoptera, Ichneumonidae) and beetles (Coleoptera)

Programme: BIFA
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Project lead organization: Xishuangbanna Tropical Botanical Garden, CAS Key Laboratory of Tropical Forest Ecology
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Narrative Final report

Executive Summary

The implemented project collaborates with Xishuangbanna Tropical Botanical Garden (XTBG) (beetle datasets) and the Institute of Eastern-Himalaya Biodiversity Research (IEHBR) (wasp datasets). Implementing and achieving major millstones went accordingly only for part of the project (beetle datasets). Nevertheless, we achieved significant progress for the promised beetle datasets by publishing all promised beetle datasets (5 sampling events). Also, we managed to sequence dung beetles from two datasets to identify the species. Another significant activity we managed was the two workshops to identify beetle in combination with an existing field course. However, we missed the opportunity to join IEHBR collaborator for the wasp identification.
The wasp datasets were delayed in mobilizing due to the strict border regulations implemented by the Chinese government because of the COVID-19 pandemic until the beginning of 2023. As a result, the main collaborator from IEHBR was stuck outside China and could not access the specimens to identify and digitize them. In addition, some of the progress meetings we planned to hold onsite were delayed. However, to some extent, we could overcome these issues by digitizing the wasp's data using images and meeting project collaborators online via Zoom and Slack. We realized that although online platforms worked somewhat, data digitizing and evaluations were affected without the person onsite. We are working to finalize the Darwin Wasps datasets and publish them as post-project activities. Due to travel restrictions, dung beetle datasets could only identify at the genus level (published) but currently identify them at the species level. Later on, we will update the existing genus-level databases and upload the sequences to the online database.

Progress against milestones

Has your project completed all planned activities?: No

Rationale: Due to the COVID-19 pandemic, the collaborator (IEHBR) was absent from the institute. This affected digitizing the wasp datasets on time and identifying them at the high taxonomic levels. In addition, the sequencing of the freshly collected wasps' species was affected for the same reason. Also, we were unable to execute the evaluation plans on-site accordingly. However, recently the collaborator returned to China, and these activities are ongoing. Now, Wasp samples have also been sent to the company for sequencing.
The dung beetle species identification at higher taxonomic levels was also affected by travel restrictions, and the institute we were supposed to visit for identification was functioning remotely from time to time due to the pandemic until the beginning of 2023. However, the higher level of taxonomic identification will be completed after the project's end. Resources allocated for project monitoring will use to monitor post-project activities.

Has your project produced all deliverables?: No

Rationale: The IEHBR collaborator was working remotely due to the COVID-19 pandemic and did not have access to the specimens for sorting and identification, as he is the expert in Darwin wasps' taxonomy. Therefore, it was essential for his presence to finalize the deliverables related to Darwin wasps. This includes finalizing DNA sequences from wasp specimens for identification as well. However, we plan to finalize the three remaining wasp checklists and the sequences from the fresh

wasp samples soon after the project and publish them through GBIF after the project. Also, later dung beetle datasets will update to species-level identification, and the DNA sequences from the dung beetle datasets will be uploaded to the databases after the project end.

Report on Activities

Activity implementation summary

Imaging-The specimen collection (IEHBR - Ichneumonidae, XTBG - Coleoptera) was photographed by the project assistant (and XTBG-Thilina) in both institutes for identification. The XTBG - Coleoptera photos were taken for dung beetle representing each morpho species identified in each dataset.

Sorting dung beetles- Dung beetle sorting and identification took longer than we initially expected due to the more significant number of individuals captured during the field surveys. The sorting was conducted on four eight field surveys (two habitats *two locations*two seasons) using 120 baited pitfall traps (5 traps*3 replicates* 8 surveys). It took more than four months to complete the field collection (between 2022 to 2021). By August 2021, Thilina have completed the dung beetle collection. Thilina and the project assistant in XTBG successfully sorted more than 7000 individuals into 64 morphospecies collected from two rainforests and two rubber plantations from both rainy and dry seasons by July 2022. Identified morphospecies are then photographed, so later, it will be helpful for experts to identify the relevant species. In addition, several individuals representing each morphospecies are kept in alcohol for DNA sequences which will also help determine the species.

BIFA Workshop- The project PI (Thilina) and project collaborator (Alexey) from the project joined the attention of the BIFA Capacity Enhancement Workshop in October 2022. Both have completed the given tasks during the workshop. One project member (Thilina) achieved a “Basic badge” after evaluating the workshop tasks. The experiences and capacities gained through workshop exercises helped familiarize me with the IPT system, archive the species data according to standard, and publish through BIFA IPT.

Higher taxa sorting and morphospecies identification- Identification for the higher taxonomic level was conducted only for the Darwin wasps and dung beetles with the support of experts in the field. But due to the Covid-19 pandemic traveling was restricted, and the institute was closed for a longer. Therefore, Thilina could not visit the museums and meet the collaborator in Beijing to identify the dung beetles at the species level. However, the situation has returned to normal, and soon Thilina will go to Beijing and identify the dung beetles.

Data entry- Data will be continuously filled into the datasets from identified collections. Beetle collection (XTBG) and Darwin wasps collection (IEHBR) are already well-curated. The dung beetle collection (XTBG) is partly shaped and will be filled with fresh specimens after the dung beetle survey in tropical forests.

DNA sequencing- In case of difficulties in identification using morphological characters, and sexual dimorphism, COI genes of freshly collected specimens (dung beetles) sequences will use to identify the species. Over 250 dung beetle samples from 64 morpho species have been sequenced and used to determine the dung beetles. The final results for the sequences arrived at the end of August 2022, and we were able to clean and prepare the sequences ad use them for identification. Currently, the waps After the project collaborator (Alexey- IEHBR) arrived in China, he started collecting and preparing the wasps samples to send to the company for DNA sequencing. After cleaning and compiling the consensus sequences, they will be uploaded to BOLDSYSTEMS as post-project activities.

First evaluation and monitoring- The initial assessment was planned to be held before the midterm report to evaluate the progress and discuss if any issues arose while sorting the specimens and entering the data. As initially planned, Thilina and Alexey regularly travel between institutes to evaluate and monitor the progress. Additionally, the first evaluation was scheduled to be held onsite in XTBG. However, due to the pandemic, the project team members could not physically meet as expected. Instead, we gathered the team online, discussed issues raised, and prepared the final evaluation for the Interim report. However, it was unsuccessful, as monitoring specimen sorting and data entry via an online platform was impractical. This also caused us to overestimate the progress speed and caused delays in some of the project deliverables.

Sequence data entry Beetle and wasp DNA sequences were received from the company, and currently, all lines are cleaned and ready for identification. However, the lines have not been submitted to the online database due to the delay in species identification based on morphological characters. After finalizing the title, all lines will be uploaded to the online database as a post-project activity.

Interim report preparation The midterm report was planned to be prepared remotely based on the first onsite evaluation. However, due to the pandemic, the first onsite evaluation was conducted via an online platform. Therefore, as planned, the interim report was remotely prepared based on the first evolution born. First, we gathered the team (via Zoom) under the supervision of the PI. Then, we picked the current progress to prepare and publish the data sets before the Interim report. Finally, in the news, we mentioned the achievements we completed as agreed for the midterm tasks, including posting at least one dataset and completing the BIFA Capacity Enhancement Workshop.

Beetle taxonomy, sequencing, and ecology workshop -Several workshops were planned under this project. As a result, we were able to successfully able to execute consecutively two times (2021 and 2022). We conducted insect sampling and identification in collaboration with “Advance Field Course Ecology and Conservation,” which was successfully held at XTBG. The project partner Prof, Nakamura and Thilina, were engaged in the project, and around 30 students across China joined the course. In addition, we hold a small training program for a selected group of people about extracting DNA from insect samples.

Darwin wasps biodiversity workshop – Alexey originally planned to organize the workshop at IEHBR to encourage regional research on megadiverse Darwin wasps focusing on biodiversity data mobilization. Also, the workshop is scheduled to include the basic skills and tools for postgraduate students and anyone interested. However, the organizer could not come to China due to the pandemic, and the workshop had to postpone. Therefore, the workshop is again planned to help as a post-project activity.

Final report preparation and final meeting-The final report were delayed in finalized and submitted due to the which was initially arranged to prepare onsite. Therefore, XTBH and IEBHR partners planned to meet at XTBG or IEBHR to prepare the final reports and check the data entry progress. However, due to the delay of the data set preparation of a part of the project, the submission of the report (28th February 2023) was delayed, primarily due to the pandemic, and part of the proposed project was stuck. However, after several online meetings with the support of the BIFA coordinators, we prepared the report and published 5 data sets at the extended deadline.

Completed activities

Activity name: Imaging

Description: Photos for the representative specimens were taken (IEHBR - Ichneumonidae, XTBG - Coleoptera), especially for representative samples from all collected dung beetle morpho species to identify the species. All collected wasp species were photographed as well. Which allowed IEHBR collaborators to work remotely.
Start Date - End Date: 1/12/2021 - 5/10/2022
Verification Sources: The attached pdf (Imaging.pdf) shows some example images using screenshots of the archived folder.

Activity name: Sorting dung beetles

Description: Dung beetles collected from the tropical forest and rubber plantations (Bubeng and Menglun) across rainy and dry seasons were taken from the collection and identified based one morphospecies.
Start Date - End Date: 3/8/2020 - 9/6/2022
Verification Sources: An Excel spreadsheet attached (55_rainy_sorting_species, bubeng_rainy_sorting_species) shows the recorded sorting data attached only for the rainy season (rainforest and rubber plantation) from both locations. The full dataset did not attach because the manuscripts from the data have not been published yet.

Activity name: BIFA Workshop

Description: Thilina and Alexey attended the BIFA workshop, and Thilina completed the activities and assessments with the basic badge.
Start Date - End Date: 25/10/2021 - 15/12/2021
Verification Sources: A digital copy of the obtained badge is attached (Thilina_badge.png).

Activity name: Higher taxa sorting and morphospecies identification

Description: Identifying specimens to higher taxa such as family and genus, and then giving morphospecies numbers for ecological and biodiversity studies. PI will travel to BIZ, KIZ to get taxonomist expertise for beetle identification. Darwin wasps will be identified at IEHBR by Prof. Alexey Reshchikov.
Start Date - End Date: 7/6/2021 - 18/5/2023
Verification Sources: We have uploaded the finalized family /sub-family level identification and the genus-level identified database sin to GBIF through BIFA-IPT.

Activity name: Data entry

Description: Data will be continuously filled into the datasets from identified collections. Beetle collection (XTBG) and Darwin wasps collection (IEHBR) are already existing and well curated. Dung beetle collection (XTBG) is partly shaped and will be filled with fresh specimens after dung beetles survey in tropical forest will be done.
Start Date - End Date: 6/1/2022 - 15/5/2023
Verification Sources: The dataset was prepared and familiarized with the IPT after the BIFA workshop and assessments. We have prepared datasets from the beetles collected from elevational transects, dung beetles, and Darwinwasps. The DNA for the sequenced species were uploaded as well

Activity name: DNA sequencing

Description: Data will be continuously filled into the datasets from identified collections. Beetles collection (XTBG) and Darwin wasps collection (IEHBR) are already existing and well curated. Dung beetle collection (XTBG) is partly shaped and will be filled with fresh specimens after Dung beetles survey in tropical forest will be done.
Start Date - End Date: 16/6/2022 - 2/5/2023
Verification Sources: DNA extraction has been done for most species and obtained the sequences ("Archived_sequences.png"). The cleaned and identified sequences will update the genus-level identified beetles and wasps to the species level. Later the sequences will be uploaded to the BOLD system.

Activity name: First evaluation and monitoring

Description: All project participants will get together at XTBG to check the progress and discuss any issues arising during the key period of specimen sorting, data entry, DNA sequencing and higher taxonomic identification. The evaluation will be done in XTBG.
Start Date - End Date: 3/1/2022 - 10/4/2022
Verification Sources: Online meetings were held with the collaborators before the midterm report, and the meeting outcome was used to finalize the midterm report ("Meeting_arrangements_01 & 02").

Activity name: Sequence data entry

Description: Taxonomic and DNA information of the specimens (for freshly collected beetles and for Darwin wasps) will be uploaded into the system.
Start Date - End Date: 6/12/2021 - 20/4/2023
Verification Sources: We will upload sequences extracted from dung beetles, and wasps targeting the CO1 gene will upload to GBIF and BOLD system with sample information.

Activity name: Interim report preparation

Description: PI and project partners will prepare the interim report to evaluate the sorting, identification and digitizing progress. The report will prepare remotely collaboration with the team
Start Date - End Date: 1/5/2022 - 31/5/2022
Verification Sources: Project partners from both XTBG and IEHBR prepared the finalized interim report. The report was submitted to the BIFA online grant portal on time

Activity name: Beetle taxonomy, sequencing and ecology workshop

Description: The first beetle identification training program incorporate with Advance Field Course in Ecology and Conservation - XTBG by Nakamura and Nimalrathna.
Start Date - End Date: 1/11/2022 - 10/11/2022
Verification Sources: We managed to hold the workshop on "Beetle taxonomy, sequencing, and ecology" incorporated with Advanced Field Course in Ecology and Conservation-XTBG by Nakamura (assisted by Nimalrathna) for two years. We also organized a small workshop on DNA extraction from insect samples (see the attached files Workshop.pdf and Workshop_sequencing.pdf)

Activity name: Final report preparation and final meeting

Description: XTBH and IEBHR partners will get together at XTBG or IEBHR to prepare the final report and to check the progress on data entry.
Start Date - End Date: 20/1/2023 - 30/5/2023
Verification Sources: The final report, which Thilina will compile with other collaborators' help, will be submitted to the BIFA grant portal.

Report on Deliverables

Production of Deliverables - Summary

The project is mainly consisting of two sets of deliverables. The first includes the three Coleoptera and

two Scarabaeinae (Dung beetle) datasets (DNA sequences for dung beetles) from XTBG. The second part includes delivering three DarwinWasps datasets and three DNA sequencing related to the identified wasps species from IEHBR. As we initially planned, XTBG managed to publish all promised sampling events except for the DNA sequences for species-level identification of dung beetles. The sequences were obtained but unable to publish in an online database. With the current work progress, we may be able to publish the sequences before the end of July 2023 as a post-project activity. Initially, we planned to visit Beijing, meet the collaborator, and identify the dung beetles at the species level. Unfortunately, we could not visit due to the Covid-19 travel restrictions. However, with the help of the Kunming Institute of Zoology museum specimens and the sequences obtained, dung beetle species could identify at the genus level. However, we plan to visit Beijing, identify the dung beetle at the species level, and update the existing dung beetle data before July 2023.
The promised deliverables from IEHBR were severely affected by the Covid-19 pandemic, where the project PI (Alexey) was stuck in Thailand. Therefore, at the moment, they were unable to publish any deliverables. IEHBR got ready with 90% of the datasets at the moment. However, the remaining deliverables must be completed or pass the quality check. Subsequently, after completing the task, wasps datasets will publish at the end of July 2023 as post-project activity.

Production of deliverables

Title: Coleoptera (beetles) from tropical forest (Bubeng)

Type: Dataset

Status update: A total of 4488 Coleoptera beetles from elevational transects from tropical rainforest in Bubeng were identified into family or subfamily levels.
Dataset scope: Coleoptera beetles collected from three elevational transects (200m interval) starting at 800m from tropical forest.}
Expected number of records: 1273
Data holder: Akihiro Nakamura
Data host institution: Chinese Academy of Sciences
Sampling method: Coleoptera beetles were collected from five 20m x 20m five sampling points separated by 150m each within three elevational transects (200m intervals) starting at 800m from the tropical forest. Five trapping methods were used: Litter extraction, Bark spray, Malaise traps, Pitfall traps, and Hand collection.
% complete: 100
DOI: 10.15468/n9b9vh
Expected date of publication:

Title: Coleoptera (beetles) from sub-tropical forest (Ailao Shan)

Type: Dataset

Status update: A total of 4587 Coleoptera beetles from three elevational transects from sub-tropical forests were identified into family or subfamily levels.
Dataset scope: Coleoptera beetles collected from three elevational transects (200m interval) starting at 2000m from sub-tropical forest.}
Expected number of records: 1383
Data holder: Akihiro Nakamura
Data host institution: Chinese Academy of Sciences
Sampling method: Coleoptera beetles collected from five 20m x 20m five sampling points separated 150m each with in three elevational transects (200m interval) starting at 2000m. Litter extraction, Bark spray, Malaise traps, Pitfall traps, Hand collection used as trapping methods
% complete: 100
DOI: 10.15468/7tfvvp
Expected date of publication:

Title: Coleoptera (beetles) from sub-alpine forest (Lijiang)

Type: Dataset

Status update: A total of 2161 Coleoptera beetles from four elevational levels from sub-tropical forests were identified into family or subfamily levels.
Dataset scope: Coleoptera beetles collected from four elevational levels (200m interval) starting at 3200m from sub-tropical forest.}
Expected number of records: 863
Data holder: Akihiro Nakamura
Data host institution: Chinese Academy of Sciences
Sampling method: Coleoptera beetles were collected from five 20m x 20m five sampling points separated by 150m each within three elevational transects (200m intervals) starting at 2000m. Litter

extraction, Bark spray, Malaise traps, Pitfall traps, and Hand collection used as trapping methods
% complete: 100
DOI: 10.15468/xqp7g3
Expected date of publication:

Title: Scarabaeinae (Dung beetle) from tropical forest (Bubeng)

Type: Dataset

Status update: A total of 5370 Coleoptera:Scarabaeinae (dung beetles) were collected from 100mx100m five sampling plots from tropical forests belonging to 64 morpho species were identified into genus levels.
Dataset scope: Coleoptera beetles are collected from tropical rainforests and rubber plantations across the rainy and dry seasons.}
Expected number of records: 244
Data holder: Thilina Nimalrathna and Akihiro Nakamura
Data host institution: Chinese Academy of Sciences
Sampling method: Dung beetle was collected from 100mx100m five sampling plots separated a minimum of 200m each within the Bubeng CTFS plot. A baited Pitfall trap (with human feces) in the middle of the plot was used and left for 48 hours. The process is repeated three times in the same plot.
% complete: 90
DOI: 10.15468/3r73vw
Expected date of publication:

Title: Scarabaeinae (Dung beetle) from tropical forest (Menglun)

Type: Dataset

Status update: A total of 1718 Coleoptera:Scarabaeinae (dung beetles) were collected from 100mx100m five sampling plots from tropical forests were identified into genus levels.
Dataset scope: Coleoptera beetles are collected from tropical rainforests and rubber plantations across the rainy and dry seasons.}
Expected number of records: 115
Data holder: Thilina Nimalrathna and Akihiro Nakamura
Data host institution: Chinese Academy of Sciences
Sampling method: Dung beetle was collected from 100mx100m five sampling plots separated a minimum of 200m each within the forest and the rubber plantation. A baited Pitfall trap (with human feces) in the middle of the plot was used and left for 48 hours. The process is repeated three times in the same plot.
% complete: 90
DOI: 10.15468/prp2s6
Expected date of publication:

Title: DarwinWasps (Hymenoptera, Ichneumonidae) from sub-alpine forests Mt. Baima (Diqing)

Type: Dataset

Status update: Collected DarwinWasps (Hymenoptera, Ichneumonidae) collected from sub-alpine forests Mt. Baima (Diqing) identification has completed 90%. The final data set is in preparation to upload.
Dataset scope: Darwin wasps collected from four sampling sites separated by elevation equal 400m asl starting at 2100m.}
Expected number of records: 2000
Data holder: Alexey Reshchikov
Data host institution: Institute of Eastern-Himalaya Biodiversity Research
Sampling method: Malaise traps
% complete: 90
DOI:
Expected date of publication: 2023-06-20

Title: DarwinWasps (Hymenoptera, Ichneumonidae) from sub-alpine forests Mt. Lasha (Lanping)

Type: Dataset

Status update: Collected DarwinWasps (Hymenoptera, Ichneumonidae) from sub-alpine forests Mt. Lasha (Lanping) identification has completed 90%. The final data set is in preparation to upload.
Dataset scope: Darwin wasps collected from four sampling sites separated by elevation equal 400m

asl starting at 2500m.}
Expected number of records: 2000
Data holder: Alexey Reshchikov
Data host institution: Institute of Eastern-Himalaya Biodiversity Research
Sampling method: Malaise traps
% complete: 90
DOI:
Expected date of publication: 2023-06-20

Title: DarwinWasps (Hymenoptera, Ichneumonidae) from sub-alpine forests Mt. Cang (Dali)

Type: Dataset

Status update: Collected DarwinWasps (Hymenoptera, Ichneumonidae) from sub-alpine forests Mt. Cang (Dali) identification has completed 90%. The final data set is in preparation to upload.
Dataset scope: Darwin wasps collected from four sampling sites separated by elevation equal 400m asl starting at 2100m.}
Expected number of records: 1500
Data holder: Alexey Reshchikov
Data host institution: Institute of Eastern-Himalaya Biodiversity Research
Sampling method: Malaise traps
% complete: 90
DOI:
Expected date of publication: 2023-06-20

Title: Scarabaeinae (Dung beetle) DNA sequences

Type: Dataset

Status update: The DNA from the dung beetles was extracted and cleaned. Some taxonomic information does not add to some sequences
Dataset scope: DNA sequences of COI genes belongs to Scarabaeinae beetles collected from two tropical forests }
Expected number of records: 240
Data holder: Thilina Nimalrathna
Data host institution: Xishuangbanna Tropical Botanical Garden
Sampling method: DNA barcoding
% complete: 90
DOI:
Expected date of publication: 2023-06-30

Title: DarwinWasps (Hymenoptera, Ichneumonidae) DNA sequences-01

Type: Dataset

Status update: The fresh samples from DarwinWasps have been sent and waiting for the final results
Dataset scope: DNA sequences of COI genes belongs to Ichneumonidae collected from Mt. Baima (Diqing)}
Expected number of records: 50
Data holder: Alexey Reshchikov
Data host institution: Institute of Eastern-Himalaya Biodiversity Research
Sampling method: DNA barcoding
% complete: 75
DOI:
Expected date of publication: 2023-07-15

Title: DarwinWasps (Hymenoptera, Ichneumonidae) DNA sequences-02

Type: Dataset

Status update: The fresh samples from DarwinWasps have been sent and waiting for the final results
Dataset scope: DNA sequences of COI genes belongs to Ichneumonidae collected from Mt. Lasha (Lanping)}
Expected number of records: 50
Data holder: Alexey Reshchikov
Data host institution: Institute of Eastern-Himalaya Biodiversity Research
Sampling method: DNA barcoding
% complete: 75

DOI:
Expected date of publication: 2023-07-15

Title: DarwinWasps (Hymenoptera, Ichneumonidae) DNA sequences-03

Type: Dataset

Status update: The fresh samples from DarwinWasps have been sent and waiting for the final results
Dataset scope: DNA sequences of COI genes belongs to Ichneumonidae collected from Mt. Cang (Dali)}
Expected number of records: 50
Data holder: Alexey Reshchikov
Data host institution: Institute of Eastern-Himalaya Biodiversity Research
Sampling method: DNA barcoding
% complete: 75
DOI:
Expected date of publication: 2023-07-15

Impact of COVID-19 pandemic on project implementation

The covid-19 pandemic impacted the finalization of the datasets promised to be delivered via GBIF. As a result, the dung beetle identification did not finalize at the species level. Furthermore, due to travel restrictions due to the pandemic, team members did not travel to BIZ earlier on time to check museum specimens and get expert opinions for identification. However, some project partners and colleagues brought some beetle representatives to the Kunming Institute of Zoology. As a result, they identified some beetles at the family level and dung beetles at the genus level. The travel restrictions are now getting easy, and work will return to normal in 2023. Hence, recently a project collaborator visited Beijing with the dung beetle samples for identification.
The significant impact due to the Covid-19 pandemic occurred for the Darwin Wasps datasets. The leading project partner responsible for Darwin Wasps data (IEHBR -Alexey Reshchikov) did not physically work on the specimen collection because he could not visit his institute due to international travel restrictions. This also affected the DNA barcoding of Darwin Wasps specimens, where Alexey could not access the preserved wasp specimens. However, after his return, the work was rescheduled, and the sequencing of wasp data is processed now. However, the identification was able to complete to some extent based on specimen photos. Photos were made by Alexey Reshchikov's (IEHBR) team, but the completion of identification started at the beginning of February 2023 after his return to China. Therefore, finalizing the wasp datasets got delayed. In addition, the Darwin Wasp workshop cannot be held on-site due to the pandemic and is planned to be held as a post-project activity. In case of further difficulties, we plan to perform the online workshop.

Events

Insect taxonomy, sequencing and ecology workshop_01

Dates: 2021-11-04 - 2021-11-09
Organizing institution: Xishuangbanna Tropical Botanical Garden
Country: China
Number of participants: 30
Comments: The first insects and beetle identification training program incorporate with Advance Field Course in Ecology and Conservation - XTBG by Nakamura and Nimalrathna.
Website or sources of verification: Workshop.pdf

Events

Insects taxonomy, sequencing and ecology workshop_02

Dates: 2022-11-01 - 2022-11-10
Organizing institution: Xishuangbanna Tropical Botanical Garden
Country: China
Number of participants: 25
Comments: The second insects and beetle identification training program incorporate with Advance Field Course in Ecology and Conservation - XTBG by Nakamura and Nimalrathna.
Website or sources of verification: Workshop_2.pdf

Events

Workshop on DNA extraction organized by Nakamura (assist by Nimalrathna)

Dates: 2021-12-01 - 2021-12-03
Organizing institution: Xishuangbanna Tropical Botanical Garden
Country: China
Number of participants: 10
Comments: A training about DNA extraction from the insect samples organized by Akihiro. Ms. XiangHui conducted the training
Website or sources of verification: Workshop_sequencing.pdf

Communications and visibility

First, when GBIF created the project page, we shared our project webpage via Facebook and WeChat (a widely used social media platform in China). Advertising on online platforms could get more attention from different parties engaged in academia regarding the data we aim to publish and the GBIF-BIFA grant. Also, the 8th International Canopy Conference in 2021 was hosted by Prof Nakamura online (due to the pandemic), and we were able to share among participants about our contributions to the GBIF community. Another International Canopy Conference will be held onsite in Xishuabgbanna Tropical Botanical Garden. We plan to take this as an opportunity to advertise our project outputs.
After we published all our data sets, we shared access links to published data sets via social media, so the availability of the data set was spread among the scientific community. In addition, this year, the “Advanced Field Course Ecology and Conservation” was successfully held at XTBG, and Prof Nakamura has conducted an insect sampling and identification workshop (in collaboration with our BIFA project). The course will help to capture the wide range of young scientists’ attention to our project. The combination of these efforts significantly impacted the promotion of our dataset among the scientific community.

Monitoring and evaluation

Final Evaluation

At the beginning of the project, we planned several visits to the museum to identify dung beetles at the species level with the help of the collaborator. However, due to the pandemic, travel plans had to change to achieve the objectives. Accordingly, the proposed budgets were adjusted and rearranged to manage the new activities. Such activities include visits to some specimen collections other than the one we originally planned. Also, the schedule was changed accordingly to the covid regulations. Such changes affected to finalization of some datasets before the end of the deadline.
We could not meet at the XTBG during monitoring activities to check the progress. Still, we regularly met in Zoom and discussed issues we faced during specimen sorting, data entry, problems with DNA sequencing, and species identification. The main point was the delayed DNA sequencing of Darwin wasps' collection specimens. Regarding travel restrictions and shipping material, we concluded that additional Darwin wasps DNA sequencing material would be obtained from Xishuangbanna fresh samples with selected species sorted. The issue with Darwin wasps' identification was solved by the introduction of the system of digital collection when every single specimen was digitized, which made higher taxa identification possible. We managed to identify the majority o the waps and finalize the wasp's datasets even though delayed beyond the deadline

Due to the pandemic, the project became difficult to initiate and continue. However, with the support and collaboration of the project partners, we were able to publish five datasets, and soon, we will be able to publish the remaining datasets via GBIF. Considering that progress, we would like to inform BIFA that the project has become successful with our collective effort.

Best Practices and Lessons Learned

Our main challenge was adjusting the project activities affected by the pandemic. The pandemic was sudden and lasted longer than we anticipated. Primarily the project involves travel and consists of activities that require onsite gathering. The best experience we gained is keeping a flexible schedule while implementing a project during a difficult time like the pandemic.

Post Project Activity(ies)

Some project activities and deliverables were delayed due to the pandemic. They were especially

publishing Darwinwasp datasets promised by the IEHBR. Currently, the collaborator is at the end of finalizing the dataset for publication. Those include three checklists and three sequence datasets for the Darwinwasp. Also, the dung beetle datasets contain species identified at the genus level. Therefore, we plan to update the existing dataset to the species level as a post-project activity with the taxonomist's help and use the sequences. We will complete these post-project activities within a month after submitting the final report.

Sustainability plans

The project helped to develop an official collaboration partnership with the Institute of Eastern-Himalaya Biodiversity Research and improve the strength of the relationship between the Beijing Institute of Zoology. The connection will allow us to initiate collaborative projects beyond sharing data to implementing combined research. Also, with no more travel restrictions due to the pandemic, we can travel to collaborative intitules and improve further collaborations.
The practice of aging through BIFA for data achieving and publishing with standard practices opens new avenues. The practice will allow us making publish the existing other datasets and future data collections available to the public. The training will also help to share the knowledge about standard data sharing among others. With the help of the grant, we were able to clarify the taxonomy of the existing collection, which will help generate future scientific publications.

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