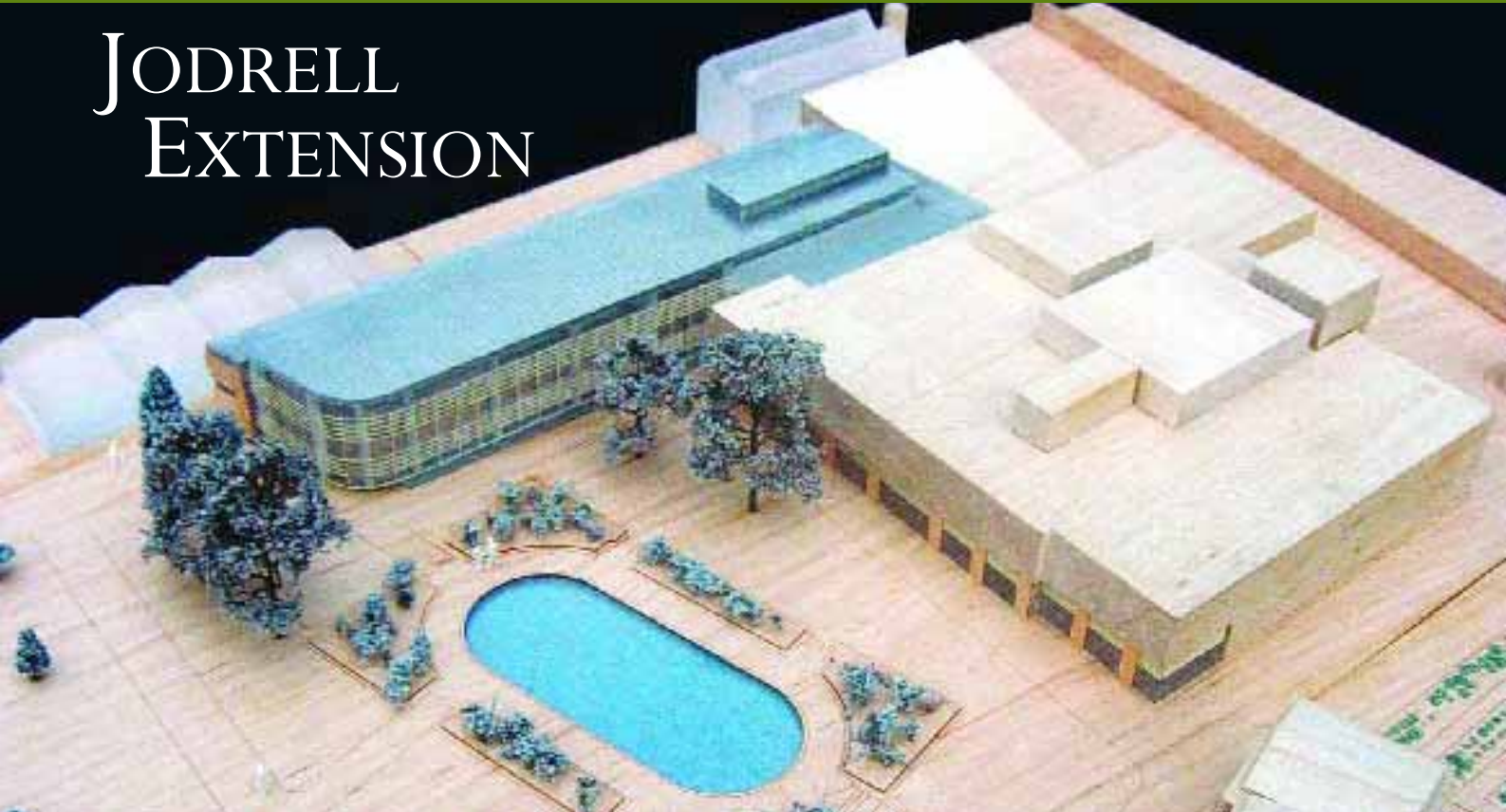


JODRELL EXTENSION



A model of the planned extension – an innovative design by architects Wilkinson Eyre.

Kew's original Jodrell Laboratory, a small structure of c. 150 square metres founded in 1876, was replaced by a new building of c. 1,000 square metres in 1965. A major extension adding c. 2,000 square metres was opened by H.M. the Queen in March 1994. This was designed to encourage interdisciplinary research, and included Kew's first purpose-built laboratory for plant molecular research.

Now a further extension to the Jodrell Laboratory is needed to ensure Kew's research remains at the cutting edge and addresses pressing global problems. The new extension will increase the size of the building by c. 2,200 square metres, over three floors.

The retirement of Michael Bennett (Keeper of the Jodrell Laboratory), due in October 2003, was postponed to fast-track science team planning until the project is completed.

Planning approval was granted in November 2003. Costing £6 million, the project will be funded by a combination of public and private sources, including a major grant from the Wolfson Foundation and substantial grant-in-aid from Defra. Construction is expected to begin in Autumn 2004 for completion by Spring 2006.

The new extension will enable

- 1 An expansion and modernisation of research laboratories, including Conservation Genetics.
- 2 The physical integration of Kew's Mycology, Palynology and Economic Botany groups with other Jodrell Department sections to provide more efficient working practices.
- 3 Additional space with improved facilities to attract and house new staff with new skills.
- 4 The opportunity to develop an internationally pre-eminent mycology programme, with appropriate staff and resources to capitalize on Kew's unparalleled collections of fungi.
- 5 The consolidation of several specialist research libraries into one.
- 6 The opportunity for sharing specialist equipment.
- 7 The expansion of Kew's science training programme by providing extra room for visiting scientists and students.

Contact: Prof. Michael Bennett (m.bennett@kew.org)

£1.25 million Wolfson Grant

In April, the Royal Botanic Gardens Kew announced the offer of a £1.25 million grant from the Wolfson Foundation towards the £6 million new Jodrell extension. This generous grant enables new science synergy and will extend and enhance the capability of Kew's internationally renowned plant science programme.

Kew's Director, Peter Crane, said:

'The new Jodrell will have the highest concentration of internationally renowned experts working in the fields of plant and fungal diversity, using the most modern techniques. We are deeply grateful to the Wolfson Foundation, who immediately understood the importance of the project and the far-reaching benefits it will achieve – new levels of collaboration and synergy at Kew – and within an architecturally sensitive design.'



Director's Message Responsibilities & Reaching Out

The diverse activities of the Royal Botanic Gardens Kew are guided by a few simple principles, most importantly the significance of plant diversity and the need to ensure that it is conserved and used in sustainable ways for human benefit – based on the best possible science. We also believe that building knowledge of plant diversity through research, and building understanding of plant diversity through education, should be intimately linked. Our visitors should come to understand not only what we know about the world of plants, but also how we come to know it.

Another important guide in the development of our programmes is the old legal adage 'where there is a right, there is a duty, where there is privilege, there is responsibility.' Working at Kew, with its incomparable collections and other resources, is a huge privilege, but we all recognise that with that privilege comes responsibilities. In particular we have the responsibility to share Kew's resources with the broadest possible public, and to connect our scientific efforts to important issues that people care about.

This issue of *Kew Scientist* highlights just a few of the many ways in which we are seeking to fulfil our broad responsibilities as public servants: from the development of new facilities to attract different audiences, to working to reduce the illegal exploitation of plants. Especially important in the coming months will be the development of 'Climbers & Creepers' – a new activity centre for children focusing on the interactions between plants and animals, and the importance of those interactions for wildlife conservation.

For many people who live in West London the physical image of Kew is simply that of a beautiful garden surrounded by an imposing brick wall. It is increasingly important that we reach beyond our walls and also enable our visitors to understand the full breadth of Kew's work. For outreach, we are investing heavily in the electronic dissemination of information so that our research and our resources can be delivered to the widest possible audience. To help change perspectives, we are developing new kinds of public programmes that may be surprising, or even challenging, compared to what we have done in the past. The new look of this issue of *Kew Scientist* is also a manifestation of this desire to change perceptions and pursue a new approach: one that emphasises our responsibility to share Kew with the world, and our duty to make everyone feel welcome.

Prof. Peter R. Crane FRS, Director

Expertise and Education

The expertise developed by Kew's scientists can achieve recognition with awards. It provides a source of botanical advice for government and non-government organisations, in the UK and abroad, on issues ranging from forensic enquiries to the sustainable uses of British plants. More recently Kew's expertise is forming the basis of new education initiatives.

Awards

The Linnean Society of London has awarded the Linnean Medal for Botany to John Dransfield in recognition of his exceptional contributions to palm biology and tropical botany as a whole. John, who leads Kew's palm team, is widely acknowledged as a world expert on palms and is the author of over 200 scientific papers, eight books and numerous floristic treatments: his name is attached to 287 taxonomic names, mostly palms. The quality and integrity of John's science alone merited this high-level recognition but his impact is far broader, having made lasting impressions on the people and organisations that interact with him.

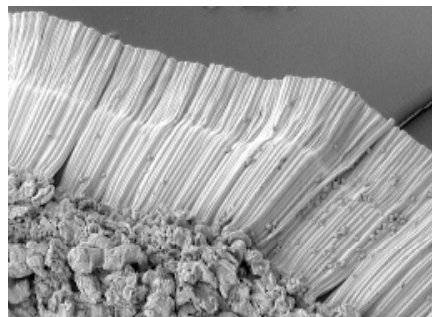
The Linnean Society has also awarded Lucy Smith the Jill Smythies Award for Botanical Illustration in recognition of her outstanding achievement as a botanical artist. Lucy has been producing illustrations for Kew, mostly for the Palms of New Guinea Project, since completing her Masters in Creative Arts in 1999.



John Dransfield, awarded the Linnean Medal.

Rory McBurney, a nutritionist in Kew's Drylands Group, has received the Young Scientist in Public Health Nutrition award from the British Nutrition Foundation for his work in developing countries. The award was presented by HRH The Princess Royal on 3 December 2003 at the City Conference Centre, London.

Adam Enquiry



Macrosclerids in the testa of *Physostigma venenosum*.

Botanical expertise at Kew is sometimes called upon to help with criminal investigations. Last year the UK police Forensic Science Service asked Kew's anatomists to examine scanning electron micrographs of plant fragments from the intestines of 'Adam', the boy whose mutilated body was found in the Thames in 2001. Identification of the fragments seemed difficult, but some months later Hazel Wilkinson noticed a similarity with certain cells in the seed coat of *Physostigma venenosum* (the deadly Calabar bean from tropical West Africa once used as an ordeal poison). Since this breakthrough, Hazel has been examining actual intestinal contents from Adam and has found fragments showing features characteristic of the fruit endocarp in several genera of Apiaceae. Other fragments seem to match cells from seeds of some Solanaceae, such as *Datura* and *Hyoscyamus*.

Contact: Dr Peter Gasson (p.gasson@kew.org)

Wildlife Crime

Elliott Morley MP (Minister for Environment & Agri-Environment, Department for Environment, Food & Rural Affairs; Defra) and Richard Brunstrom (chairman of the Association of Chief Police Officers and Chief Constable for North Wales) were among 140 participants at the third Partnership for Action Against Wildlife Crime (PAW) Seminar on 23 February 2004, hosted at Kew in conjunction with Defra. The Conventions and Policy Section presented Kew's work with Defra and HM Customs & Excise that is helping to combat wildlife crime, including the production of enforcement guides and posters for CITES-listed timber species.

Contact: Madeiline Groves (m.groves@kew.org)
www.defra.gov.uk/paw/default.htm

Lydia White holding the CITES poster on *Swietenia macrophylla* that she helped produce for HM Customs & Excise.



Green DNA

The one-day Continuing Professional Development course for secondary school teachers and technicians, 'Green DNA' (supported by Bio-Rad and ASE), was run again twice at Kew during March 2004. Developed by John Ellison (Kew) and Roger Delpach (Science and Plants for Schools and Haberdashers Aske's School in Elstree), the course shows how school students can make easily understood and inexpensive practical investigations to inspire an interest in plant sciences. These range from DNA extraction and analysis by electrophoresis to use of free molecular graphics software. The course, first held in March 2003 as part of the BBSRC-supported events celebrating 50 years of DNA research, evolved from Kew's molecular systematics research and shows the value of a taxonomic approach through easily accessible CD and web-based genomics and proteomics software. A CD-ROM containing all technical manuals, course notes and software is provided for participants.

Contact: John Ellison (j.ellison@kew.org)



Students on the 'Green DNA' course

Seed Conservation Web Course...

An internet-based course has been launched by Londonlearning and Kew which will enable advanced-level students to gain a BTEC qualification in seed conservation science. The course content, created by science and education staff at the Millennium Seed Bank Project, will enable students to discover how scientists in different countries undertake seed collection and conservation, and encourage them to undertake wider research in this field. Details: www.london-learning.com

...and book

The proceedings of the 2001 conference on seed conservation at Wakehurst Place have been published as *Seed Conservation, turning science into practice* (Eds R.D. Smith, J.B.

Dickie & S.H. Linnington; RBG Kew). The 1056-page volume reviews the current scientific knowledge that underpins seed banking technology. ISBN 1 84246 052 8, £120.

Details: www.kewbooks.com



Computer graphic of the Climbers & Creepers play zone.

Climbers & Creepers

Kew is making a new commitment to engaging young children in learning about plant and animal relationships through a major new attraction opening on 29 June this year. To be called 'Climbers & Creepers', it will be the UK's first interactive botanical play zone. An adventure landscape will enable children to explore some of the dynamic relationships between plants and the insects and other animals they need to complete their life cycles. The themes to be explored include pollination, carnivorous plants, uses of plant materials in animal nests, an introduction to cultivation and simple aspects of plant identification. It is intended for children between the ages of three and nine, accompanied by adults.

Contact: John Lonsdale (j.lonsdale@kew.org)

Nucleus Group

Kew has joined a science education network known as 'Nucleus'. This network brings together education and communications staff from several key academic and research institutes interested in promoting 'cutting-edge' science to teachers and students. The aim is to inspire more children to choose science as a career. The 'Nucleus' team co-ordinated a day of lectures by renowned academics at the last Association of Science Education (ASE) conference in Jan 2004, and they are currently developing a similar exercise for the 2005 ASE conference. The theme will be 'Feeding the World? Curing the World?', and the lectures will explore the importance of science research and its social and ethical impact.

Contact: Gail Bromley (g.bromley@kew.org)

Britain's Wild Harvest

There is growing public and government demand for changes in agricultural policies that encourage more diversified and sustainable land management. In response to this, a Countryside Agency-funded study at Kew has examined commercial products from about 130 wild or traditionally managed plant and fungus species. These include thatching material from *Phragmites australis*, the many products from coppiced deciduous woodland species, seeds for meadow restoration from herbs, drinks from *Sambucus nigra*, and fungi sold to restaurants.

The study concludes that the main threats to commercial use are conflicts between landowners and harvesters, competition from synthetic substitutes and foreign imports, and lack of marketing skills. Most harvesting is sustainable and some could be expanded, for example through the creation of reedbeds that meet both the demand for thatching material and the objectives of UK biodiversity action plans. Research is needed on the effects of certain harvesting, for example *Porphyra umbilicalis* (edible laver), *Salicornia* spp (marsh samphire), calcified seaweeds dredged for fertiliser, and bryophytes used for decorative purposes.

Most employment associated with wild harvesting is seasonal. The harvesters are generally highly motivated and committed to the sustainability of their trade. Since completion of this study, sustainable use of UK species has been incorporated into the UK's response to the Global Strategy for Plant Conservation, and a book based on this work by Hew Prendergast and Helen Sanderson entitled *Britain's Wild Harvest* was launched in February at Ashdown Forest.

Contact: Helen Sanderson (h.sanderson@kew.org)

Britain's Wild Harvest. H. Prendergast & H. Sanderson; RBG Kew. ISBN: 1 84246 072 2, £9.95. From www.kewbooks.com

Harvesting *Schoenoplectus lacustris* (club rush) on the Great Ouse river.



Evolution

Molecules & Micromorphology

It is ten years since the first large scale *rbcl*-based plant phylogenetic tree was published. Since then DNA-based phylogenetic trees have been used to reclassify all families of flowering plants, discover potential candidates for the ancestral flower and identify molecular living fossils. This decade of progress in plant molecular phylogenetics has been reviewed by Vincent Savolainen and Mark Chase in *Trends in Genetics* 19, 717 (2003). Progress continues with recent publications co-authored by Kew including angiosperm origins and a new or did classification.

Origins

The evolutionary origins of angiosperms and the causes of their diversity were described by Darwin as an 'abominable mystery' in a letter dated 22 July 1879 addressed to J. Hooker, then Director of Kew. This mystery has been revealed in a new evolutionary super-tree of flowering plants produced by Jonathan Davies, Tim Barraclough (Imperial College and Kew), Pam and Doug Soltis (University of Florida) and Mark Chase and Vincent Savolainen (Kew) and published to coincide with Darwin's birthday on 12 February. By including all families of plants, the study shows how diversity varies markedly among even closely related families, indicating that the tendency to accumulate lots of species is not a fixed attribute of major groups of plants. Instead, it depends on the interaction between biological attributes and the environment plants find themselves in – being the right plant in the right place at the right time. *Proc. Natl Acad. Sci. USA* 101, 1904 (2004).

Contact: Dr Vincent Savolainen
(v.savolainen@kew.org)

Jonathan Davies successfully completed his PhD on this topic in January 2004, under co-supervision from Kew and Imperial College London.

New Angiosperm Analysis Published

As a new international collaborative effort, a large scale phylogenetic tree for all major lineages of angiosperms has been published based on plastid *matK* gene information. The *matK* gene has three times more variable sites than the widely used plastid genes *rbcl* and *atpB*; it also has high rates of non-synonymous substitutions and a ratio of transitions to transversions that approaches unity.

The results are in broad agreement with previous molecular phylogenetic work, for example *Amborella* is sister to all other angiosperms, followed by a grade of Nymphaeales and Austrobaileyales. A crown group within core eudicots are also resolved by *matK* sequences comprising Berberidopsidaceae/Aextoxicaceae, Santalales, Caryophyllales, rosids and asterids, including a sister group relationship between Caryophyllales and asterids. Combined

Extinctions

The issue of when a species becomes extinct is interesting. Did dinosaurs all go in a 'bang', or is their slow disappearance before the KT boundary genuine and not a reflection of uneven and incomplete sampling? How long do rare species linger in forest fragments or on islands? In most cases, the extinction of a species is not directly observed; therefore extinction times have to be inferred from records of sightings or biological collections. Recently Dave Roberts (Kew) and Andrew Solow (Woods Hole Oceanographic Institute) have shown how a method known as optimal linear estimation (OLE) can be used to date extinction events. They used the best-known modern extinction, that of the dodo, and estimated the date of extinction at 1690, based on sighting records. The method of OLE is also being used to date plant lineages based on fossil records, as well as studying species range distributions and the effects of climatic change. *Nature* 426, 245 (2003).

Contact: Dr Dave Roberts (d.roberts@kew.org)

analyses of *matK* and other DNA regions have high potential to enhance resolution and internal support in deep-level angiosperm phylogenetics and provide additional insights into angiosperm evolution. *Amer. J. Bot.* 90, 1758 (2003).

Contact: Dr Vincent Savolainen
(v.savolainen@kew.org)

Fruits of *Amborella trichopoda* (Amborellaceae), the species sister to all other angiosperms.



M. Chase



Odontoglossum odoratum

Tree of Life

Kew continues to co-ordinate efforts of the European phylogenetic and taxonomic community aimed at submitting a large bid to the European Commission on Assembling the Tree of Life (AToL). The US National Science Foundation has now awarded about 43 million US dollars within its AToL programme, and it is urgent that European systematists can complement US initiatives in the spirit of making AToL a truly international effort. The Steering Committee of AToL met in Padua, Italy, in January 2004, and a selection of best sub-proposals covering major taxa and bioinformatics topics will be assembled if AToL is included in the next call from the Commission. *Science* 302, 1894 (2003).

Contact: Dr Vincent Savolainen
(v.savolainen@kew.org)

Big Genera Grant

The Leverhulme Trust has just funded the South Africa Big Genera Group (SABIGG) with a £107,020 Academic Interchange Network grant for three years and which will be co-ordinated by Julie Hawkins from Reading University. Researchers from Reading, Kew, Stellenbosch, Cape Town, Johannesburg, Zurich and Wageningen will organise regular workshops and exchange students to study the causes of the exceptional plant diversity in the southern African hotspots.

Contact: Dr Vincent Savolainen
(v.savolainen@kew.org)

Orchid Classification

The phylogenetics of the orchid family, Orchidaceae, have been under active study using DNA sequences for the past ten years, and new patterns of relationships have been discovered. The last classification of the family, based exclusively on morphological data (that of Dressler, 1993), pre-dated the use of DNA data. Now a new classification of the family has been published by Mark Chase and colleagues in the conference proceedings *Orchid Conservation* that incorporates new information from DNA sequences and morphology. At the subfamilial level, a new subfamily is recognised for *Vanilla* and its relatives (Vanilloideae), and the spirantheid orchids, Spiranthoideae of several previous classifications, have been submerged in Orchidoideae. Two of the other three subfamilies, Apostasioideae and Cypripedioideae, remain unchanged from all previous systems of classification, and the circumscription of the largest subfamily, Epidendroideae, is enlarged by the addition of a number of 'primitive' genera in which pollen is not tightly bound into masses (pollinia), which is otherwise typical of this subfamily. The main areas that remains unclear are tribal limits in Epidendroideae, but as more studies are completed these will need to be amended.

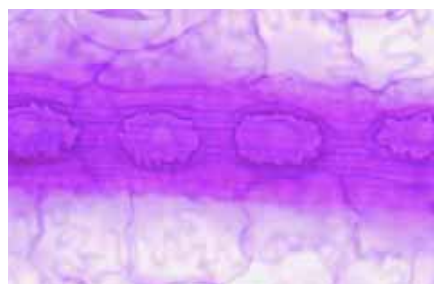
Contact: Prof. Mark Chase (m.chase@kew.org)

Orchid Conservation (Eds K.M. Dixon, S.P. Kell, R.L. Barrett, P.J. Cribb), Nat. Hist. Pub., Kota Kinabalu (2003), pp 69 – 89.

Silica Bodies

Some plants take up soluble monosilicic acid from the soil and subsequently deposit it in their tissues as silica bodies. Such bodies have characteristic shapes and distribution patterns, and therefore have considerable potential as systematic markers. Christina Prychid, Paula Rudall and Mary Gregory have reviewed the distribution and diversity of these bodies in a phylogenetic framework within monocotyledons, in which silica bodies are restricted to a few genera of orchids and the large commelinid clade (including palms, grasses, sedges and rushes); they are absent from other lilioid and basal monocots. The most common type is more or less spherical, but other types include a conical form (present in both grasses and orchids) and an amorphous fragmentary type (silica sand). *Botanical Review* 69, 440 (2003).

Contact: Christina Prychid (c.prychid@kew.org)



Light micrograph of silica bodies in *Marantochloa cuspidata* (Marantaceae).

History of Cocaine



A talk by David Musto at Kew on the 'History of Cocaine' (11 Dec. 2003) started the meeting 'Profiting from Cocaine: a growing addiction' at the Royal Society of Medicine. Publication of *A History of Cocaine, the mystery of Coca Java and the Kew plant* (ed. S.B. Karch; RSM Press) coincided with the event. It reproduces old and rare texts on the early and then legal cocaine industry, including a 1889 paper in *Kew Bulletin* detailing Kew's involvement. Delegates saw early specimens of cocaine in a visit to Kew's collections.

Contact: Prof. Monique Simmonds (m.simmonds@kew.org)



John Day Orchids

The orchid enthusiast John Day (1824 – 1888) created 52 scrapbooks with 2,300 illustrations. They were given to Kew in 1902 by his sister, and a collection of the paintings have now been published in *A Very Victorian Passion: The Orchid Paintings of John Day*. (P. Cribb & M. Tibbs; Thames & Hudson; £49.95). Reproductions from the scrapbooks are being displayed in the Kew Gallery during 2004.

Contact: Dr Phillip Cribb (p.cribb@kew.org)

Papuan Visit



Maria Justina Sadsoeitoeboen (right) demonstrating New Guinea pandan specimens to Agustina Arobaya (middle) and Damien Hicks (left).

The 13 – 20,000 vascular plant species of Papua are poorly catalogued and the only reference collection in the province is the herbarium at PPKH, Manokwari. Safeguarding this resource is the aim of the Darwin Initiative Papuan Plant Diversity Project. In this final year of the project, PPKH staff Agustina Arobaya (orchid taxonomist and manager of Herbarium Manokwariense) and Maria Justina Sadsoeitoeboen (ethnobotanist and pandan taxonomist) visited Kew from February to March to work on their chosen groups and receive training in curation, identification and the BRAHMS database. They returned with books donated by the World Land Trust's NGO Book Project and Kew's support for their herbarium plans and more exchange visits. Further collaboration with PPKH exists in the Kew–Leiden production of the Interactive Key to Malesian Plant Families.

Contact: Damien Hicks (d.hicks@kew.org)

New Insights into Pollen Evolution



Scanning electron micrograph of monosulcate pollen of *Oziroë biflora* (Hyacinthaceae).

Pollen morphology has long been a source of characters in systematic botany. By relating this diversity both to development and modern molecular analyses, Carol Furness and Paula Rudall have uncovered new insights into the evolution of both pollen grains and the plants producing them. Basal angiosperms produce pollen grains with a single polar aperture (sulcus) via either simultaneous or successive microsporogenesis. In some monocots the sulcus is covered by an operculum, a piece of exine like a lid. This feature is particularly characteristic of some lilioid monocots, in which it probably evolved as a response to dry habitats, the operculum having a protective function. An increase in aperture number, from one to three, occurred at the base of the eudicot clade, coupled with a shift in position from polar to equatorial. This transition could represent a key innovation underlying eudicot success and subsequent radiations. Increased aperture number offers a potential selective advantage by increasing the number of prospective germination sites, thus facilitating contact between at least one aperture and the stigmatic surface. Tricolpate eudicot apertures develop only by simultaneous microsporogenesis, which is a more successful strategy for developing higher aperture numbers. *Int. J. Pl. Sci.* 164, 835 (2003). *Trends in Pl. Sci.* 9, 154 (2004).

Contact: Dr Carol Furness (c.furness@kew.org)

Madagascar

Fieldwork for the Madagascar Threatened Plants Project (TPP) from November to December last year by Adam Britt, Tiana Ranarivelo, John Dransfield, Phillip Cribb, Dave Roberts and colleagues from partner institutions concentrated on the conservation status of the target species of palms and orchids. The team found continued felling of mature *Beccariophoenix madagascariensis* for palm heart in the Mantadia National Park, but further populations in the coastal forests of Ste. Luce were located. They confirmed a new population of another palm, *Dypsis ambositrae*, that had been discovered by Tiana in a forest fragment south of Ambositra (it is extinct at the two previously known sites) and relocated the poorly known *Dypsis aquatilis* near Manantenina. Possibly two new species of the orchid genus *Phycoceras* were discovered in the Ranomafana National Park and the extremely rare TPP target orchid species *Aerantes henrici* and *Grammangis spectabilis* were recorded for the first time in the Zombitse forest.

In December, Henk Beentje joined Adam Britt to take part in botanical inventory work, organised by Helene Ralimanana (Kew's Madagascar representative), in the remote and unstudied Reserve Speciale d'Ambatovaky. Almost 400 herbarium specimens were collected, which doubtless include many undescribed taxa and at least three new species of *Dypsis*. Another of the TPP target orchid species *Eulophiella roempleriana* was also recorded for the first time at Ambatovaky. Tiana has recently returned from a trip collecting seed of target succulent species on which she discovered previously unknown populations of *Aloe rauhii* and *Euphorbia tulearensis*.

Contact: Dr Adam Britt (a.britt@kew.org)

The newly discovered population of *Dypsis ambositrae*.



Assessing the invasive *Scaevola sericea* on Anegada.

Field Work

British Virgin Islands

Kew is a partner in a new Darwin Initiative project to document the coastal biodiversity of Anegada, British Virgin Islands (BVI). The project will also build local research capacity and develop a biodiversity strategy and action plan for the area. Initial botanical fieldwork in November 2003 and February 2004 collected data for a habitat map and documented the distribution of key species. New populations of the globally endangered *Malpighia woodburyana* were located and mapped and the first appearance was noted of *Scaevola sericea*, an invasive species from the Indo-Pacific that poses a threat to the native coastal community.

Whilst Kew leads on the plant work, the Marine Turtle Research Group from Exeter



Flowers of *Malpighia woodburyana*.

University is assessing turtle foraging and nesting behaviour, and the Royal Society for the Protection of Birds is surveying the bird communities. The BVI National Parks Trust, Conservation and Fisheries Department, H. Lavity Stoutt Community College and members of the Anegada community form a strong caucus of local partners that will ensure the sustainability of the project.

Contact: Dr Colin Clubbe (c.clubbe@kew.org)

Seed Conservation in the UK Overseas Territories

The conservation of rare or endemic native plant species in the UK Overseas Territories of the British Virgin Islands, Ascension, St. Helena and the Falklands will be underpinned through in-territory seed conservation training and seed banking made possible by a grant from the Foreign and Commonwealth Office. Seed of target species, identified by territory conservation staff, will be stored in small-scale local banking facilities wherever possible, with duplicate samples being held at Wakehurst Place. Contact: Steve Alton (s.alton@kew.org)

Bolivia

A major collecting programme led by John Wood (Kew Honorary Research Associate), in collaboration with the National Herbarium of Bolivia and institutes in Cochabamba, Santa Cruz and Sucre, has resulted in over 13,000 high quality Bolivian collections (to date) enriching the Kew Herbarium. Nicky Biggs, David Goyder, John Wood and four Bolivian colleagues travelled to several remote and poorly collected regions of Bolivia in November 2003. Data from this and earlier expeditions highlight the importance of the inter-Andean dry valleys and, to a lesser extent, the Precambrian serranias of the Chiquitania as hotspots of plant endemism. Twenty new species of *Justicia* (Acanthaceae) have been described from Bolivia based principally on these collections, and over 20% of the 150-plus Bolivian species of Asclepiadoideae



A new species of *Philibertia* (Apocynaceae: Asclepiadoideae) from southern Bolivia.

(Apocynaceae) are either new to science or have never previously been recorded from the country. *Kew Bull.* 58, 769 (2003).

Contact: Dr David Goyder (d.goyder@kew.org)

Wood Work



Home-made kiln for charcoal production in Pernambuco state, Brazil.

Brazilian Fuelwood

A project in Pernambuco state, Brazil, managed by APNE and Kew, is aiming to improve sustainable management of the caatinga for fuelwood. Two years ago, four species used for charcoal production (*Caesalpinia pyramidalis*, *Mimosa ophthalmocentra*, *M. tenuiflora* and *Croton sonderianus*) growing at two sites were subjected to coppicing, pollarding or crown-thinning. Considerable regrowth has now occurred. Lazaro Benedito da Silva (PhD student, University of Feira de Santana, Bahia) recently spent six months at Kew comparing tissue proportions in the wood so as to assess its quality. There is strong interest in the project from local schools and communities, with encouraging signs that recommendations will be implemented.

Contact: Dr Peter Gasson (p.gasson@kew.org)

African Community Trees

Timber species comprise about 40% of the 82 species selected for the Darwin Initiative supported project to research seed conservation in trees used by local communities in Africa. The project involves a network of biodiversity institutes in 16 Africa countries, and 48 African scientists have now attended workshops in Burkina Faso, Ethiopia and at Wakehurst Place in the UK.

Eleven of the institutes have committed to memoranda of understanding in compliance with the CBD, and all have agreed to accept at least two trainees each, which will ensure a wider impact and long term sustainability of the project.

Contact: Dr Moctar Sacande (m.sacande@kew.org)

Sandalwood Quality

Currently India cannot meet the increasing demand for good quality sandalwood oil from *Santalum album*. Thus other countries are producing sandalwood and from a range of different species. To evaluate the source and quality of sandalwood oil entering the trade in the UK, Monique Simmonds, Melanie Howes and Geoffrey Kite obtained samples of sandalwood oil from different traders and analysed them by gas-chromatography-mass spectrometry. The results were compared with standards, including some from the Royal Pharmaceutical Society of Great Britain collection housed at Kew.

None of the traded oils contained 90% santalols, the international recognised standard, and not all the oils were from *S. album*. Oils from the traded samples of *S. album* contained 50-70% santalols, and those with lower amounts were thought to have been extracted from other species. The study recommends that the standards for santalol content are lowered. *J. Chromatography A* 1028: 307 (2004).

Contact: Prof. Monique Simmonds (m.simmonds@kew.org)

Sandalwood oils from the Royal Pharmaceutical Society collection.

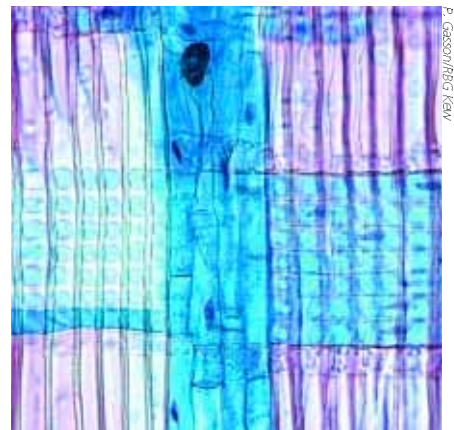


Softwood Glossary

Identifying a softwood is often extremely difficult, unless it is Scot's pine! A profusely illustrated and unambiguously worded glossary of the anatomical characters used to identify conifer woods has long been needed, and has just been published. Written by 16 of the world's most experienced wood anatomists, the glossary describes the features of softwoods that can be used for identification. These characters are subtle and require careful microscopic examination, often at high magnification. Dietger Grosse in Munich has taken all the photographs in this glossary, which will help to make the task of recognising diagnostic features and therefore identification much easier in the future. This publication follows the highly successful hardwood list published in 1989. This is used worldwide by wood anatomists, archaeologists etc. and is currently in its third printing.

Contact: Dr Peter Gasson (p.gasson@kew.org)

HG Richter, D Grosse, I Heinz & PE Gasson, (eds). *IAWA list of microscopic features for softwood identification*. IAWA, Leiden (2004), 25 euros.



Pinus sylvestris. Radial section of wood showing the characteristic window pits.

Furniture Beetles

The factors that influence the susceptibility of wood to attack by furniture beetles are still unknown. These small beetles along with their larger relative, the deathwatch beetle, do a lot of damage to the content and structure of historical buildings. English Heritage has awarded Kew funds for a two-year project to identify compounds in oak and pine timber that vary with the age of the timber. These compounds will be tested to see if they modulate the host selection behaviour of the insects, the aim being to develop traps that can be used in building conservation projects. As part of the project, researchers will be working in historic buildings in England (such as Westminster Hall and Blenheim Palace) and Germany.

Contact: Prof. Monique Simmonds (m.simmonds@kew.org)

Wood Identification Course

Peter Gasson and Rowena Gale will be running a course on wood identification from 16 – 20 August 2004. It is designed for botanists, archaeologists, conservators, furniture and picture restorers, forensic scientists and others who work on wood. Details: www.iawa-web.org.

African Types

A new project, funded by the Andrew W. Mellon Foundation, will image and database all of Kew's holdings of type material from Africa and Madagascar, estimated to be some 50,000 sheets. The aim is to make Kew's data on African type material, which is fundamental for the study of African plant diversity, more accessible for research. Major herbaria in Africa, Europe and America are also imaging and databasing their African type holdings as part of this initiative, with training being held at Kew. Images will be made available through ALUKA, a new not-for-profit organization for which the mission is to build and support non-commercial online databases of scholarly resources.

Contact: Dr Shahina Ghazanfar (s.ghazanfar@kew.org)

Enhancing Seed Conservation

Digitisation of 100,000 herbarium specimens is essential to the success of Part 1a of the Millennium Seed Bank (MSB) Enhancement programme. This is to help MSB Partner institutes prioritise and plan their collecting activities, especially with respect to endangered, endemic and potentially economically useful species. Sharon Balding is leading a team of digitisers and other specialists, who will analyse the accumulated specimen data, using GIS and other techniques, to generate threat and endemism ratings. These will be combined with information from Floras etc. into collection guides for each country, with illustrations and location information for the target species.

Contact: Sharon Balding (s.balding@kew.org)

Part 1b of the MSB Enhancement programme will enable SEPASAL (the Survey of Economic Plants for Arid and Semi-Arid Lands) to establish a node at the National Botanical Research Institute in Namibia. The collaboration will repatriate data on useful Namibian plants and provide equipment, software and training to allow information on uses of Namibian plants to be captured and managed locally. Producing comprehensive datasets on useful dryland species will support conservation and sustainable use projects.

Contact: Steve Davis (s.davis@kew.org)

Part 2 of the programme will also improve electronic data management to increase the effectiveness of seed collecting programmes. Database development in the USA, Chile and Mexico will provide partners with more efficient handling of data, while Kew and Oxford University are developing a taxon database.

Contact: Michael Way (m.way@kew.org)

Digitisation and Repatriation

Access to information held in Kew's collections has been largely restricted by the need to visit the UK to consult them. Electronic imaging and data dissemination technology provides a means by which Kew can share this information with a wider audience.



Shahina Ghazanfar and Sharon Balding (behind) digitising specimens.

eFlora Zambesiaca

All published volumes of *Flora Zambesiaca* (FZ) are now available through a searchable website. This is the first comprehensive eFlora (c. 10,000 accepted names) digitised from hard copy text. The site can be searched for synonyms and accepted names and will list endemics, species from a particular FZ division or country, and species matching particular habit or altitudinal ranges. From these lists the full information for each taxon is available. The Flora is currently 70% complete.

www.kew.org/efloras/

One of the great florilegias of the 1700s, the *Hortus Nitidissimis*, can also now be viewed on the Internet as a result of a project at Kew and the Natural History Museum funded by the Andrew W. Mellon Foundation.

www.kew.org/data

Brazil Repatriation

Cecilia Azevedo, the new Brazilian Research Officer for Kew's NE Brazil Herbarium Data Repatriation Project, began her year's fellowship on 16 February 2004. Cecilia, from the State University of Feira de Santana, Bahia (one of Kew's major Brazilian partner institutes), will be working on repatriation of orchid and other monocot data before returning to Brazil to take up a PhD course.

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First Café Marron Seedling

Controlled pollination trials at Kew have resulted in the first recorded fruit of *Ramosmania rodriguesii* (café marron) being produced, from which seed has been germinated in culture. Café marron is one of the world's rarest plants, with only one plant remaining in the wild on Rodrigues. Previously plants for repatriation had only been produced from cuttings. Seed from the fruit has also been stored in the seed bank at Wakehurst Place.

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Ramosmania rodriguesii.

Kew Scientist

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