



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

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

## ***Annual Report***

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

Project title	<i>UK Darwin Initiative Papuan Plant Diversity Project</i>
Country(ies)	<i>Papua, Indonesia</i>
Contractor	<i>Royal Botanic Gardens, Kew (RBG Kew)</i>
Project Reference No.	<i>162/10/018</i>
Grant Value	<i>£147990</i>
Start/Finishing dates	<i>10/2001 – 10/2004</i>
Reporting period	<i>October 2002 – May 2003</i>

### **2. Project Background**

The Herbarium is at the Biodiversity Study Centre (PSKH), Universitas Negeri Papua (UniPa), Manokwari, Papua, Indonesia. This is the only plant diversity reference collection in Papua, one of the least studied and most diverse areas of the humid tropics. Its important collections of nearly 20 000 specimens are in urgent need of rehabilitation.

### **3. Project Objectives**

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 the 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.

The objectives and operational plan remain the same as originally conceived, though some modifications to implementation have been made with approval from the Darwin Secretariat.

### **4. Progress**

The co-ordinator's planned second trip to Manokwari was derailed by security alerts following the bomb in Bali in October 2002. Subsequent international instability and concurrent events in Indonesia have maintained obstacles to travel but we are optimistic that a July departure from UK will not be resisted by immigration authorities in Jakarta. This will allow adequate preparation on the ground for the Herbarium Techniques Course, now planned for September, for which Damien Hicks will be joined by four other Kew staff for one month.

Two Manokwari staff members have just returned to Indonesia following a month-long visit to Kew under the auspices of the Palms of New Guinea Project. This provided a good opportunity to monitor progress in the herbarium and a budget has been negotiated and now implemented for continuation work. Books and equipment are being transported back to Manokwari, and some purchase of capital items is to be made by staff members returning via Jakarta. Transportation and communication is difficult in Papua and most of the herbarium equipment must be shipped over from Jakarta.

The lack of wider development of the University in Manokwari (UniPa), of which the herbarium is a part, has been identified as a recurrent obstacle to progress. Funding for UniPa for this sort of basic infrastructural work could clear the way for speedy and effective capacity-building in this and other related faculties of the institution, and staff at Kew have been investigating opportunities for acting as a catalyst for this sort of investment. A presentation on the Darwin Initiative Papuan Plant Diversity Project was given to a BP representative invited to Kew, and there is potential for application for Indo-Melanesian trust funds for next year.

Extended-duration working visas continue to be difficult to obtain for any foreigners wishing to work in Papua, and the decision still lies with immigration authorities in Jakarta. Whilst fieldwork permits are unlikely to be granted now, liaison by Manokwari staff with the local government in Papua, and the Education Department and Intelligence Section in Jakarta, may facilitate the progress of paperwork.

Damien Hicks visited Leiden again in January to continue work on the Interactive Key to Malesian Seed Plants with collaborators in the Rijksherbarium. Images have been donated to the project from various authors in Kew and Leiden, and DH is creating and maintaining the database and copyright agreements for these. The format is similar to that used by L. Watson & M.J. Dallwitz for their 'Interactive Key to the Families of Flowering Plants of the World' (<http://biodiversity.uno.edu/delta/angio/index.htm>), using a critical selection both of their data and of M.J.J. van Balgooy's 'Malesian Seed Plants' as a framework.

Running specimens through the prototype key as well as checking and rescoreing of characters and taxa, may prove to be the lengthiest but important tasks, but experimenting with real specimens can effectively also be done by contacts in other herbaria in Malesia and elsewhere.

There is a clear need for identification tools in the Malesian region and such a product is vindication of a capacity-building approach. The assemblage of a functioning well-equipped herbaria, with trained curators who have this means to identify and classify the new and old specimens which they deal with, could produce the sort of centre of excellence for Papuan biodiversity which will serve as a foundation for future research and consultation.

Please see Appendix 1 for a screen shot of the key in progress. A preliminary draft version of the key is scheduled to be produced in July, with a beta version ready for presentation at the Flora Malesiana conference in the Philippines in February 2004. A poster presented by one of the Kew collaborators on the key was well received at the symposium on Asian botany in California in March 2003.

Please consult Appendix 2 for a work plan for the next period.

## 5. Partnerships

Long distance management is continuing and there may indeed be some advantages to this change from the originally planned stay of half of every year. A climate of trust is engendering the sort of project ownership and independence that will be key to our exit strategy.

Collaboration with other regional herbaria may become an important factor in sustainability of the network of Indo-malesian herbaria. Kew has historically a good relationship with several of these, including Bogor and Lae, and staff continue to work to nurture these relationships.

Staff at Kew are facilitating communication on botanical diversity issues between UniPa and BP. The latter have current interest in Papua regarding the development of their Tangguh liquid natural gas project, and are pursuing a consultative approach with environmental impact assessment. It is felt that there may be an opportunity here for synergistic collaboration.

Manokwari staff are keen to build on relationships with NGO's involved with biodiversity in Papua, such as WWF and TNC, to encourage information-sharing with our continuing work.

## 6. Impact and Sustainability

We consider that constantly stressing the importance of the Darwin Initiative Papuan Plant Diversity Project with key stakeholders in Papua and Indonesia will result in benefits for our current and future activities. Manokwari Herbarium staff are in the process of arranging discussions with their local government, newly empowered by a national policy of autonomy, regarding the project. The head of UniPa is well-connected with the traditional establishment of the region, and one staff member has connections with the intelligence bureau in Jakarta.

Increasing interest for biodiversity and the herbarium is suggested by the retention of the Head of the Biodiversity Studies Centre (PSKH) under the current UniPa staff structure, by continuing communications from PSKH staff and by a recent shipment of herbarium material on loan to Kew.

## 7. 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 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 comments within this section. Further information on this scheme is available from the DEFRA website.*

- From project progress so far, what follow-up activities would help to embed or consolidate the results of your Darwin project and why would you consider these as suitable for Darwin Post Project Funding?
- What evidence is there of strong commitment and capacity by host country partners to enable them to play a major role in follow-up activities?

## 8. Outputs, Outcomes and Dissemination

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

Code No.	Quantity	Description
Herbarium Resources		Acid-free paper, specimen folder bags, hand-held microscopes, voltage stabilisers
Collecting Equipment		Secateurs, binoculars, pole-saws, slide film
Dissecting Microscope	1	Nikon SMZ645/660
Technician incentive	8 staff	Daily food and drink for the crucial herbarium technicians for a 6 month period of continuation work
Staff trip from MAN to JKT	1	Item acquisition and processing of visas

The above are in process of being purchased by Manokwari staff in Jakarta. Several major infrastructural problems have been identified on the UniPa campus, including an irregular electricity supply, internet and telephone communication, transportation. We have bought voltage stabilisers to deal with the former and are considering the need for a generator. The purchase and maintenance of a UniPa internet server might assist internet and email access, but telephonic communication is at present insoluble. Transportation will continue to be difficult in this underdeveloped region for some time – a herbarium vehicle has been requested but is not feasible within the bounds of this project.

**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	A revision of the <i>Calamus aruensis</i> (Arecaceae) complex in New Guinea and the Pacific (2003) WJ Baker, RP Bayton, J Dransfield, RA Maturbongs	Kew Bulletin 58 in prep	W.Baker@rbgkew.org.uk	-

## 9. Project Expenditure

**Table 3: Project expenditure during the reporting period: October - April**

Item	Budget	Expenditure
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## 10. Monitoring, Evaluation and Lessons

When visas are secured the immediate indicators of achievements will be the advancement of curation expertise in Manokwari herbarium through the certificated Kew Herbarium Techniques Course, the instalment of capital items, tackling of specimen backlog, the instigation of BRAHMS database and increased contact between Manokwari and Kew specialists. Perhaps also we might hope that a greater level of interest in government circles of Papua and Jakarta could further success.

## 11. Author(s) / Date

May 2003

## Appendix 1: Screen shot of Malesian Key in progress

**INTKEY :**

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# I ? S L1 L2 ST AF

**Best Characters (33)**

- 1.00 180. flowers (inflorescence, general description: data in process of development)
- 0.81 692. (Flower) Ovary inferior
- 0.81 707. Leaf margin dentate - serrate
- 0.72 215. perianth (regardless of its morphological interpretation, total number of parts: 'many' encoded as -50 or more)
- 0.65 268. androecium (of male-fertile flowers, number of members including any staminodes: 'many' encoded as -50 or more)
- 0.65 244. corolla (number of petals or segments: 'many' encoded as -50 or more)
- 0.57 214. perianth (presence/absence, constitution: beware states 1/3-5, especially in relation to Monocots)
- 0.52 351. styles (number: intended for syncarpous gynoecia)
- 0.50 399. fruit (syncarpous, dehiscence)
- 0.45 54. leaves (compound form)
- 0.42 299. anthers (manner of dehiscence)
- 0.35 43. leaves (whether petiolate)
- 0.35 61. (leaf) lamina (basic vein layout: in compound leaves, refers to the entire leaf, not individual leaflets)
- 0.33 37. leaves (insertion)
- 0.33 197. flowers (symmetry of K, C and A, exclusive of G)
- 0.33 257. corolla (symmetry)
- 0.33 333. gynoecium (constitution: less precise but more accessible than the alternative, preferred version)
- 0.28 288. stamens (fertile only, number relative to the perianth - irrespective of relative position/symmetry)
- 0.25 31. hydrophytic habitat
- 0.25 64. leaves (whether ligulate)
- 0.25 178. flowers (aggregation)

**Remaining Taxa (4)**

- 57. Anacardiaceae
- 206. Araliaceae
- 370. Burseraceae
- 631. Cycadaceae

**Used Characters (5)**

- 335. gynoecium (1) superior
- 5. habit (1) trees
- 226. calyx 3
- 51. leaves (2) compound
- 708. Resinous exudate (2) present

**Eliminated Taxa (589)**

- (1) 87. Androstachyaceae
- (1) 276. Balanophoraceae
- (1) 440. Cecropiaceae
- (1) 483. Cleomaceae
- (1) 545. Coniferae
- (1) 613. Cunoniaceae
- (1) 625. Cupressaceae
- (1) 975. Gnetaceae
- (1) 986. Bambusoideae
- (1) 1021. Haloragaceae
- (1) 1113. Julianaceae
- (1) 1120. Labiatae
- (1) 1162. Leguminosae-Caesalpinioideae

**Notes:**

Choices are made by the user in the top left hand box, which currently contains a selection of what we feel to be a priority list of characters selected from Watson & Dallwitz (1992 onwards) and Max van Balgooy (1997).

The 'remaining taxa' box at top right is the feedback to the user searching for identification of their specimen. The finished product will key out to families and also to groups of higher taxa where efficient to do so.

Our remit is to have all characters and states fully illustrated, with representative images and family descriptions for each taxa.



## **Appendix 2: Framework**

### **May 2003 – May 2004**

- Project co-ordinator continues work at RBG Kew. Continues work on guide to families of New Guinea seed plants and prepares for second visit to Manokwari.
- July 2003, project co-ordinator to Manokwari for six months, continues with work as described above, including field trips where visa allows.
- Further acquisition and installation of physical assets and consumables (10 herbarium cupboards, microscope).
- Herbarium database installed.
- Occasional lectures to UniPa students given by project co-ordinator.
- September 2003, project leader to Manokwari for four weeks to discuss progress and participate in fieldwork. Concurrent with Herbarium Techniques Course, staffed by three additional RBG Kew personnel.
- Curation of material collected.
- Late 2003, R. Maturbongs and C. Heatubun visit R. Banka at the Papua New Guinea Forest Research Institute for two weeks to continue collaboration on the Field Guide to the Palms and Rattans of New Guinea.
- End 2003 project co-ordinator returns to RBG Kew.
- Approximately six papers submitted to peer-reviewed journals.
- Project co-ordinator compiles Annual Report.

### **May 2004 – December 2004**

- Project co-ordinator continues work at RBG Kew, naming specimens from Manokwari, distributing duplicate specimens, informing Manokwari of identifications, working on repatriation of New Guinea plant data from RBG Kew as required (e.g. key literature, type photographs, duplicates), continues work on guide to families of New Guinea seed plants, prepares for third and final visit to Manokwari.
- May 2004, R. Maturbongs and C. Heatubun visit RBG Kew for one month, and R. Banka for 4 months to finalise Field Guide to Palms and Rattans of New Guinea with J. Dransfield and W. Baker (funded through Palms of New Guinea Project).
- July 2004, project co-ordinator to Manokwari for four months, continues with work described above, including one field trip.
- Further acquisition and installation of physical assets and consumables (5 herbarium cupboards, etc).
- Herbarium database continued.
- Occasional lectures to UNIPA students given by project co-ordinator.
- September 2004, project leader and W. Baker to Manokwari for 2 weeks for supervisory visit, concluding workshop and finalising exit strategy.

- October 2004, project co-ordinator returns to RBG Kew to finalise Field Guide to the Families of Papuasian Seed Plants
- December 2004, Field Guide to the Palms and Rattans of New Guinea and Field Guide to the Families of Papuasian Seed Plants published.
- Approximately six papers submitted to peer-reviewed journals.
- Six papers submitted in year 2 published.
- Project co-ordinator compiles Final Report.