

The Rufford Small Grants Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details

Your name	Pieter B. Pelsler with Julie F. Barcelona and Daniel L. Nickrent
Project title	Co's Digital Flora of the Philippines: cybertaxonomy to the rescue of conservation
RSG reference	10753-1
Reporting period	October 2012 – January 2013
Amount of grant	£ 6000
Your email address	Pieter.pelsler@canterbury.ac.nz
Date of this report	7-Feb-13

1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments (please see the text of items 2-11 for more detailed information)
To take scientific-quality photos for the CDFP website.			X	c. 5,500 photos were taken of c. 600 plant species at Tinago Falls (Lanao del Norte prov.), the Initao-Libertad Protected Landscape and Seascape (Misamis Oriental prov.), Mount Kitanglad Range Natural Park (Bukidnon prov), and Mt. Apo at the Energy Development Corporation (EDC) geothermal plant (North Cotabato prov.).
To provide copies of plant photos that were taken during the fieldwork to our local collaborators and hosts.			X	Copies of photos were provided to the DENR offices in Region 10, MSU-IIT and EDC, Mr. Gullier Opiso of the Philippine Eagle Foundation, and the mayor's office in Baungon, Bukidnon
To provide preliminary identifications for the plants that we photographed.			X	
To edit and upload the plant photos and their associated metadata (e.g., locality information, GPS coordinates, date, and comments) on the Phytolimages website		X		To date, 417 photos have been uploaded on Phytolimages and provided with taxonomic identifications. As was originally planned, the remaining photos will be uploaded in the coming months as they are edited, data are compiled, and identifications are verified or provided.
To link all photos that were taken during our fieldwork and deposited in Phytolimages to the CDFP website.		X		As photos are deposited in Phytolimages, they are linked to the CDFP website.
To give seminars and plant identification and photography workshops to faculty and students of Mindanao State University – Iligan Institute of Technology (MSU-IIT; Iligan City) and San Pedro College (Davao City).			X	The workshop and seminars in the cities of Iligan and Davao attracted a total of 149 participants from all over the Philippines. Three MSU-IIT early career teachers and an early career researcher of the National Museum of the Philippines were given advanced botanical training and career development opportunities.

To encourage seminar and workshop participants to use the CDFP resources and to contribute plant photos.		X		The number of members of our CDFP Facebook group grew from 638 to 1169 members after the workshops and seminars. Workshops in other parts of the Philippines could increase the number of users and contributors.
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

There are no problems to report that affected our project.

3. Briefly describe the three most important outcomes of your project.

Co's Digital Flora of the Philippines (CDFP; www.philippineplants.org) is a website named in honour of the late Filipino botanist Leonardo L. Co, who inspired us to continue his efforts to document the amazing botanical biodiversity of the Philippines and to share these data freely with the Filipino people. The CDFP website presents the only complete and current overview of the botanical diversity of the Philippines. It is a checklist with taxonomic data, literature references, voucher data, and distribution information for the c. 10,000 species of vascular plants recorded for the Philippines. It is illustrated with plant photos that are stored and linked from Phytolimages (www.phytoimages.siu.edu). Our CDFP Facebook Group (www.facebook.com/groups/260276987384309/; 1169 members on 7-Feb-13) is an interactive outpost of the CDFP website where group members post plant photos for identification and help each other by providing identifications.

The main aims of our RSG-funded project were 1) to conduct plant photography fieldwork on the island of Mindanao to represent as many species in the CDFP checklist as possible with high-quality scientific photos, 2) to provide botanical skills training through workshops and seminars, and 3) to engage in outreach activities that promote appreciation of biodiversity through the use of the CDFP and Phytolimages websites. Overall, we aim to provide free and user-friendly access to biodiversity data to the Filipino people through these websites as well as through the CDFP Facebook Group.

Most important outcomes of this project:

1) The fieldwork component of our project resulted in c. 5,500 scientific-quality photos of c. 600 species of ferns, fern allies, gymnosperms, and flowering plants. This high number of photos and the substantial botanical diversity that we were able to document far exceeded our expectations. It demonstrates, for the first time, that plant photography is a cost- and time efficient yet scientifically sound method for assessing botanical biodiversity. Plant photography therefore proves to be a powerful method for generating data that is needed to make informed conservation management decisions.

2) During our plant photography fieldwork, several important discoveries were made that underline the importance of this method for biodiversity research and conservation management, e.g.:

-Discovery of a second population of *Rafflesia schadenbergiana*. This *Rafflesia* species has one of the largest flowers in the world, up to 80 cm in diameter, and is an icon of the Philippine rain forest (Fig. 1). Before our RSG-funded fieldwork, only a single living plant of this species was known to science and *R. schadenbergiana* was therefore feared to be on the brink of extinction. Finding a second population of this species, about 30 km from the previously known location (Fig. 2), provides hope that this species is more common than

previously thought.
-Potentially new species. We photographed several species that are most likely new to science. These include an unnamed orchid species (*Gastrodia*; Fig. 3) and a parasitic mistletoe (*Macrosolen*; Fig. 4).
-Species not previously recorded. We found a number of species that had not previously been recorded for the areas where we carried out our fieldwork. For example, *Ginalloa angustifolia* (Fig. 5) is a new record for Mindanao and, to our knowledge, our photos are the first ever taken of this mistletoe genus. *Hoya amrita* (Fig. 6) was newly recorded for Bukidnon province. *Ophioglossum ramosii*, a Philippine endemic fern known only from the type collected from the island of Camiguin in Mindanao, was rediscovered in Mt. Kitanglad. The type was destroyed during WWII when the Philippines' Bureau of Science herbarium was bombed and our finding is therefore particularly noteworthy.

3) Our 3-day plant taxonomy and photography workshop at MSU-IIT (Figs. 7-12) and 1-day seminar series at San Pedro College (Figs. 13 & 14) attracted scientists, students, teachers and other professionals from all over the Philippines. These participants received training in the following: 1) the use of the CDFP website (and other free online tools for biodiversity and conservation), 2) scientific plant photography, 3) plant identification, and 4) building websites such as illustrated checklists for particular regions in the Philippines. All of these activities make use of the photos of Philippine plants that are currently available from the PhytoImages website. The workshop at MSU-IIT was attended by 89 participants from Mindanao State University (IIT, Marawi, Balo-i, Naawan, LNAC, and General Santos campuses), University of Mindanao - Matina, Caraga State University - Ampayon, La Salle University - Ozamiz City, Aurora State College of Technology, Xavier University, Mindanao University of Science & Technology, Surigao del Sur State University, Ateneo de Zamboanga University, University of the Philippines - Baguio, Central Mindanao University, and Western Mindanao State University. The seminar series at San Pedro College attracted 60 participants from Davao Doctor's College, Ateneo de Davao University, Cor Jesu College, University of Southeastern Philippines, San Pedro College, and University of the Philippines-Mindanao.

In addition, three early career teachers of MSU-IIT (Mr. Muhmin Michael E. Manting, Ms. Nanette Hope N. Sumaya, and Ms. Sharon Rose M. Tabugo) received additional, more advanced training in plant recognition and photography at our fieldwork site in the Cinchona Forest Reserve (Figs. 15-16; Mt. Kitanglad range). We provided an early career researcher of the National Museum of the Philippines (Mr. John Rey Callado) with career development opportunities by involving him as a teacher in our workshops and seminars and during our plant photography fieldwork.

4. Briefly describe the involvement of local communities and how they have benefitted from the project (if relevant).

Our CDFP project aims to provide the Filipino people with freely accessible biodiversity data. We believe that this empowers them to make informed conservation management decisions. Our workshops and seminars attracted a wide range of scientists, students, teachers and other professionals from all over the Philippines. These participants are now familiar with the CDFP website as well as other free online tools for biodiversity and conservation studies that we introduced to them and will pass on this knowledge to their colleagues and students. In our opinion, it is critical to nurture and grow an informed academic workforce of Filipino professionals that have the skills and knowledge necessary for dealing with future biodiversity challenges. We therefore also provided advanced botanical skills training to three young teachers of MSU-IIT and career development opportunities to an early career researcher of the National Museum of the Philippines.

As the CDFP project grows through our efforts in conjunction with the contributions of local educational, environmental, and academic communities, our website will become a more integral component of biodiversity conservation, education and research in the Philippines. This is exemplified at University of the Philippines – Diliman, where Dr. James V. LaFrankie uses the CDFP Facebook website as a teaching tool in his courses. In addition, an increasing number of staff of the Department of Environment and Natural Resources (DENR) and students, teachers and researchers at universities in the Philippines (e.g. University of the Philippines - Baguio, Aurora State College of Technology, Central Mindanao University, Caraga State University, University of the Philippines Visayas, Tacloban College and the Philippine Native Plants Conservation Society, Inc.) are posting plant photos for identification or are identifying photos uploaded by others on the CDFP Facebook group. Several Philippine plant experts and enthusiasts (e.g., Jim Cootes, Michael Calaramo, Nestor Bartolome, Ravan Schneider, Wally Suarez) have been contributing their plant photos in bulk for inclusion in the CDFP and Phytoimages websites. This involvement of individuals, local communities and organizations in our CDFP project is expected to increase with a more complete photographic representation of the flora of the Philippines.

5. Are there any plans to continue this work?

Yes. Our plant photography fieldwork was highly successful, and the seminars and workshops were very well received. We have been invited by some of the participants to organise a similar programme at their home institutions. This would provide us with the opportunity to train and encourage people from other areas of the Philippines to document the Philippine flora. Our vision is to see the “citizen scientist” approach continue to grow and mature. Ideally, the Facebook page will become the forum for active participation by more and more amateur and professional botanists, and we foresee that the photos they contribute continue to populate Phytoimages, thus increasing its depth and breadth. In the future, we also hope to provide tools for individuals to easily generate illustrated checklists for any geographic region in the Philippines.

6. How do you plan to share the results of your work with others?

All c. 5,500 plant photos taken during our fieldwork and their associated metadata will be made publicly available on www.phytoimages.siu.edu and linked to the CDFP website. As such, these data will be freely available for use for non-commercial purposes to the public. Unedited photos of high resolution and with preliminary identifications have been given to our collaborators and hosts at MSU-IIT and San Pedro College, DENR Region 10, the Energy Development Company, Philippine Eagle Foundation, and local communities through their municipal office.

In addition to making the photos publicly available, we are actively promoting the use of the CDFP and Phytoimages website by introducing them as conservation, research and teaching resources to NGOs, national and local government agencies (e.g., municipal offices, DENR), amateur plant enthusiasts, and teachers and students of schools, universities and colleges in our seminars, workshops, and on our CDFP Facebook Group.

7. Timescale: Over what period was the RSG used? How does this compare to the anticipated or actual length of the project?

The fieldwork, seminars, and workshops in Mindanao took place between 19 November and 20 December 2012. This is similar to the originally planned timeframe.

8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used.

Exchange rates (24-Jan-23) obtained from <http://www.oanda.com/currency/converter/>:

-Philippine Peso - £ Sterling: 0.01549

-New Zealand \$ - £ Sterling: 0.53121

Item	Budgeted Amount	Actual Amount	Difference	Comments
Plane tickets (Christchurch, NZ to Manila - return) for Pelser and Barcelona	2123	2136.13	-13.13	
Plane tickets (Carbondale, IL, USA to Manila - return) for Nickrent	906	854.40	51.60	
Plane tickets for 3 persons (Manila/Iloilo to Cagayan de Oro)	110	95.90	14.10	
Hire of local guides, porters, etc.	325	489.48	-164.48	
Supplies and food and for guides/porters	290	414.14	-124.14	
Cell phone cards and internet top-ups	45	71.72	-26.72	
Per diem for Mindanao for three persons for 22 days at US\$70.00/day/person (covers accommodation, food, local transportation)	1840	1840	0	
Vehicle hire from Iligan City to Davao	145	92.96	52.04	
Taxi Rolleston, NZ to Christchurch Airport (return)	106	74.74	31.26	
Plane tickets for 3 persons (Davao to Manila)	110	135.48	-25.48	
TOTAL	6000	6204.95	£ -204.95	

9. Looking ahead, what do you feel are the important next steps?

Our goal is to encourage Filipinos to document, study, and protect the immense botanical diversity of their country. We aim to do this by providing a well-illustrated and up-to-date online checklist that contains all species of vascular plants and serves as a framework for conservation-related teaching and research. In order to achieve this, we need to continue with plant photography fieldwork to represent as many species as possible with scientific quality photographs. Currently, c. 26% of the checklist species are illustrated with photographs, but our goal is to increase this to 33% in the coming three years. The archipelagic setting of the Philippines contributes to this immense diversity and nearly 30% of the flora is endemic to the country. Many of these are island or local endemics and so the more islands we visit, the better we can represent the Philippines' unique flora on our websites. We also want to continue to offer introductory and advanced botanical skills training to potential and current users/contributors of the CDFP website in different parts of the Philippines. There is a strong demand for this type of training, partly because six of the Philippines' botanists/plant taxonomists died in the past 3 years and others have retired or will retire soon. In addition, we aim to grow our Facebook-centered network of plant enthusiasts, students, and professionals as a user-friendly and low-threshold medium for collaboration and mentorship.

Because the number of plant photos that are contributed to CDFP by its users is steadily increasing, managing and curating the CDFP websites will become increasingly more time consuming for our team of editors. In order to ensure that we will still be able to handle contributions to the websites in a timely fashion, we may look for funding to appoint someone to assist with preparing metadata

associated with photos and editing, uploading, and linking photos. We may also seek funding to involve staff and researchers of the National Museum (and perhaps other academic and scientific institutions in the Philippines) to process and study plant specimens that are collected under DENR permits during our plant photography fieldwork as scientific vouchers for species that are potentially new to science or otherwise noteworthy. This is time consuming and therefore difficult for us to do during our brief visits to the Philippines.

10. Did you use the RSGF logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?

The RSGF logo was presented as a powerpoint slide at the start of our workshops and seminars, printed on the workshop announcement flyers, and is included on the home page of the CDFP website. It was also included in a presentation about our work in the Philippines at a meeting of the Canterbury Botanical Society in Christchurch, New Zealand. Each plant photograph taken during our project and deposited in PhytoImages will be provided with the phrase: "Photograph taken with financial support from the Rufford Small Grants Foundation". By entering 'Rufford' in the 'Keyword or Locality' search field at www.phytoimages.siu.edu, thumbnail images of all uploaded photos taken during this project can be viewed. We are currently writing a manuscript about the CDFP project for publication in the Philippine Journal of Science in which the support of the Rufford Small Grants Foundation for this project is explicitly acknowledged. The Foundation will also be acknowledged in any other publications that may result from the RSG-funded fieldwork.

11. Any other comments?

We would like to thank the Rufford Small Grants Foundation for supporting our CDFP project. Your financial support allowed us to move from the first phase of the project in which the checklist website was built to the second phase in which we aim to present photos for as many plant species as possible and to promote its use among Filipinos. Your support therefore greatly helped towards reaching our goal of constructing and curating a website that is a free and scientifically sound resource for conservation, research, and teaching.



Fig. 1. Dr. Julie Barcelona posing with a flower of *Rafflesia schadenbergiana* of the only previously known living plant of this species (photograph taken June 2007; © J.F. Barcelona). Fig. 2. Mr. Wilson E. Balansag, resident of Lantapan, with a senescent flower bud at the newly discovered population of *Rafflesia schadenbergiana* in his municipality.



Fig. 3. *Gastrodia* sp. (Orchidaceae). Most likely an undescribed species or at least a new record for the Philippines. Fig. 4. *Macrosolen* sp. (Loranthaceae). Possibly an undescribed species.



Fig. 5. *Gillialoa angustifolia* (Viscaceae). No other photographs of this genus are known to us. Fig. 6. *Hoya amrita* (Apocynaceae). A new record for the province of Bukidnon.



Fig. 7. Participants of our 3-day seminar and workshop series at MSU-IIT. Fig. 8. Plant identification workshop at MSU-IIT.



Fig. 9. Dr. Pelsler teaching a plant spot-recognition workshop during the MSU-IIT seminar and workshop series. Fig. 10. Dr. Nickrent during his seminar presentation on plant photography at MSU-IIT.



Fig. 11. Dr. Barcelona teaching a plant specimen collecting workshop as part of the 3-day seminar and workshop series at MSU-IIT. Fig. 12. Dr. Nickrent teaching a photo-editing and botanical website design workshop at MSU-IIT.



Fig. 13. Dr. Pelsler during a seminar on free online botanical resources at San Pedro College, Davao. Fig. 14. Participants of a one-day seminar series at San Pedro College, Davao.



Fig. 15. Miss Nanette Hope Sumaya (MSU-IIT) during advanced botanical skills training in the Cinchona Forest Reserve. Fig. 16. Discussion of plant photography results with the participants of the advanced botanical skills training at the DENR field station of the Cinchona Forest Reserve.