

KEW WORLD HERITAGE SITE



Prof. Peter Crane

ON 3 July 2003 the UNESCO World Heritage Centre in Paris inscribed the Royal Botanic Gardens, Kew, on the list of World Heritage Sites as an 'internationally unique cultural landscape.' UNESCO made the award following the joint nomination of Kew by the UK Government Department for Environment, Food and Rural Affairs (Defra) and the Department for Culture, Media and Sport in February 2002.

The nominations reflected the two heritage aspects of Kew. The site embodies over 250 years of historical landscape and culture, housing 39 listed buildings and structures and two ancient monuments. This heritage landscape encompasses living and preserved collections considered to be of world importance, and the site is associated with scientific work of historic significance, such as that of Charles Darwin.

Speaking at the time of the award, Defra Minister Lord Whitty noted that Kew was the first botanical garden of its kind to be given World Heritage status and the award would heighten awareness of the role Kew plays in understanding and conserving plant and fungal biodiversity. Kew's Director, Prof. Peter Crane, pointed out that much of Kew's present day scientific research and vital conservation work was only made possible by its rich heritage and the award supported Kew in helping to maintain the environment for future generations.

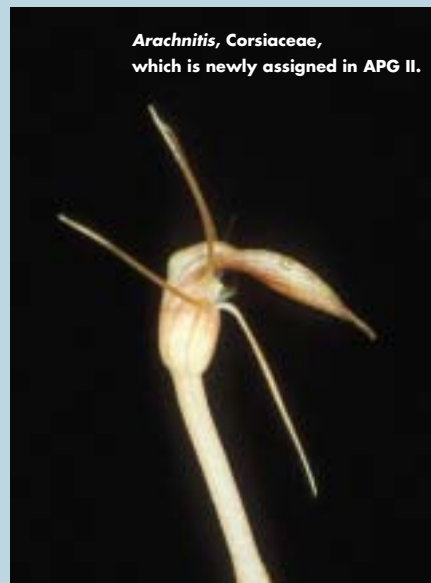
ANGIOSPERM CLASSIFICATION

IN the first truly phylogenetic classification of the angiosperms published by the Angiosperm Phylogeny Group (APG) in 1998, there were several groups unplaced to order in both the monocots and eudicots. Many of these were achlorophyllous taxa, for which the usual plastid DNA regions were absent or difficult to analyse. Five years later, many of these unplaced elements, and family circumscriptions, are better studied, which made an update of the APG system timely.

APG II recognises five new orders: Austrobaileyales, Canellales, Gunnerales, Crossosomatales and Celastrales. Newly-placed families include Hydnoraceae, Nartheciaceae, Corsiaceae, Triuridaceae, Hanguanaceae, Bromeliaceae, Vitaceae, Elatinaceae, Podostemaceae and Cardipteridaceae. New circumscriptions were adopted for Salicaceae (including a large part of Flacourtiaceae), Achariaceae (most of the remainder of Flacourtiaceae), Euphorbiaceae (recognising three families, Euphorbiaceae s.s., Picrodendraceae and Phyllanthaceae), Scrophulariaceae, Alliaceae and Asparagaceae, among others. *Bot. J. Linn. Soc.*, 141: 399 (2003).

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

Arachnitis, Corsiaceae, which is newly assigned in APG II.



Prof. Mark Chase FRS

Professor Mark Chase was elected as a Fellow of the Royal Society in May in recognition of his position as a world leader in the application of genetic data to questions of plant evolution, in particular the development and analysis of large data sets of DNA sequences. His papers are noteworthy for their innovative integration of genetic, morphological and phytochemical information.



Director's Message

Yesterday, Today and Tomorrow

On 3 July 2003 at UNESCO headquarters in Paris, Kew, together with 23 other locations from countries as diverse as Australia, Chile, Gambia and Mongolia, was inscribed on the list of World Heritage Sites. Only two other sites from Western Europe were inscribed this year. Securing World Heritage Site status is hugely exciting for all of us. It is a stamp of approval that puts us in the company of the best of the best, which in turn brings with it increased prestige and public awareness. But even more importantly it embodies a public commitment to maintain an organisation and place that is truly special and world class.

Recognition of Kew's heritage is also important because our urgent scientific and conservation work is only made possible by a wonderfully rich legacy from the past. The outstanding Herbarium, Library, and other collections are fundamental to what we do: they help us understand how plant diversity came to be, what its current status is, and how it can be conserved and used in sustainable ways for human benefit. At the same time Kew's landscapes, gardens, buildings and living collections provide superb opportunities for engaging the public about the future of plant diversity. Our effectiveness in delivering our mission is therefore based, to a very large extent, on a rich history of collections, knowledge, gardens and landscapes. It is appropriate that this history is now recognised formally by UNESCO.

Kew's heritage also provides the springboard for the future. We need to develop new ways to make our resources more useful, and also more readily accessible. Intensifying efforts to increase virtual access by imaging, databasing and expanded use of the web is one approach. Looking for new ways to enhance physical access is another. In the future we need to find innovative ways for visitors to experience the massive collections in the herbarium, to browse Kew's collections of botanical art, to gain more easy access to the library, and to explore the archives. Currently many of our visitors leave without any appreciation of the full richness that is Kew. We need to change their perceptions.

Recognition as a World Heritage Site provides a formal acknowledgement of Kew's 'outstanding universal value', but it also gives new impetus to our efforts to restore and conserve Kew's heritage for the future, and find new ways to better serve the current and future needs of science and the public. As the World Heritage Site inscription makes clear – the right balance must be struck. Kew's work helps us understand the yesterday, today and tomorrow of plant diversity. We also need to respect the past, understand the present and envisage the future as we plan for Kew's continuing evolution.

Prof. Peter R. Crane, Director

OLD & NEW

The historically significant collections at Kew's World Heritage Site are just as important for research today. Examples of recent publications, reported here, show how they are studied in phylogenetic, evolutionary, palynological and phytochemical research. Even species new to science are sometimes discovered in the collections at Kew.

Right: A new species of *Aeranthes* found in Kew's living collection of orchids. A plant, grown from seed collected from the Comoro Islands, flowered in August 2003 and was found to be an undescribed species new to science. It is being described by Dr Dave Roberts.



TESTING 'TREE OF LIFE' METHODS

AS biologists work towards producing a phylogenetic 'tree of life', the computer techniques used to generate large trees need careful assessment. 'Bootstrap' and 'jackknife' re-sampling techniques are commonly used to assess internal support on molecular phylogenetic trees, but large matrices require a lot of computer time and so less rigorous algorithms are often employed. Researchers at Kew and Trinity College Dublin have used large plant phylogenetic matrices to examine the differences in internal support obtained with bootstrap and jackknife after various searches using several of the swapping algorithms available to

systematists. They found that variation in internal support between the bootstrap and jackknife was far less than that caused by use of the various swapping algorithms, while searches without swapping produced more divergent values than searches using any swapping algorithms. These findings have implications for the way confidence will be assessed in very large trees. *Molecular Phylogenetics and Evolution* 27, 528 (2003).

Dr Nicolas Salamin received the Ernst Mayr Award from the Society of Systematic Biologists (USA) in recognition of his PhD work on this topic.

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POLLEN SUPPORTS PHYLOGENY

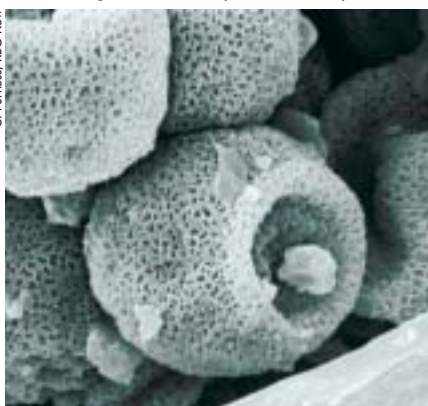
NEW research by Drs Dave Simpson, Carol Furness and Prof. Mark Chase in collaboration with Dr Trevor Hodkinson (Trinity College Dublin) and Dr Muthama Muasya (National Museums of Kenya) has helped to understand the relationships of an unusual group of sedges. Subfamily Mapanioideae comprise plants that have a specialised inflorescence structure, occurring mainly in tropical wet forests. Most Cyperaceae are wind-pollinated with pollen, termed 'pseudomonads', having a developmental pattern unique in angiosperms in which three of the four daughter nuclei produced by meiosis

degenerate. However, in Mapanioideae, some species have *Mapania*-type pollen, which is similar to typical angiosperm pollen and is sticky, suggesting that the plants are animal pollinated.

A molecular phylogenetic analysis strongly supported Mapanioideae as a group distinct from the rest of Cyperaceae. It also resolved two groups within the subfamily, and when pollen type was mapped onto the analysis, it clearly supported these groups - one had pseudomonads, the other *Mapania*-type pollen, indicating specialisation in terms of pollination biology. These groups broadly correspond to tribes, Chrysitricheae and Hypolytreae, but with the transfer of two genera from Hypolytreae to Chrysitricheae. Further work will look in detail at the relationships between the genera within these tribes. *Amer. J. Bot.* 90, 1071 (2003).

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Scanning electron micrograph of *Mapania tenuiscapa* pollen.



C. Furness/RBG Kew

EVOLUTION IN NICOTIANA

NICOTIANA (Solanaceae), the genus of tobacco, has become in recent years a minor model organism for the study of a number of evolutionary phenomena. These include studies of genome rearrangements following hybridisation and naturally occurring insertions of viral DNA, which occurs in many species. Goodspeed's monograph (published in 1954) has been the basis for all other studies, but few aspects of the evolution of *Nicotiana* have been extensively studied in a phylogenetic framework.

Prof. Mark Chase (Kew), Dr Sandra Knapp (Natural History Museum) and colleagues have now used nuclear ribosomal spacer DNA sequences and genomic *in situ* hybridisation to evaluate many of Goodspeed's ideas about parentage of the hybrids. The results demonstrate that many of Goodspeed's conclusions were correct, but in a few cases he appears to have been wrong. A new taxonomic treatment of *Nicotiana* is being proposed based on the results of the phylogenetic studies. *Annals of Botany* 92, 107 (2003); *Taxon* (in press).

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



M. Ismail

Khat bundles

New Alkaloids in Khat

CHEWING khat (*Catha edulis*) for its stimulating effects is a social pastime in Yemen, Ethiopia and Kenya. The pharmacological activity of the major active constituent, the simple alkaloid cathinone, is well known. Recently, Muna Ismail and Prof. Peter Houghton at King's College London have been investigating the activities of the structurally more complex cathedulin alkaloids also produced by the plant. In collaboration with Dr Geoffrey Kite and Prof. Monique Simmonds at Kew, the first detailed analysis of a khat extract by liquid chromatography-mass spectrometry was undertaken. An incredibly complex mixture of 62 cathedulin alkaloids was discovered of which only 15 have been described previously, mostly over 20 years ago. *Rapid Communications in Mass Spectrometry* 17, 1553 (2003).

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AWARDS & GRANTS

Tropical Botany Award

Prof. John Beaman (Honorary Research Fellow at Kew) has been awarded the José Cuatrecasas Medal for Excellence in Tropical Botany by the Smithsonian Institution. The medal is awarded annually to a botanist of international stature who has contributed significantly to advancing the field of tropical botany.

MSBP Grants

The Millennium Seed Bank Project (MSBP) has been awarded an enhancement grant of £2.15m by the Millennium Commission that will enable the Project's partners, by means of herbarium studies, to increase the proportion of threatened, endemic, and useful species conserved. Further, a consortium of 19 European institutes, co-ordinated by the Seed Conservation Department (which manages the MSBP), has been offered a grant of up to 2.65m euro (about £1.86m) by the European Commission to establish a European Native Seed Conservation Network. Both awards are subject to contract negotiations.

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Grass Grant

A three-year 177,000 euro grant has been awarded to researchers at Trinity College Dublin and Kew by Enterprise Ireland to explore the phylogenomics of the grass family using phylogenetic reconstruction based on large multigene datasets and supertrees. Grasses are one of the largest families of higher plants and are undoubtedly the most important from an economic perspective; the project aims to use this family as a case study for more comprehensive analyses at the scale of the entire 'Tree of Life'.

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Prance Fellowships

A new programme of fellowships has been funded by the Weston Foundation of the United Kingdom in recognition of the outstanding contributions made by Prof. Sir Ghilleain Prance during his time as Kew's Director. The Prance Fellowships in Neotropical Botany, administered as part of an expanded Kew Latin America Research Fellowships programme, focus on the application of botanical knowledge to the conservation and sustainable use of plant biodiversity. They offer support for visiting plant scientists from Latin America (including the West Indies and the Guianas). There are three major focus areas: capacity building in Neotropical countries; repatriation of plant knowledge to Neotropical countries; and building collaboration and partnership with Kew in the conservation and sustainable use of plant biodiversity.

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SCIENCE OPEN DAYS

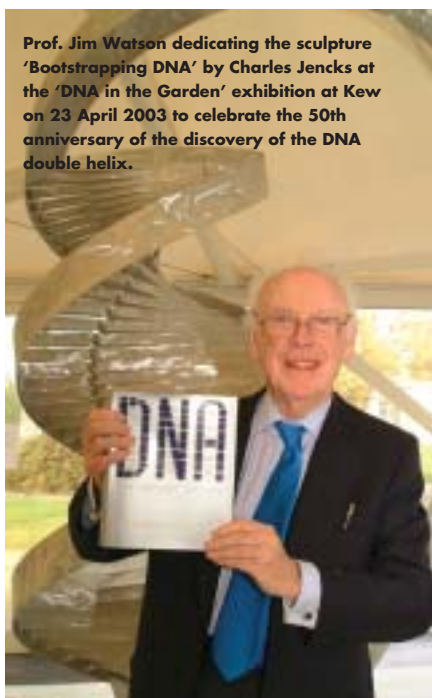
This year, visitors to the Royal Botanic Gardens Kew had the opportunity to see behind-the-scenes research and collections in a series of open days.

AS a spin off from the 'DNA in the Garden' exhibition (co-presented with BBSRC), escorted tours of the Jodrell Laboratory were provided on 25-26 April to show visitors various aspects of Kew's research on DNA. On 26 May about 1,100 people passed through the Tropical Nursery, which had an open day for the public to see major parts of the living collections not usually on display. There were

manned displays of cacti and succulents, orchids, carnivorous plants and moths. On 26-28 June, guided tours of the Herbarium and Library ran at half-hourly intervals throughout the day as part of the celebrations for their 150th anniversary. In addition, demonstrations of plant pressing and an interactive plant identification key ran continuously in the Nash Conservatory.

Events throughout the summer-long Go Wild festival (sponsored by GlaxoSmithKline) also gave visitors insights into science at Kew. A temporary museum recreated an Edwardian collector's hut and illustrated the traditional medicinal uses of British plants. At this Field Hospital, visitors could contribute to the Ethnomedica project. This project, supported by the National Institute of Medical Herbalists, the Chelsea Physic Garden, the Eden Project, RBG Kew and Neals Yard Remedies, was established in 1999 to research and record knowledge about the uses of plants as medicines in Britain.

A survey of fungi at Kew continued during Go Wild. Discoveries included the first British record of the ascomycete *Splanchnonema platanii*. With 2,500 species now listed, Kew is one of the most comprehensively surveyed sites in the world.



Prof. Jim Watson dedicating the sculpture 'Bootstrapping DNA' by Charles Jencks at the 'DNA in the Garden' exhibition at Kew on 23 April 2003 to celebrate the 50th anniversary of the discovery of the DNA double helix.

A. McRobb/RBG Kew

COMMUNITY TREE SEEDS

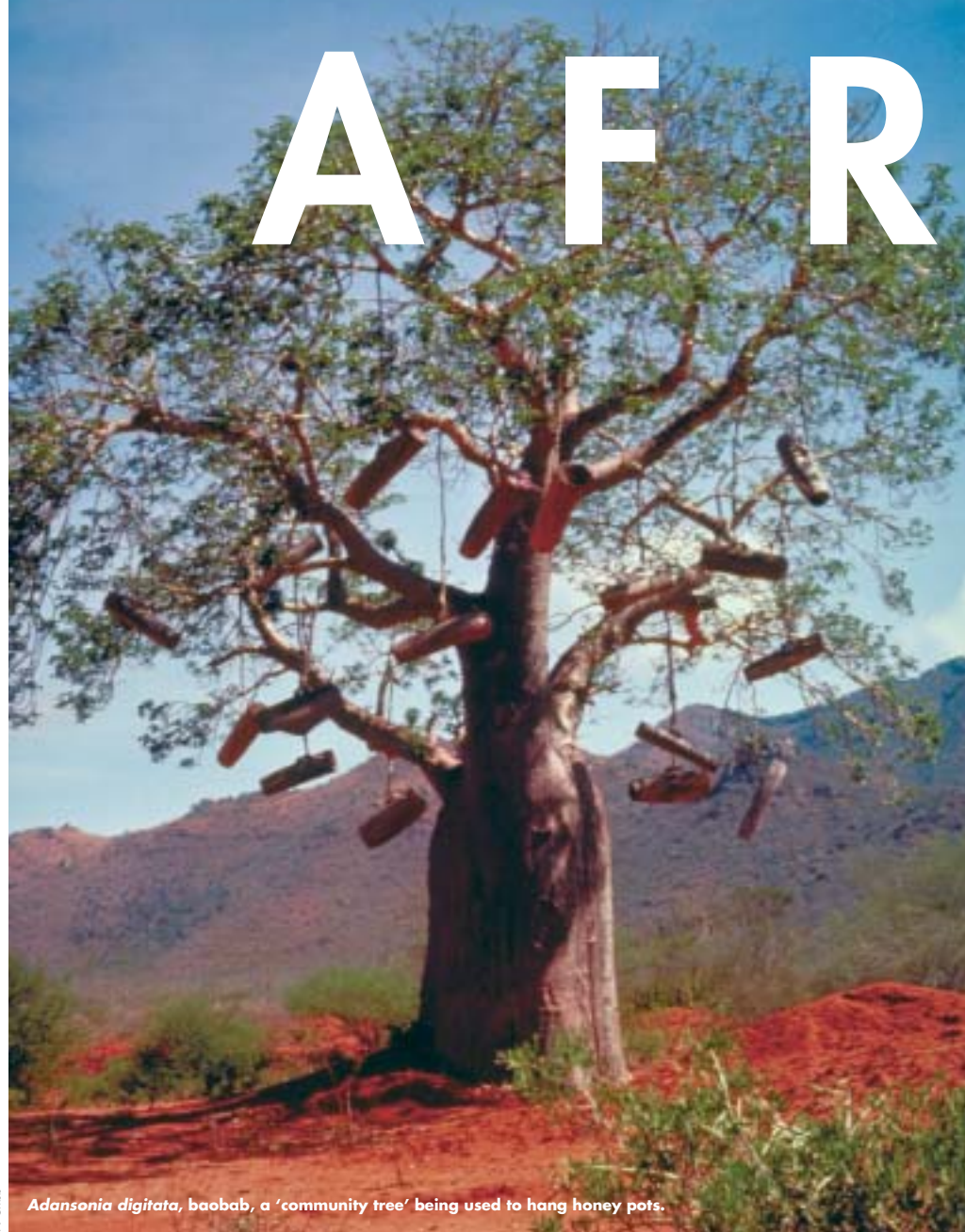
THE sustainable use and conservation of trees are of major importance in sub-Saharan Africa. However, many factors hamper the optimal usage of their seeds for reforestation, biodiversity conservation or economic exploitation. The biology of African dryland tree seeds is poorly understood, and the problem is compounded by inadequate institutional, financial and human resources to improve the situation.

Supported by a Darwin Initiative grant of over £180,000 from Defra, a network of 16 African tree seed and biodiversity institutes and Kew will research and develop methods for handling, storing and germinating seed from about 60 African tree species. These species will be selected from the sub-Saharan Forest Genetic Resources priority list as being of importance for biodiversity and to the community. Training in seed research and conservation techniques will also be provided for 32 scientists from the African institutes by means of workshops in Burkina Faso (CNSF, Ouagadougou), Ethiopia (FRC, Addis Ababa), as well as at Wakehurst Place.

The initiative is also being supported by a gift-in-kind from the Millennium Seed Bank Project and by the International Plant Genetic Resources Institute. It will have lasting effects on the capacity of the African institutes to be actively involved in national and international programmes of *in situ* and *ex situ* conservation.

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P. Cribb



Adansonia digitata, baobab, a 'community tree' being used to hang honey pots.

CAMEROON 50 New Species Published

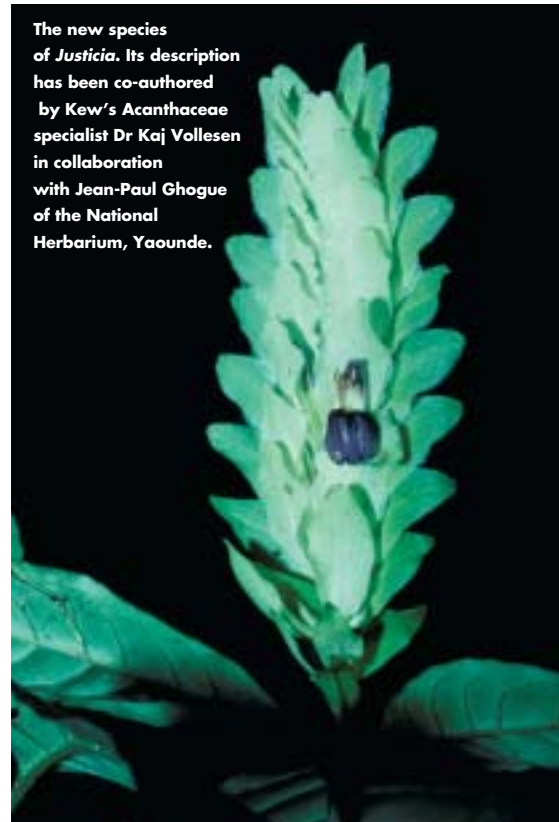
THE number of new plant species published (or submitted for publication) from Kew's Earthwatch-Darwin supported surveys-for-conservation in western Cameroon, with the Cameroonian National Herbarium, Yaounde (IRAD-MINREST) passed 50 in July with the completion of a paper describing a spectacular new *Justicia* (Acanthaceae) from the Bakossi Mts of SW Province. Many of the new species have small geographic distributions and are threatened with extinction. Consequently the papers have included international conservation assessments using the IUCN 2001 criteria, and 16 of the species are featured in species-specific conservation posters to promote awareness in Cameroon.

At least another 50 potential new species await writing up. Amongst those currently in preparation is one on a new species of *Dovyalis* (Salicaceae) from the Bamenda Highlands

being analysed by Rita Ngolan of the Kilum-Ijim Project as part of her thesis for this years Plant Conservation Techniques Course at Kew. Altogether about ten Cameroonian biologists have been involved in publishing these discoveries, principally those from the National Herbarium (Dr Gaston Achoundong, Dr Jean-Michel Onana and Jean-Paul Ghogue), but also the University of Yaounde (Drs Bonaventure Sonke and Louis Zapack) as well those from some of the six partner conservation projects that protect the areas in which the surveys have been conducted. Numerous international specialists have been involved in co-authoring papers, for example Drs Gerardo Salazar (Orchidaceae, Mexico), Kåre Lye (Cyperaceae, Norway), Doug Stone (Melastomataceae, USA), Eberhard Fischer (Germany) and Piet Stoffeln (Rubiaceae, Belgium). In addition about 10 staff from Kew have been involved.

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The new species of *Justicia*. Its description has been co-authored by Kew's Acanthaceae specialist Dr Kaj Vollesen in collaboration with Jean-Paul Ghogue of the National Herbarium, Yaounde.



I C A

Africa is a major geographical focus in Kew's research programmes. There is a critical need for baseline floristic surveys, with habitats under threat in both wet tropical and dryland areas. Much of Kew's work aims to build in-country capacity to catalogue, conserve and use biodiversity sustainably.

AETFAT

Association pour l'étude taxonomique de la flore d'Afrique tropicale



EVERY three years AETFAT holds an international meeting, bringing together botanists with an interest in African plants. This year the conference took place in Addis Ababa, Ethiopia (21–26 September), and attracted 180 botanists from 33 countries. A strong Kew contingent was present; twelve of them gave papers, four presented posters, and Prof. Peter Crane gave the plenary lecture on the opening day. Kew also provided assistance for seven African botanists to attend the conference.

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Book Donation

BEN POLLARD has instigated and overseen the donation of 140 Kew publications to 20 organisations in six West African countries. BirdLife International agreed to sponsor and distribute the books, comprising ten sets of Volumes 1-3 of Humphrey Burkill's *The Useful Plants of West Tropical Africa* and 30 near-complete sets of *The Flora of West Tropical Africa* (2nd edition). The donation will help the organisations with their scientific research and conservation action.

Ben Pollard at Kew handing over books to Andy Brock-Doyle (BirdLife Int.) for shipping to Africa.



Ms Brock-Doyle

SOUTH AFRICA DNA Bank

THE Darwin Initiative from Defra has funded Kew for a three-year project on DNA banking, phylogeny and conservation of the South African flora, starting June 2003. South Africa supports the richest temperate flora in the world, with 9,000 species of which around 70% are endemic. Scientists from Kew and the National Botanical Institute in South Africa have been working together for many years, and both institutes have now proposed to take things a major step further by helping to create a jointly-held DNA bank.

The South African DNA bank will benefit biodiversity research by providing a comprehensive centralised in-country facility for DNA extraction and storage; a phylogenetic 'tree of life' of South African plant genera will also be produced, thereby assisting bioprospecting as well as identifying areas of high priority for *in situ* conservation. Finally it will provide the opportunity for capacity building in addition to training and job creation in the highly skilled field of biotechnology. Scientists from the UK and South Africa met at Kew on 1-3 July 2003 to launch the project.

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KENYA Seeds for Life

THE Seeds for Life project, a collaboration between five Kenyan institutes and the Millennium Seed Bank Project, has entered its second phase. The project aims to enhance conservation and sustainable utilisation of Kenya's plant genetic resources, focussing on the arid and semi-arid lands that comprise about 80% of Kenya and are home to around 10 million of the poorest people in the country.

Phase I made nearly 800 seed collections and gathered information on the constraints that face communities in their efforts to conserve and utilise indigenous plants. Phase II will continue to add collections and address some of the identified problems. Technologies for on-farm seed handling, storage and use will be evaluated and adapted where necessary. Successful seed storage is key to farmers' seed security and may also enable communities to generate income through collecting seed and propagating native plants for sale.

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MEETINGS

Second Plant Genome Size Workshop & Meeting

Seventeen scientists attended the Second Plant Genome Size Workshop at Kew on 8-9 September 2003. They reviewed progress against targets set at the first workshop in 1997, and agreed new goals for the next five years. Since 1997 the number of accessible DNA C-values for plant species rose from 2,974 to 4,793, a 61% increase over the number amassed in the previous 40 years. A target of another 1% for angiosperms (c. 2,500 species), to achieve 75% familial and 10% generic coverage by 2009, was agreed. The group strongly endorsed the Plant DNA C-values Database (www.kew.org/cval/homepage.html), recommending that Kew continues to update this important diversity information source. The workshop was followed by a two-day discussion meeting attended by 67 participants from 18 countries. Sessions with 22 oral and 31 poster papers addressed aspects of genome size, including its evolution, ecological and conservation significance, and the molecular mechanisms responsible for its variation. Papers will appear in *Annals of Botany* in 2004.

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Conference Contributions

● Kew was well represented at the 4th Biennial Meeting of the Systematics Association in August in Dublin as staff presented or co-authored 30 papers. Several were in the thematic symposium entitled 'The systematics of large and species-rich taxa'.

● Drs Brian Schrire and Gwilym Lewis, Neil Brummitt, and Prof. John Beaman presented papers at a symposium on Plant Diversity and Complexity Patterns (Royal Danish Academy of Sciences & Letters, Copenhagen, 25–28 May 2003). The papers will be published in *Biologiske Skrifter*.

● Dr Gwilym Lewis with Drs Toby Pennington and Jim Ratter (RBG Edinburgh) organised a two-day Plant Biodiversity session, focussing on the Neotropics, at an international conference on Tropical Savannas & Seasonally Dry Forests (RBG Edinburgh, 14–20 September 2003).

Palm Workshops

Two palm workshops were held at Kew from 23-27 April 2003. A workshop for the BAT-funded Palms of New Guinea project was attended by 14 collaborators from Papua New Guinea, Indonesia, Denmark, USA, Australia and UK. Discussions at progress reports and editorial sessions indicated that *Palms of New Guinea* would go to press in 2005. The workshop was followed by the third annual meeting of the European Network of Palm Specialists, in which a varied programme of lectures and discussions was attended by almost 50 scientists.

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LEGUMES

Brownea macrophylla, a widespread Neotropical tree with cauliflorous inflorescences, in the caesalpinoid tribe Detarieae.



G. Lewis

Legume Literature

Advances in Legume Systematics, part 10. Higher Level Systematics (Eds B.B. Klitgaard & A. Bruneau) was published by Kew in September 2003 (ISBN 1 84246 054 4, £59.50). It contains 19 papers presented at the fourth International Legume Conference held in Canberra, Australia in 2001. Papers on legume chemistry were published in *Biochemical Systematics & Ecology* 31 (2003).

Legumes of South Asia, a Check-list (S. Kumar & P.V. Sane; RBG Kew) is the latest in a series of checklists issued from the International Legume Database and Information Service (ILDIS). ISBN 1 84246 058 7, £39.00.

www.kewbooks.com

Protecting Pigeonpeas

CATERPILLARS of the podborer *Helicoverpa armigera* decimate pigeonpea (*Cajanus cajan*) by feeding upon the pods. The crop provides a fundamental source of protein to some of the poorest farmers in South Asia, so losses can threaten severely the stability of rural livelihoods in these areas. Scientists at Kew, the International Crops Research Institute for the Semi-Arid Tropics, India (ICRISAT), and the Natural Resources Institute, University of Greenwich, have found that extracts of pigeonpea pods stimulate feeding by *H. armigera* larvae and this may be a key to understanding why pigeonpeas are a favoured food for the insect. The extracts were also shown to stimulate the adult moths to lay eggs. A flavonoid

CAESALPINIOIDEAE GRANT

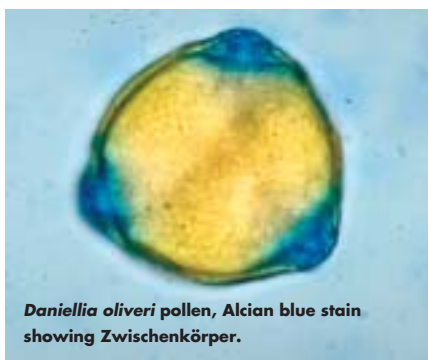
THE National Science Foundation of the United States has awarded a \$300,000 grant to Drs Pat Herendeen (George Washington University), Anne Bruneau (University of Montreal) and Gwilym Lewis (Kew) for a four-year study of the Phylogeny and Evolution of Caesalpinoid Legumes. The grant is primarily for field work in countries where key caesalpinoid genera need to be collected and studied *in situ*.

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Pollen Discovery

HANNAH BANKS has discovered structures termed *Zwischenkörper* in legume pollen that were previously not reported in the family. *Zwischenkörper* are involved with pollen hydration and early pollen tube growth. Alcian blue staining clearly showed this feature in mature pollen of some members of Detarieae *sensu lato* but not others, and the distribution is phylogenetically informative. *Ann. Bot.* 92, 425 (2003).

Contact: Hannah Banks (h.banks@kew.org)



H. Banks/RBG Kew

Daniellia oliveri pollen, Alcian blue stain showing *Zwischenkörper*.

Remarkable Chemistry

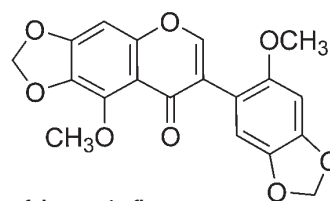
MORE than two decades ago Prof. Arthur Bell (former Director of RBG Kew) and colleagues reported the occurrence of unusual non-protein amino acids in seeds of *Ateleia herbert-smithii*. Now researchers at Kew have discovered that the leaves of this tropical legume are exceptionally rich in isoflavones, chalcones and flavonol glycosides. Among the 20 compounds identified to date are seven new natural products, including four extremely rare bis(methylenedioxy)isoflavones. Their distribution in *Ateleia* and related genera is being studied by Drs Nigel Veitch and Geoffrey Kite to better understand chemical evolution and diversity in basal papilionoid legumes. *J. Natural Products* 66, 210 (2003).

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A. McRobb/RBG Kew

Ateleia herbert-smithii



One of the new isoflavones isolated from *A. herbert-smithii*



P. Green

Helicoverpa armigera on pigeon pea pod.

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Dr Paul Green (paul.green@kew.org)

Dimorphorchis rossii var. *graciliscapa* flowering for the first time at Kew this year. The plant was raised from seed collected by Dr Phil Cribb and Chris Bailes from the type plant in Borneo in 1983.

ORCHIDS

A. Markob/ RBG Kew

GENERA ORCHIDACEARUM 3

VOLUME 3 of *Genera Orchidacearum*, edited by staff members of Kew and the University of Copenhagen and written by invited specialists, has been published by Oxford University Press. Like earlier volumes, this one incorporates the wealth of new DNA data into a truly phylogenetic classification and identifies the areas and taxa needing additional work. This volume treats the 105 genera of subfamily Orchidoideae remaining from volume 2 and all 15 genera of subfamily Vanilloideae, such as the commercially important *Vanilla*. Comprehensive treatments are provided for each genus, which include complete nomenclature, description, distribution (with map), anatomy, palynology, cytogenetics, phytochemistry, phylogenetics, pollination, ecology and economic uses. Cultivation notes are provided for those genera known to be in hobbyist collections. Genera are illustrated with line drawings and/or colour photographs. Volumes 4-6, covering subfamily Epidendroideae, are now in preparation. ISBN 0 19 8507119, £99.95.

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ORCHIDS OF BORNEO 4

It is estimated that between 1,400 and 1,500 orchid species in some 150 genera are native to the island of Borneo. Many new taxa and distributional records have resulted from recent exploration and taxonomic research. The Orchids of Borneo project aims to document a broad selection of these new records, describing and depicting 100 taxa in each of a series of volumes. The fourth volume, published in June 2003, contains a miscellaneous selection of taxa including many recently described species, such as *Calanthe otuhanica* and *Goodyera condensata*, and others, such as *Porphyrodesme sarcanthoides* and *Sarcoglyphis potamophila*, that are poorly known. Each orchid is illustrated by a line drawing accompanied by a detailed description and notes on habitat, distribution, points of interest and etymology. Colour photographs are included wherever possible. It is hoped that the series will heighten awareness of this endangered natural heritage and stimulate its conservation for future generations to enjoy.

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7 Conservation Book

A new practical handbook on orchid conservation techniques, *Orchid Conservation* (Eds K. Dixon, S. Kell, R. Barrett & P. Cribb; Natural History Publications, Kota Kinabalu, Sabah), was published on 1 October 2003. Several Kew staff, including Margaret Ramsay, Prof. Mark Chase, Drs Phillip Cribb, Mike Fay and David Roberts authored or co-authored chapters, which they presented as lectures at the First International Orchid Conservation Conference held in Perth, Australia (24-28 September 2001).

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

Orchid Conference

THE Thirteenth European Orchid Conference and Show was held at the Royal Horticultural Society's Halls in Westminster, 12-16 March 2003. Four Kew staff members, Prof. Mark Chase, Drs Phillip Cribb, Alec Pridgeon and David Roberts, and three Honorary Research Associates, Johan and Clare Hermans and Isobyl la Croix, presented lectures. Kew also gained two Silver Medals at the show for an exhibit of living orchids and another on John Day's orchid paintings.

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BOOKS

CBD Guide

China Williams, Kate Davis and Phyllida Cheyne have produced a new guide and training tool, *The CBD for Botanists: an Introduction to the Convention on Biological Diversity for People Working with Botanical Collections*, as part of a recent Darwin project. It provides a basic background to the CBD, with a focus on the issue of access and benefit-sharing and guidance on practical implementation. The pack contains slides and suggested speaker's notes, a resources section with useful links and suggestions for further reading, and the texts of the CBD and the Bonn Guidelines. It is available in English, French and Spanish versions, with a CD-ROM in all three languages. £50.

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Seed Biology

Papers from the 7th International Workshop on Seeds held in Salamanca, Spain, in May 2002 have been published in a new book *The Biology of Seeds* (Eds G. Nicolás, K.J. Bradford, D. Côme & H. Pritchard; CAB International). ISBN 0 85199 467 9.

Contact: Prof. Hugh Pritchard (h.pritchard@kew.org)

Poisonous Plants

A completely revised and updated second edition of *Poisonous Plants and Fungi* (M.R. Cooper, A.W. Johnson & E.A. Dauncey; The Stationery Office) was published in September. It provides information on over 300 plants and 70 fungi, native or cultivated, that may cause poisoning in Britain. ISBN 0 11 702861 4; £14.95.

Contact: Dr Liz Dauncey (e.dauncey@kew.org)

ePIC

Kew's electronic Plant Information Centre (www.kew.org/epic) expanded this year with the addition of Kew's databases on micromorphology literature, seed information, the economic botany collections, the first tranche of the herbarium collections and Kew's website. These information sources can now be searched simultaneously with the International Plant Names Index, Kew's living plant collections, the Kew Record of Taxonomic Literature, and the Survey of Economic Plants in Arid and Semi-Arid Lands.

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Kew plays a role in conserving the UK's natural heritage of plants and fungi through reintroduction programmes and monitoring and protecting the native flora on its sites.



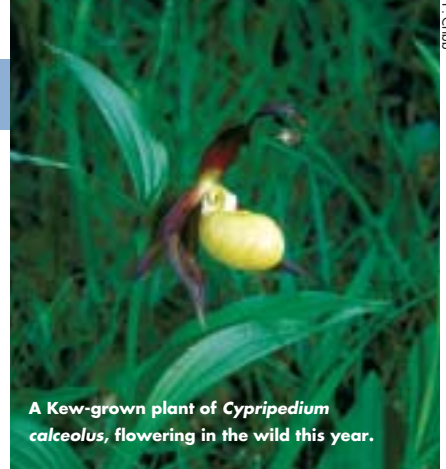
Bromus interruptus

Reintroduction of *Bromus interruptus*

A TRIAL reintroduction of the British endemic grass, *Bromus interruptus*, is taking place in Cambridgeshire. This annual grass is believed to be extinct in the wild but has survived in cultivation. It is grown in a few gardens, including Kew. The last known collection of wild seed was in 1963 and all cultivated material is derived from this.

Kew is the lead partner for a UK Biodiversity Action Plan (www.ukbap.org.uk) to conserve and reintroduce this species, and over the past few years seed from cultivated plants has been collected and stored in the seed bank at Wakehurst Place. In March 2003 some of this seed was sown in a field just south of Cambridge. It has flowered and will be left to self-sow this autumn. Its ability to sustain itself will be studied, and if successful a permanent site will be sought for a full reintroduction programme.

Contact: Stewart Henchie (s.henchie@kew.org)



A Kew-grown plant of *Cypripedium calceolus*, flowering in the wild this year.

Cypripedium Committee

DR DAVID ROBERTS joins Margaret Ramsay as Kew's representatives on English Nature's *Cypripedium* Committee, set up by Edgar Milne-Redhead when Deputy Keeper of the Kew Herbarium. He replaces Dr Phil Cribb who has served for 25 years and who, in 1982, initiated the Sainsbury Orchid Project at Kew which has grown hundreds of *C. calceolus* for re-introduction. Until recently a single plant survived in the wild in England, but the population has been successfully reinforced by the Kew plants and several flowered at the wild site this year.

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NEW RESERVE FOR CRYPTOGRAMS

A NEW reserve, dedicated to the conservation of mosses, liverworts, lichens and filmy ferns, was officially opened at Wakehurst Place on 16 September 2003. The 25 ha reserve, possibly one of the first of its kind in Europe, is named after Dr Francis Rose, the naturalist renowned for his study of the Weald flora of

southern England. The sandstone outcrops found at Wakehurst Place, and elsewhere in the Kent and Sussex Weald, bear a cryptogam flora that is unique in lowland Britain and are among the top sites for bryophyte conservation, as recognised by English Nature.

Kew is helping to conserve some two-thirds of Britain's 48 rarest cryptogams. Local and national rarities growing in the new reserve include the lichen *Cystocoleus ebeneus*, the liverwort *Blepharostoma trichophyllum* (which was thought to be extinct in Sussex until rediscovered at Wakehurst Place) and *Hymenophyllum tunbrigense* (Tunbridge filmy fern). The reserve's sandstone outcrops will provide ideal sites for the re-introductions of other rare species. Among the key species for reintroduction is *Orthodontium gracile* (slender thread moss), now known at only eight sites across Britain.

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Natural Heritage Discoveries

IN early May this year, during an on-going survey of the wild flora of Kew, Dr Tom Cope found a small population of *Myosurus minimus* (mousetail) in an area adjacent to the River Thames. Mousetail is an increasingly rare plant in Great Britain and is thought to be on the verge of extinction in Surrey.

This discovery coincides with the rediscovery of *Leersia oryzoides* (cut-grass) by Madeline Holloway (Ecological Information Network Consultants) in the Old Deer Park only a few metres from the southern boundary of the Gardens. Cut-grass was first found in the countryside at Kew in the late 18th century but knowledge of this locality had been lost for two hundred years. It is interesting that two rare wetland species should have been found within a year of each other in such a small area.

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Dr Francis Rose examining cryptogams in the new reserve.

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