



## **Darwin Initiative Papuan Plant Diversity Project**

# ***Darwin Initiative for the Survival of Species***

## ***Annual Report***

### **1. Darwin Project Information**

Project Ref. Number	162/10/018
Project Title	<i>UK Darwin Initiative Papuan Plant Diversity Project</i>
Country(ies)	<i>Papua, Indonesia</i>
UK Contractor	<i>Royal Botanic Gardens, Kew (RBG Kew)</i>
Partner Organisation(s)	<i>Biodiversity Studies Centre, State University of Papua, Manokwari</i>
Darwin Grant Value	<i>£147990</i>
Start/End dates	<i>10/2001 12/2004</i>
Reporting period (1 Apr 200x to 31 Mar 200y) and report number (1,2,3..)	<i>01/05/2003 – 07/05/2004 (3)</i>
Project website	<i><a href="http://www.rbgkew.org.uk/herbarium/keys/fm">http://www.rbgkew.org.uk/herbarium/keys/fm</a></i>
Author(s), date	<i>Damien Hicks, John Dransfield, Bill Baker 07/04/2004</i>

### **2. Project Background**

The province of Papua, previously called Irian Jaya, is the Indonesian part of the world's largest tropical island, New Guinea. It remains one of the least known areas of the world and its plant diversity is very incompletely catalogued, with estimates of the number of vascular plant species ranging from 13 000 to 20 000.

The herbarium at the Biodiversity Study Centre (PPKH), Universitas Negeri Papua, Manokwari, is the only plant diversity reference collection in Papua. Staffed by a team of Papuan university lecturers and technicians, the centre holds a unique collection of 20 000 herbarium specimens from the last half century. The increasingly highly skilled team is also becoming a unique resource, performing further collections in key areas of Papua and sharing their expertise and findings on the international botanical forum. There is also clearly a niche role for Manokwari staff in the various projects being run both by environmental organisations (e.g. WWF, TNC) and commercial interests (e.g. BP, Rio Tinto) in Papua.

### **3. Project Purpose and Outputs**

The primary objective of the project is to develop the research capacity in plant diversity at PSKH through the rehabilitation of the Herbarium, the renovation and development of the herbarium collections, and through the training of staff in curation and research. With well-curated and expertly named herbarium collections as a basic reference, and with training in fieldwork and research, the staff of Manokwari Herbarium are being empowered to play an active role in the surveying of remaining natural vegetation in Papua, essential for the effective conservation of the region's biodiversity.

#### 4. Progress

Rehabilitation work continues in Manokwari herbarium and our monitoring procedure is being supplemented by digital images sent from the Head of the Biodiversity Studies Centre, Jack Wanggai (see Section 12). Please note the installation of capital equipment and consumables detailed in our previous budget, namely the computers for databasing and internet, dissecting microscope, air-conditioning, tiling, herbarium boxes and aluminium racks. The last were chosen in preference to our original plan of herbarium cupboards, after careful deliberation by Manokwari staff on the most appropriate equipment for their tropical conditions.

It is felt that contacts and training through networking within Kew and in the wider academic circuit may prove to form a flagstone in the exit strategy of the Papuan Plant Diversity Project as it completes its final year. In this vein two very effective study visits to Kew by Biodiversity Study Centre staff Agustina Arobaya (current manager of Manokwari Herbarium) and Maria Justina Sadsoeitoeboen were carried out in February and March. Maria specialises in the ethnobotany of Pandans and Bamboos; Agustina in the taxonomy of Papuan Orchids.

In addition to working on their chosen groups, they received thorough botanical training in several areas of the herbarium including the Spirit Collection, Loans and Processing, Pest Control, Digital imaging and Curation of specialist groups. Kew



South-East Asian Section staff worked together with them on plant identification in the herbarium, and introductory sessions were held in the Micropropagation Lab and Centre for Economic Botany. A visit to Kew by Denis Filer, the author of the BRAHMS herbarium database, allowed for a sound start to the installation of a professional database in Manokwari Herbarium. Agustina gave a presentation on her research on the Orchids of the Raja Ampat Archipelago in Papua, for which the specimens are being curated in Manokwari. An article recording this Darwin Initiative activity features in the April 2004 edition of *Kew Scientist* (enclosed with this Annual Report).

**Data Repatriation: Maria Justina Sadsoeitoeboen in Kew Palm and Pandans Section, taking measurements and digital images of *Pandanus* specimens**

Agustina and Maria have now returned to Manokwari, with eighteen books from UK and the full set of PROSEA (Plant Resources of South East Asia) purchased en route at discount price from Bogor Herbarium. The Darwin Initiative Papuan Plant Diversity Project is supporting their plans for herbarium databasing, curation, purchase of herbarium and plant-collecting equipment and further staff visits between the two institutions.



**Agustina Arobaya demonstrating Orchid morphology in Kew Princess of Wales Conservatory, February 2004**

Visas allowing, there is an opportunity for a herbarium techniques course in Manokwari later this year and also presentations to the Flora Malesiana Symposium in the Philippines in September.

There is further collaboration in the Kew-Leiden production of the Interactive Key to Malesian Plant Families. This is now in a testing version which is available on <http://www.rbgkew.org.uk/herbarium/keys/fm/>. Please download the program Intkey (there is a link to this on the above website), reboot and open the Interactive Key to Malesian Seed Plants. Feedback is welcomed and questions can be sent to Damien at [d.hicks@kew.org.uk](mailto:d.hicks@kew.org.uk). Specialists in Kew and Leiden are currently engaged in testing the key and it is hoped that input from other staff working in the Malesian region will contribute their expertise.

While the data matrix is being refined, the priorities for the key are for additional plant family images and character illustrations to assist the user with identification. The aim is to finish this process at the end of July, allowing six weeks for a production run of compact disks carrying the Darwin Initiative logo, which can then be distributed with presentation of the key in the Flora Malesiana Symposium in the Philippines in September. The provision of an identification and learning tool in this and other herbaria in the region will complement equipment and training provided to Manokwari staff, advancing the herbarium's capacity as the regional centre for Papuan Plant Diversity and providing an important legacy from this Darwin Initiative project.

Damien has also used time in UK to request specimens of the genus *Ilex* collected from New Guinea to be loaned to Kew from herbaria in Berlin, Harvard, Brisbane and Leiden. Taxonomic study has previously been done on this genus in parts of western Indonesia (Andrews 2002) but there is uncertainty as to the species present in New Guinea. He aims to have this geographical revision submitted for publication at the end of the year.

One of the computers bought with Darwin Initiative funding is being used by PPKH staff to produce their twice-yearly in-house journal, *Beccariana*. During the reporting period, Manokwari published one part (Volume 5, part 2), containing six articles in Indonesian:

1. Hamzah et al.: Use of plants for traditional medicine by people living in Manisnam Island of Manokwari.
2. Silvia Kesaulija et al.: Exploration of orchid species in the mangrove forest around Oransbari, Manokwari district.
3. Nega et al.: Exploration of palm species in the lowland forest of Bayeda District, Teluk Arguni.
4. Gusbager et al.: Palm species in the river basin of Tami, Arso Jayapura.
5. Wanggai et al. The use of plants from Mangrove forest by local people in Senebuay Vilage district of Rumberpon, Manokwari.
6. Duwila et al.: The use of three species for traditional boats by local people in Wariap Village District of Ransiki, Manokwari.

Please consult Annex 1 for a work plan for the next period.

## **5. Actions taken in response to previous reviews (if applicable)**

We have yet to receive feedback on the half- and annual year reports submitted to ECTF.

## **6. Partnerships**

Rudi Maturbongs will visit Kew in November 2004 together with Roy Banka (Lae Herbarium, Papua New Guinea herbarium) to complete the manuscript of the the field guide to New Guinea palms. This links the Darwin PPDP with the Palms of New Guinea project, and strengthens the partnership between Manokwari and its sister herbarium in PNG.

Partnerships form another crucial part of the exit strategy for Manokwari herbarium. Taxonomic contacts are continually sought to assist with specialist families and a consultancy relationship is being developed with the creator of the BRAHMS herbarium database program (<http://storage.plants.ox.ac.uk/brahms/>). The latter is specifically designed for herbaria and has the flexibility to facilitate sharing and dissemination of Manokwari's important data in a way deemed most appropriate by themselves.

A key contact this year has been Peter Edwards from the Tropical Asian section at Kew. He is now working with Ida Sinaga of Manokwari herbarium on a set of fern specimens which she collected from Papua and sent to Kew.

A footnote on the remarkable independence being shown in Manokwari is necessary here. It is apparent that staff there have responded to the reduced international presence by developing a culture of independence and competence which deserves recognition in the challenging post-Darwin Initiative period ahead.

## 7. Impact and Sustainability

On their return trip from UK through Java, Agustina Arobaya and Maria Justina Sadsoeitoeboen promoted further discussion of the project's objectives and rationale with government officials in Jakarta and herbarium staff in Bogor. We hope once more that this will both increase national support for the development of the project and smooth the application process for foreign nationals like ourselves who are seeking permits to work in and with Manokwari herbarium.

Manokwari staff are involved in plans to have a UniPa internet server installed on the campus, which could greatly assist ongoing work in the herbarium. Other important infrastructural plans include renovation of an old screenhouse, provision of water supply, increased security and a generator to run during electrical supply failures.

## 8. Post-Project Follow up Activities (max 300 words)

*This section should be completed ONLY if your project is nearing completion (penultimate or final year) and you wish to be considered to be invited to apply for Post Project Funding. Each year, a small number of Darwin projects will be invited to apply for funding. Selection of these projects will be based on promising project work, reviews to date, and your suggestions within this section. Further information on this scheme introduced in 2003 is available from the Darwin website.*

## 9. Outputs, Outcomes and Dissemination

**Table 1. Project Outputs (According to Standard Output Measures)**

Code No.	Quantity	Description
2	1	Rudi Maturbongs attains MSc, Jakarta
6a	2	Manokwari staff on Kew study visit
6b	8	February/March 2004
11a	2	Details below + 1 noted <i>in prep</i> in 2003 annual report
11b	2	Details below
16a	1	Details below
20	£6000	Scientific equipment and shipping thereof



**Table 2: Publications**

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
Journal	Banka, R. & W.J. Baker. A Monograph of the genus <i>Rhopaloblaste</i> (Arecaceae). In press. Kew Bulletin	<i>Kew Bulletin</i> Volume 59 <i>in prep</i>	W.Baker@rbgkew.org.uk	-
Journal	Hicks, D.M. 2004. A new species of <i>Ilex</i> (Aquifoliaceae) from Kebar Valley, Papua, New Guinea	<i>Kew Bulletin</i> Volume 59 <i>in prep</i>	D.Hicks@rbgkew.org.uk	-
*Journal	Hicks, D.M., Dransfield, J. & Baker, W.J. 2004. Update on the Darwin Initiative Papuan Plant Diversity Project	<i>Kew Scientist</i>	<a href="http://www.kew.org/kewscientist/">http://www.kew.org/kewscientist/</a>	-
*Journal	Dransfield, J. & W.J. Baker. 2003. An account of the Papuan species of <i>Calamus</i> (Arecaceae) with paired fruit	<i>Kew Bulletin</i> Volume 58	J.Dransfield@rbgkew.org.uk	-

## 10. Project Expenditure

**Table 3: Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)**

Item	Budget (please indicate which document you refer to if other than your project schedule)	Expenditure	Balance

Please refer to correspondence of 15 April 2004 with Mr D. Bennett, Project and Tax Accountant, RBG Kew.

## **11. Monitoring, Evaluation and Lessons**

Direct monitoring has largely been achieved this year through progress talks with visiting Manokwari staff and photographic evidence of installation of capital items. The herbarium database and curation backlog are clearly priorities now and the need for this is independently recognised with the Biodiversity Studies Centre. Kew's key roles now are in offering taxonomic and curation advice, searching for Manokwari literature requirements and assisting with planning for post-Darwin Initiative project activities.

The next indicators of achievement are of a functioning herbarium with Manokwari-specific curation manual and a routine pest-control regime. Additional to this, and a key institutional outcome for the Darwin Initiative project in Manokwari, would be the securing of management-level university commitment for maintaining staffing of the six crucial herbarium posts. From this credible and stable point the exciting period of fieldwork, collection and description of Papua's under-researched and diverse flora by these indigenous experts can continue unabated.

Evaluation will follow face-to-face contact with Manokwari personnel on their visits to Kew, the Flora Malesiana Symposium in September and a final trip by Kew staff to Manokwari planned for the second half of 2004.

## **12. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum)**

### **■ I agree for ECTF and the Darwin Secretariat to publish the content of this section**

The enclosed article has been completed by Manokwari Herbarium staff. It reveals the outstanding capacity for independent work which has developed in Manokwari Herbarium during a time of minimal assistance on the ground. This competence may be the critical factor ensuring sustainability of this valuable biodiversity resource after Darwin Initiative support.



## ***Annex 1: Workplan***

### **May 2004 – August 2004**

- Project co-ordinator continues work at RBG Kew. Submits Interactive Key to Malesian Seed Plant Families for CD production at end of July, continues work on regional revision of New Guinea Aquifoliaceae, and commences visa applications with Manokwari contacts for visit to Papua in second half of 2004.
- Acquisition and installation of physical assets and consumables for Manokwari Herbarium completed. Further investigation of possibilities for obtaining donations/free copies of literature requested by PPKH (please see Annex 2).
- Facilitation with Oxford Forestry Institute for PPKH staff to database their herbarium collections with BRAHMS software.
- Support to PPKH to produce Herbarium Curation Manual in Bahasa Indonesia.
- Joint Kew/PPKH feasibility assessment of Herbarium Techniques Course and associated field trip to Kebar Valley in 2004, given implications of current elections in Indonesia. The course would run for three weeks and be staffed by two to three additional RBG Kew personnel in addition to project co-ordinator.
- Preparation for final visit to Manokwari: to consolidate good practice, monitor Herbarium function and conduct further talks with Herbarium Technicians, PPKH staff, UniPa staff and local government officials regarding institutional needs of the herbarium.
- Liaison and facilitation for PPKH team to attend Flora Malesiana Symposium. R. Maturbongs and N. Sinaga to attend with Kew contingent.

### **September 2004 – December 2004**

- Herbarium database continued.
- Flora Malesiana Symposium, Manila, September 20<sup>th</sup>-25<sup>th</sup>: Presentation of Interactive Key to Malesian Seed Plants with dissemination of CD's to delegates; PPKH staff give progress talks on Papuan Plant Diversity Project.
- Plans for post-Darwin Initiative continuation for Manokwari Herbarium. Liaison with other regional herbaria and Kew Tropical Asian Section.
- Wider dissemination and follow-up work on Interactive Key to Malesian Seed Plants.
- Further investigation of post-Darwin Initiative funding for Manokwari Herbarium running costs, with increased exposure of PPKH activities through e.g. web presence.
- Processing of specimens and pest control regime are in routine operation.
- Final check for Herbarium equipment needs
- R. Maturbongs and R. Banka to visit Kew for 4 weeks to finalise collaborative work on the Field Guide to the Palms and Rattans of New Guinea (funded through Palms of New Guinea Project).
- December: Field Guide to the Palms and Rattans of New Guinea submitted; Aquifoliaceae of New Guinea submitted.
- Project co-ordinator compiles Final Report.

## ***Annex 2: PPKH Manokwari book requirements***

A glossary of botanical terms (rprnt 1971) BD Jackson  
A manual of the grasses of New Guinea (1969) EE Henty  
Design and analysis of ecological experiments (2001) SM Scheiner  
Ecological dynamics (1998) Gurney  
Ecology of mangroves (1987) P Huctings. University of Queensland  
Flowering plants of the world (1993) Heywood  
Freshwater plants of PNG (1985) Leach & Osbourne  
Global status of mangrove ecosystems (1983) P Saenger et al. IUCN Commission on Ecology Paper No.3  
Insect pests in museums (1994) D Pinniger  
Integrated pest management (1998) D Pinniger & P Winson  
Island biogeography (1998) RJ Whittaker  
Keys to the families and genera of higher plants in NG (1959) van Royen  
Mammals of New Guinea (1995) T.Flannery  
Managed ecosystems (1999) Hatch  
Mangrove forests of the Malay peninsula(1928)J Watson.Malayan forest record No.6  
Manual of the forest trees of Papua and NG (1964) P van Royen. Dept. of Forests.  
Manual of the larger and more important non-dipterocarp trees of Central Kalimantan, Indonesia (vol's 1 and 2) Argent et al. FRI Samarinda  
New Guinea Vegetation (1976) K.Paijmans, Ed.  
Palms of Malaya (1998) TC Whitmore  
Palms throughout the world (1995) D Jones  
Pisang-pisang liar di Indonesia (LIPI, 2001) Nasution\_RE, Yamada\_I  
Plant Form (1993) A Bell  
Standards in the museum care of biological collections (1992) Museums & Galleries Commission  
Structure and function of an alpine ecosystem (2001) Bowman  
The Alpine Flora of New Guinea (1979 - 83) van Royen ... 4 volumes  
The biology of Mangroves (1999) PJ Hogarth  
The birds of New Guinea (1986) Beehler, Pratt & Zimmerman  
The botany of mangroves (1986) P Tomlinson  
The mangrove ecosystem: research methods (1984) S Snedaker. UNESCO - YR  
The plant book (1997) DJ Mabberley  
The structural biology of palms (1990) PB Tomlinson  
Tree flora for Indonesia: Checklist for Irian Jaya (1997) TC Whitmore et al.  
Tree flora of Malaya series ed. TC Whitmore  
Tree flora of Sabah and Sarawak series. Seopadmo et al

**Annex 3: Report of progress and achievements against Logical Framework for Financial Year: 2003/2004**

Project summary	Measurable Indicators	Progress and Achievements April 2003-Mar 2004	Actions required/planned for next period
<p><b>Goal:</b> To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve</p> <ul style="list-style-type: none"> <li>• The conservation of biological diversity,</li> <li>• The sustainable use of its components, and</li> <li>• The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</li> </ul>			
<p><b>Purpose</b></p> <p>To build capacity in plant diversity research at the Biodiversity Study Centre, Manokwari through the rehabilitation of the Herbarium, the renovation and development of the Herbarium collections and through the training of staff in curation and research.</p>	<p>Increase in use of Herbarium; expansion of Herbarium; Herbarium recurated to international standards; staff expertise called upon; staff conducting research independently.</p>	<p>Increased activity in herbarium as rooms and offices renovated. Fieldwork planned to follow instigation of professional curation regime. Manokwari staff competent and moving forward work in specialist taxonomic areas. Manokwari herbarium manager gives presentation at Kew</p>	<p>Manokwari staff to attend Flora Malesiana Symposium, September 2004. Encouragement of independent research for Manokwari staff. Further Kew staff visits to Manokwari – smooth bureaucratic obstacles to attempt to make Herbarium Techniques Course a reality.</p>
<p><b>Outputs</b></p>			
<p>Herbarium curated and managed to international standards</p>	<p>Specimens preserved; pests under control.</p>	<p>Capital equipment in place to serve herbarium curation.</p>	<p>Herbarium backlog tackled and professional herbarium routine established.</p>
<p>Herbarium database</p>	<p>Database started and updated.</p>	<p>Database started – collaboration instigated with expert help mechanism provided</p>	<p>New collections to be accessioned, databased and therefore form part of a growing resource</p>

Palm and rattan field guide; Field guide to Papuan seed plant families.	Field guides published.	Work continuing on palm and rattan field guide – another PNG and Papua study visit this year. Malaysian Seed Plant Family guide is in final testing stage.	Field guides published.
Skills transferred; research collaborations established.	Manokwari staff working with overseas specialists.	Collaboration of Manokwari-Kew Fern and Palm specialists, with exchange of specimens.	Further collaborations established