

SEED samples from 93% of the UK's native higher plant flora are now being stored in the Seed Bank at Wakehurst Place. The seeds have been collected over the past three years as Phase I 'The UK Flora Programme' of the Millennium Seed Bank Project. The UK target of the project was to collect seed samples from almost every species of native vascular plant that produces bankable seed. This meant collecting seeds from a further 800 species to add to the 570 or so species already stored in the bank prior to 1997. More than 250 individuals from around 35 organisations were involved in the collaborative collecting programme and at the end of the final collecting season in 1999 the Seed Bank had received 1,532 collections representing 768 species.

Of the remaining 7% of the UK higher plant flora, a number of species produce seed rarely or not at all, one or two species are feared extinct, and a minority produce seed which cannot be banked. However, it is intended to continue collaborative seed collecting in the UK, both to 'mop up' as many of the remaining species as possible and to obtain better eco-geographic coverage of some of the conservation priority species.

The Seed Bank now holds collections from 229 species listed in the UK Vascular Plant Red Data Book. Of these, 80 are protected under Schedule 8 of the *Wildlife & Countryside Act* with 17 being classed as 'Critical', 31 as 'Endangered' and 99 as 'Vulnerable' under the IUCN Threat Categories. In addition, 41 species are protected in Northern Ireland, and 197 are classed as 'Nationally Scarce' in the UK.

As part of the UK Programme, research was carried out into the particular problems associated with banking certain species. It had been assumed that seeds of aquatic plants would become non-viable if dried, but Dr Fiona Hay found that many UK native aquatic species actually produce desiccation-tolerant seeds. She has also investigated storage methods for those species that cannot be banked using conventional means.

Species with very small seeds are not only difficult to handle but also many, for example parasitic broomrapes (*Orobanche* spp.) and orchids, have interactions with other species. For banking orchids, Dr Chris Wood developed a technique for storing the seed at low



UK FLORA BANKED

Fiona Hay collecting seeds of *Potamogeton acutifolius* in Cantley Marshes, Norfolk.

temperatures in alginate beads along with the mycorrhizal fungal symbiont that is required for germination. Finally, research on willows (*Salix* spp.), undertaken with the Institute of Arable Crop Research at Long Ashton which is investigating possible renewable energy sources, suggests that seeds of these species are also desiccation-tolerant.

Contact: Steve Alton (01444 894119)

- Roger Smith, Head of the Seed Conservation Department, was awarded an OBE in the New Year's Honours List for 'services to the Millennium Seed Bank Project'.
- Last summer, Dr Keith Ferguson, who retired in 1998 as Deputy Keeper of the Herbarium and Head of Palynology, was awarded an OBE in the Queen's Birthday Honours List for 'services to botany, palynology and RBG Kew'.

Funding for the Millennium Seed Bank Project has been provided by many sources, including three major contributors. The Millennium Commission is providing up to £30m of the total £80m project cost. The Wellcome Trust, the world's largest medical research charity, is providing £9m and the building itself will be called the Wellcome Trust Millennium

Building. The main exhibition area will be known as the Orange Room, reflecting the early commitment of Orange plc to the Appeal.



The Nature Conservancy Council for England provided financial support through their Species Recovery Programme.



A MILLENNIUM PROJECT
SUPPORTED BY PUBLIC
FUNDS FROM THE NATIONAL LOTTERY





Director's Message

Conservation begins at home

There is increasing recognition that improved stewardship of the Earth's natural resources must be a global priority in the new millennium. Whether they act as a sink to help absorb excess atmospheric carbon dioxide, as a protective covering for the soil of critical watersheds, or a source of economically or socially important products, plants and plant communities will be a crucial part of our future. Kew is working with partners world-wide to increase scientific knowledge and public understanding of plant diversity to ensure these resources are managed wisely for the future. Nevertheless, for our efforts to have added credibility, it is important that Kew also commits its expertise and resources to the conservation, restoration and sustainable use of UK biodiversity.

With only about 1,400 species of seed plants, the UK flora is poor compared to many other parts of the world; for example, the Ducke Reserve in Amazonia supports more species in only 100 square kilometres. Nevertheless, the significance of efforts to conserve UK biodiversity, and enhance public understanding of its importance, should not be underestimated. As the world's fifth largest economy, the UK has a responsibility to show leadership by harmonising patterns of consumption with conservation and the sustainable use of natural resources. Also, because almost everyone in the UK is relatively close to some kind of 'natural area', there is a wonderful opportunity to engage the public in the practice of conservation, rather than the equally important but more abstract notion of conservation on the other side of the world.

At Kew we take our responsibilities for the conservation and monitoring of UK biodiversity very seriously. Our activities range from conservation initiatives with particular species to broader efforts to improve our own operations. We are working to preserve plant species in their natural communities, but we are also expanding our *ex situ* conservation efforts as 'insurance' against their disappearance. The Millennium Seed Bank Project is especially important in this regard and almost all species of the UK's native seed plant flora are now preserved in the Seed Bank. We are also focussing on the importance of monitoring the wildlife on our estates at Kew and Wakehurst Place to continually assess the health of the native plant and animal populations under our stewardship. Both sites are significant reservoirs of UK biodiversity and thus provide important opportunities for conservation, restoration, scientific research and public education in our own backyard. They provide us with excellent opportunities to lead by example, thereby increasing the impact of our work both in the UK and overseas.

Prof. Peter R. Crane, Director



J.M. Topman

The launch of Wildlife 2000 at Kew with the mayors of the six London boroughs involved with the festival sowing seed on the Broad Walk wheat field plantings.

WILDLIFE 2000 is an exciting initiative to celebrate wildlife in southwest London. It comprises a year-long festival of fun events organised by six London boroughs (Hounslow, Merton, Kingston, Sutton, Wandsworth and Richmond) in partnership with the London Wildlife Trust and RBG Kew. Forming part of the UK-wide Millennium Festival, and supported by a Millennium Commission lottery grant, Wildlife 2000 aims to give Londoners the opportunity to value more highly the natural and managed wildlife habitats around them. The launch on 1 December 1999 was held at Kew, since Richmond proposed the concept

and is the host borough, providing an office for the co-ordinating officer, Ruth Hayhurst. All six borough mayors attended the launch and broadcast wildflower seed onto the Broad Walk to link with 'Wild at Kew' themes being held in 2000. This year the Broad Walk will be flanked by wheat field plantings containing native UK arable species, many of which are becoming increasingly rare, so as to highlight 'The UK Flora Programme' of the Millennium Seed Bank Project.

Contact: Mark Bridger (020-8332 5535)

Flowering Times

IN a project to mark the new millennium, precise flowering times of selected plants at Kew are to be recorded in a database each year to detect any impact of climate change. The project continues the personal records started in the 1950s by Nigel Hepper (now retired) who has collected flowering dates for nearly 5,000 species at Kew, although not all the records are continuous. His information will be incorporated into the new database and Nigel has suggested 100 species to be monitored in the future. These range from exotic shrubs such as *Philadelphus* to native species like the bluebell.

Contact: John Lonsdale (020-8332 5543)



Hyacinthoides non-scripta (bluebell), one of the species at Kew whose flowering times are to be monitored.

Wildlife Database



Comma butterfly at Kew

A DATABASE of wildlife records at Kew and Wakehurst Place is currently being tested. The objective of the database is to make available valuable historic records of wildlife at the two sites and collate them with the results of recent and ongoing surveys contained in several disparate databases. Recent surveys include butterflies, lichens and fungi at Kew, and mosses and liverworts at Wakehurst Place. Dr Tom Cope is currently surveying the wild-growing flora of the Kew site and has so far recorded 365 species. When data entry has been completed, the Wildlife Database will provide a powerful management tool for Kew's local conservation activities.

Contact: John Lonsdale (020-8332 5543)

BRITISH BASIDIOMYCETES

WORK has started on the first checklist and database of the British and Irish *Basidiomycetes*. This group of fungi, with over 3,000 species in Britain and Ireland, includes mushrooms and toadstools, bracket fungi, puffballs, earthstars, and stinkhorns. The three-year project, based at Kew, has received funding of £147,000 through the Kew Foundation from English Nature, Scottish Natural Heritage, the Countryside Council of Wales, the Environment & Heritage Service (N. Ireland), the Heritage Council of Ireland, the British Mycological Society, and the Fungus Research Charitable Trust. Much of the research will centre around the British National Collections of fungi at RBG Kew, comprising some 250,000 specimens, but the collections at RBG Edinburgh will also be examined as well as the extensive, scattered literature on British species.

Dr Brian Spooner is project leader and Nick Legon, one of Britain's leading field mycologists, joins the Kew team as project officer. The checklist will contain species-by-species entries for all the *Basidiomycetes* recorded from Britain and Ireland, giving details of the correct name, authorities and place of publication, synonymy, distribution, frequency, bibliographic and illustration references. The list will not only be published in book format by Kew, but will also be maintained as an actively updated database available for consultation through the Internet.

Contact: Dr Brian Spooner (020-8332 5256)

A volunteer survey of the mycota of Kew, started in 1999, has already turned up several species new to Britain, including the rust *Puccinia lujulinica* on *Smyrnium perfoliatum*.



Lecanidium quercinum



Cytidia salicina

Celia R. Stephenson

Rediscovered Species

The corticioid fungus *Cytidia salicina* was last seen in Britain in 1900, but in September 1999 it was rediscovered on willow in Kielder Forest, Northumberland, by Gordon Simpson MBE, a retired forester, and sent to Kew for determination. Each year Kew's Mycology Section receives dozens of fungal species new to science found in Britain, as well as many new British records and the occasional species that no one has seen for years. It is partly to keep track of these new and rediscovered British species that a checklist and continually updated database is urgently needed.

Miscanthus Project

FUNDING for two years has been secured through a contract with MAFF for further molecular research on the grass genus *Miscanthus*. A previous contract with MAFF (1995-97) funded an investigation into the genetic diversity and biomass yield of *Miscanthus* plants available in Europe, mainly from horticultural sources; the new contract will be concerned with the genetic diversity and performance of wild source clones. This is now possible following a seed collecting trip to Korea by Steve Renvoize in 1997 and the acquisition of native material from Japan and China. The results of the research will provide the foundation for a breeding programme that will seek to develop *Miscanthus* as a biomass crop. This is a Kew-ADAS collaborative project.

Contact: Steve Renvoize (020-8332 5272)

Miscanthus sinensis on Cheju Island, S. Korea.



Ganoderma on Oil Palm

GANODERMA BONINENSE causes basal stem rot of oil palm and is the major disease constraint in this crop in S.E. Asia. A molecular diagnostic tool to detect the pathogen has already been developed in an EU-funded STABEX programme at the Papua New Guinea Oil Palm Research Association, on which Prof. Paul Bridge was a subcontractor. In a further two-year contract, this tool will be used to determine the epidemiology of *G. boninense* and related species in plantations and their environs. The work will be managed through Birkbeck College, London University, with specific activities at Kew, where the collections of S.E. Asian *Ganoderma* from pre-oil palm times will be used to determine the historic and current spread of the fungus.

Contact: Prof. Paul Bridge (020-8332 5257)

Rhizoctonia

PROF. PAUL BRIDGE and Dr Peter Roberts have obtained a Faculty of Science Research Grant from Birkbeck College to continue studies on the molecular systematics of the *Rhizoctonia*-forming fungi. These basidiomycete fungi form mycorrhizal associations with terrestrial orchids, being particularly significant in seed germination. The project will extend the existing bank of ribosomal RNA gene and spacer sequences and aims to determine the generic relationships within this heterogeneous group. Insights into speciation within each generic group will also be obtained. Culture work was initially carried out at Kew, and the DNA extraction and analysis is being undertaken through the School of Biological and Chemical Sciences at Birkbeck.

Contact: Dr Peter Roberts (020-8332 5258)

New Book

Taxonomy of Cultivated Plants (eds S. Andrews, A. Leslie & C. Alexander; RBG Kew) brings together for the first time the diverse interests of growers, breeders, scientists and those concerned with the legislation of cultivated plants. The book covers intellectual property rights, national collections, breeding, molecular techniques, genetically modified crops, plant data bases, International Registration Authorities and patenting of new cultivars. ISBN 1 900347 89 X. £27.

Contact:
Susyn Andrews
(020-8332 5275)



Award to Bernard Verdcourt



A F



The 16th AETFAT congress 'Plant systematics and phytogeography for the understanding of African biodiversity' will be held this August at the National Botanic Garden of Belgium.

Kew has a long history of taxonomic research in Africa, highlighted by the Linnean Medal awarded to Dr Bernard Verdcourt, but there is now increasing emphasis on conservation and training.

The proceedings of the 15th AETFAT congress were published by Kew in February.

NEW COLA SPECIES

FRIENDS and colleagues will be delighted to know that Dr Bernard Verdcourt is to receive the Linnean Medal for Botany in May. This is a fitting recognition of the work he has done in the Kew Herbarium over the last 35 years, particularly in the field of African botany. Before coming to Kew in 1964, Bernard spent 15 years at the East African Herbarium, where he wrote his PhD thesis on the tribal classification of the Rubiaceae. At Kew he has worked mainly on the *Flora of Tropical East Africa* and to date he has written over 60 family accounts, including major contributions to Leguminosae (Fabaceae) and Rubiaceae, amounting to between a third and a half of the whole Flora. In 1968 he took time off from African botany and spent a year in New Guinea writing his *Manual of New Guinea Legumes*. Having recorded more than 1,000 publications, Bernard continues to amaze colleagues with his productivity, but not everybody knows that he has published almost as many papers on molluscs and insects as he has on plants.

Other Awards

The research of Kew scientists will be recognised at other levels in this year's Linnean Society awards. Dr Mike Fay (Conservation Genetics Unit) will receive the Bicentenary Medal in recognition of work done by a biologist under the age of 40, and Dr James Richardson (a former Kew PhD student) will receive the Irene Manton Prize for the best PhD thesis in botany. James studied the predominantly African genus *Phyllica* and his thesis was entitled 'Molecular systematics of the genus *Phyllica* L. with emphasis on the island species'.

FTEA

A further eight parts of *Flora of Tropical East Africa* (FTEA) were published in December 1999. Seven parts (Davalliaceae, Equisetaceae, Marattiaceae, Osmundaceae, Parkeriaceae, Psilotaceae and Vittariaceae) were written by Dr Bernard Verdcourt while Zosteraceae was written by Dr Henk Beentje.

Contact: Dr Henk Beentje (020-8332 5210)

A NEW SPECIES of *Cola* was discovered in December 1999 during field-work in the East Usambara Mountains, Tanzania, when it was realised that lowland populations of a rare endemic species, thought to be *C. usambarensis*, were a new species. This discovery, confirmed by Dr Martin Cheek, represents the first new *Cola* species found in East Africa in 15 years, and it results from a project set up in 1998 by the East Usambara Catchment Management Project (EUCAMP) and Kew to develop a recovery plan for *C. usambarensis*.

The 'Endangered' status of *C. usambarensis* was highlighted by Shedrack Mashauri (EUCAMP) in a project submitted for the 1996 'Plant Conservation Techniques Course for East Africa', a joint Kew-National Museums of Kenya co-ordinated Darwin course. The plant's status was formally assessed during a 'Conservation Assessment and Management Planning' training workshop, held during the 1998 course at Amani, East Usambara Mountains. Recommendations were made to monitor factors affecting its distribution, such as fire and harvesting for building poles and medicinal use. An initial study done by



Flower of the new species of *Cola*.

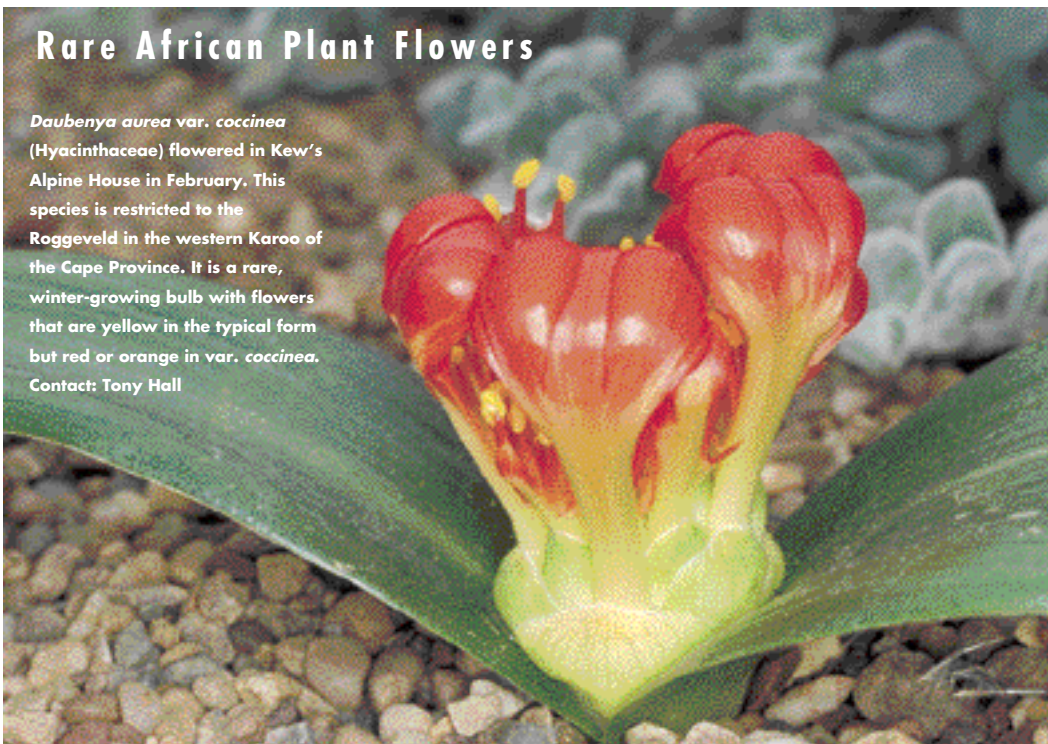
Catharine Muir (University College London) for her Masters degree had shown that many lowland populations were completely extirpated by forest fires in 1997 and they were more heavily harvested than the upland populations.

The finding that the lowland populations are not *C. usambarensis*, which appears to be restricted to higher altitudes, means that the status of both species of *Cola* is much more serious than first anticipated. The plots set up by Catharine are now being monitored regularly and EUCAMP are implementing fire protection measures in these areas.

Contact: Dr Clare Hankamer (020-8332 5584)

Rare African Plant Flowers

Daubinya aurea var. *coccinea* (Hyacinthaceae) flowered in Kew's Alpine House in February. This species is restricted to the Roggeveld in the western Karoo of the Cape Province. It is a rare, winter-growing bulb with flowers that are yellow in the typical form but red or orange in var. *coccinea*.
Contact: Tony Hall



R I C A

Grass CD

A CD-ROM of *African Grass Genera* is being produced following a request for an electronic means of grass identification that entomologists could use to name host plants in the field. The necessary descriptive and synonym information will be drawn from the World Grasses database and illustrations will be included from various Kew Flora projects. The CD-ROM is scheduled for completion in late 2001. Illustrations, descriptions and diagnoses of 300 grass genera recorded from tropical and south Africa will be presented in a format designed for use by botanists and non-botanists who are unfamiliar with grasses.

Contact: Steve Renvoize (020-8332 5272)



Aristida meridionalis in Botswana.

Earthwatch Fellows

SINCE 1993 the Earthwatch Institute (Europe) has sent 118 African and Malagasy botanists and conservationists, known as Earthwatch Fellows, to join Kew's programme of botanical inventories in western Cameroon. Each Fellow spends two weeks with a botanical team learning more about conducting inventories for conservation management and receiving training in the collection and preparation of herbarium specimens, family identification, and plot and GPS methodology.

The greatest accolade for Kew's Earthwatch African Fellowship programme has been the success of Geoffrey Mwachala. After being a Fellow in 1995, he applied to Earthwatch for funds to set up a similar botanical inventory programme for the Taita Hills in Kenya, with the support of his colleagues at the East African Herbarium, Nairobi. His all-African programme has been a great success and since 1998 Cameroonian botanists, as well as those of other nationalities, have profited from joining Geoffrey's teams in Kenya.

Contact: Dr Martin Cheek (020-8332 5434)

If you are interested in being a field assistant in Cameroon, please contact Earthwatch (01865 318831 or info@uk.earthwatch.org).

Since going live on the Internet in August 1999, over 150 organisations or projects worldwide have become registered users of SEPASAL (the Survey of Economic Plants for Arid and Semi-Arid Lands database). Of the more than 40 developing country organisations so far using SEPASAL, 20 are African. www.rbgekew.org.uk/ceb/sepasal/internet/



Aloe Gel *Aloe arborescens*

TOM REYNOLDS and Anthony Dweck (Dweck Data) have reviewed the past 14 years of research investigating the therapeutic claims made for *Aloe* gel. Recent research has largely upheld the anti-inflammatory properties of the gel and indicated additional activities such as antibiotic, anticancer and antidiabetic activities and particularly immunomodulatory effects. *J. Ethnopharmacology* 68, 3 (1999).

Contact: Tom Reynolds (020-8332 5374)

Ancient Woods

THE recently published *Ancient Egyptian Materials and Technology* (eds P.T. Nicholson and I. Shaw; Cambridge University Press) has a chapter on wood by Dr Peter Gasson and two former Kew staff, Rowena Gale and Nigel Hepper. Botanical descriptions of the woods identified in ancient Egyptian artefacts are given (with plant illustrations by Nigel Hepper) together with their uses and examples of the artefacts. The book covers the wide range of materials and food used by the ancient Egyptians and has contributions by 34 specialists from institutes and museums worldwide.

Contact: Dr Peter Gasson (020-8332 5330)

AFRICAN SEED CONSERVATION

MSB Co-ordinators

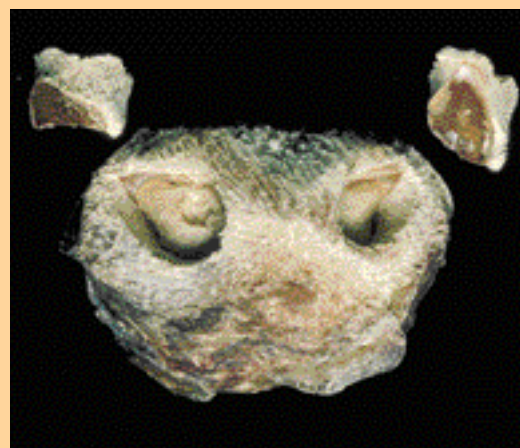
REFLECTING the importance of African partnerships in the Millennium Seed Bank (MSB) Project, the team of Regional Collection Co-ordinators for Africa has increased from one to three. Michiel van Slageren, who did cover all Africa, will now concentrate on the west and north. He is joined by Tim Pearce (previously DFID adviser to the East African Herbarium in Kenya), who will develop partnerships in the *Flora of Tropical East Africa* region and Ethiopia, and Paul Smith, who will concentrate on Kew's *Flora Zambesiaca* area, a region where he has performed biodiversity and ecological surveys for the past eight years.

Contact: Dr Michiel van Slageren (01444 894117)

Recalcitrant Trees

THE Seed Conservation Department has received a \$10,000 grant from IPGRI to quantify dryland seed storage behaviour as part of Phase II of the Danida-supported project on 'Effective conservation and use of intermediate and recalcitrant tropical forest trees'. In Phase I the storage behaviour of eight multipurpose species, including *Sclerocarya birra*, was studied. In Phase II work has already been completed on three species: *Dovyalis caffra*, *Ximenia americana* and *Strychnos cocculoides*. The collaboration extends to institutes in Burkina Faso, Tanzania and Kenya.

Contact: Dr Hugh Pritchard (01444 894140)



Fruit of *Sclerocarya birra* with the 'caps' removed to reveal the seeds inside.



Education at Kew

Botanic gardens have a major role to play in education. In an increasingly changing and industrialising world, it is vital to raise awareness about the importance of plant resources and to build knowledge, skills and enthusiasm in such a way that future generations will be able to sustain and safeguard plants and their habitats. At RBG Kew, education has been developed across three programme areas and is managed as a cross-departmental activity.

Kew's Higher Education and Training programme offers a range of courses and postgraduate project work. The suite of International Diploma Courses in Conservation, Threatened Plants, Education, Botanic Garden Management and Herbarium Techniques has already served 245 students from 91 countries. Besides going on to facilitate capacity building within their institutes and regionally, these students also support our international networking capability. Additionally, at any one time over 50 PhD students study at Kew, contributing greatly to Kew's research capacity.

Kew's schools programme involves children in plant science and conservation, whilst providing an exciting day out. Using plants as a focus, curriculum topics such as art, music, technology and mathematics are covered, supported by six Kew teacher packs. In 1999, direct training sessions were provided for over 9,000 schoolchildren and 300 teachers. This year, Kew has been cited as an innovative resource site, providing a focus for the Government's Maths 2000 initiative. For those that cannot come to Kew, we can take Kew to the school via an Outreach Unit and teacher.

Last, but not least, Kew engages the visiting public. Utilising over 80 information sheets, 250 explanatory panels, eight trails and 35 knowledgeable guides, we are able to explain the collections, science and history of the Gardens. Our Winter Lectures, together with about 24 study days and short courses, offer informal training to over 1,500 participants annually. Complex issues such as ethnobotany are explained in exhibition format. Over 250,000 people have visited the new 'Plants+People' exhibition in Museum No.1 in less than 2 years, and summer 2000 will see the opening of the new Millennium Seed Bank Project exhibition at Wakehurst Place.

Underpinned by the Convention on Biological Diversity and Agenda 21, Kew's education programmes over the next five years will focus on Kew's new emerging science strategy. Enabling our many audiences to utilise Kew's key knowledge and expertise will help build capacity locally, nationally and globally.

Gail Bromley, Head of Education

TRAINING IN

UNDERGRADUATES

Orchid Mycorrhizae

KEW offers several work placements to undergraduates whose degree courses include a year's industrial training. Reem Salman (studying microbiology at Surrey University) is working with Dr Peter Roberts and Grace Prendergast to determine whether any of the named *Rhizoctonia*-forming fungi maintained by the Mycology Section will form mycorrhizal associations with temperate terrestrial orchids.



Reem Salman

Although it is well known that such orchids benefit from fungal associations, most of the fungal strains used in the Micropropagation Unit to germinate and grow terrestrial orchids are unnamed. Already some interesting results have been obtained, with *Tulasnella helicospora* and *T. albida* giving good germination of seed of *Dactylorhiza fuchsii* (common spotted orchid). The orchids produced will be planted at Sussex University where they are developing an orchid garden growing all 49 species of British terrestrial orchids.

Contact: Grace Prendergast (020-8332 5559)

Conservation Genetics

RECENT publications on conservation genetics of *Populus euphratica* and *Cephalanthera longifolia* have been co-authored by the intern students Molly Kornblum and Hannah Thornton from Smith College, Massachusetts. The internship programme, funded by the Muriel Kohn Pokross Travelling Fellowship and the Howard Hughes III Internship Fund, is now in its seventh year and two students each year spend about 10 weeks at Kew.

Contact: Dr Mike Fay (020-8332 5366)

POSTGRADUATES

Dioscoreales

LIZABETH CADDICK successfully completed her Kew-funded PhD studentship on the 'Systematics of Dioscoreales' in January 2000. The order Dioscoreales was formerly a heterogeneous assemblage united by having petiolate, reticulately-veined leaves, but following a recent revision it now includes a broad spectrum of morphological types. Liz's thesis culminated in a combined cladistic analysis of 4,811 molecular and 47 morphological characters in Dioscoreales and allied taxa. This resolved phylogenetic relationships at family and generic levels and indicated that Dioscoreales comprise probably three families: Dioscoreaceae (including *Dioscorea*, *Trichopus*, *Tacca* and *Stenomeris*), Burmanniaceae (including Burmanniaceae and Thismieae) and Nartheciaceae. Liz has now taken up a postdoctoral position at the University of Cape Town.

Contacts: Dr Paula Rudall (020-8332 5331)

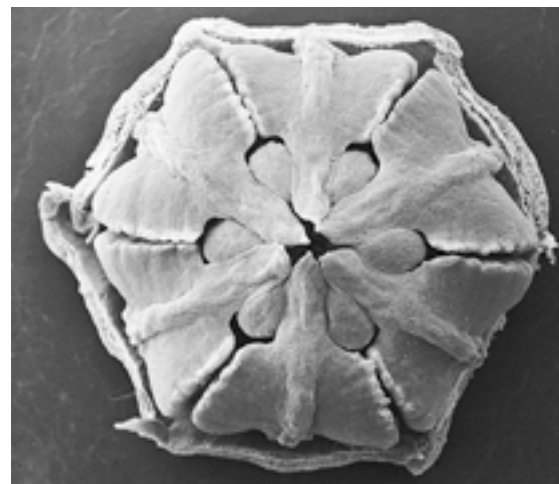
Dr Paul Wilkin (020-8332 5281)

SEM of a mature flower of *Avetra sempervirens*, showing the stamens reflexed over the style to form a chamber. *Avetra*, *Trichopus* and *Stenomeris* were three small hermaphrodite genera successfully collected and examined by Liz Caddick during her PhD research on Dioscoreales.

Anti-Malarial Plants

IN FEBRUARY, Kew-funded student Jonathan Steele was awarded a PhD for his research on the anti-plasmodial activity of plants used in the treatment of malaria by indigenous peoples of S. America. Working at Kew and the London School of Hygiene and Tropical Medicine, he confirmed that many of the species had anti-malarial activity and was able to identify some of the active compounds. His PhD forms part of a wider collaboration with Brazilian institutes.

Contact: Prof. Monique Simmonds (020-8332 5328)



SAVING FELTON'S FLOWER

KEW has a specific remit to support conservation in the UK Overseas Territories under the UK Biodiversity Action Plan. Training courses, such as the Darwin Initiative-funded 'Conservation and Cultivation of Threatened Plant Species of the UK Overseas Territories', play a major role in building capacity for Overseas Territories to implement the Convention on Biological Diversity. An example of the conservation projects such courses can promote is the work on Felton's flower, *Calandrinia feltonii* (Portulacaceae), which is endemic to the Falkland Islands.



Calandrinia feltonii

Nick Woods

Calandrinia feltonii was classed as 'Extinct in the Wild' with stocks only held in gardens, including Kew, but in 1996 populations were discovered on West Falkland. That year a recovery plan was produced by Sinéad Doherty, a student on the Darwin course who was then with the Falkland's Department of Agriculture. Subsequently, Felton's flower was adopted for the Friends of Kew Threatened Plants Appeal enabling the genetic diversity of *ex situ* stocks at Kew and on the Falklands to be determined by Dr Mike Fay and Robyn Cowan. The results have informed the recovery process, which is now being managed by the Department of Agriculture.

In 1998 Rebecca Ingham of Falklands Conservation attended the Darwin course and worked with the Department of Agriculture to co-ordinate the reintroduction of *C. feltonii* into plots free of competition from weeds and grazing. This has met with mixed success, highlighting the need for research into the factors limiting establishment; one factor may be reduced rainfall. In December 1999 it was thought that a further wild population had been found but the floral characteristics of specimens collected more closely resemble *C. ciliata*, a North American relative. This may have been introduced to the islands accidentally by North American sealers.

Contacts: Dr Clare Hankamer (020-8332 5584)

Dr Colin Clubbe (020-8332 5637)

Performing FISH

FLUORESCENCE *in situ* hybridisation (FISH) is an important technique in modern plant genome research and Kew scientists played a key role in developing its biosystematic uses. Two international training workshops were held at Kew in the 1990s, sponsored by NERC, and transfer of this technology will now be aided by the release of a training video 'Fluorescence *in situ* hybridisation to plant chromosomes', jointly produced by the University of Nottingham and RBG Kew, and funded by DfID.

Contact: Dr Ilia Leitch (020-8332-5329)

Genomics, which unifies our perception of genomes, and the new classification of angiosperms, which uses genomic information to understand phylogeny, are key modern developments in plant science. At the 8th Plant and Animal Genome Research conference in January, Prof. Mark Chase addressed 1,600 scientists on 'A clear picture of angiosperm phylogeny: a tool for all areas of biological research', while Prof. Mike Bennett reviewed 'Polyploidy in angiosperms'.

Mellon Fellowships

ONE of the first Latin American scientists to be awarded a grant under the Kew Latin American Research Fellowships Programme was Dr Victoria Sosa (Instituto de Ecología, Xalapa, Mexico). She spent August to December 1999 at Kew studying in the Molecular Systematics Section where she investigated the relationships and biogeography, from a phylogenetic standpoint, of the Mexican endemic genera *Velascoa*, *Cordia*, *Dignathe* and *Chiangi dendron*. Her research is part of a wider programme of study in Mexico to establish strategies for biodiversity conservation.

The fellowship programme, funded by the Andrew W. Mellon Foundation of New York City and based at Kew, supports research study visits of between three and 12 months by Latin American systematic botanists to Kew and other European taxonomic institutes.

Contact: Michael Daly (020-8332 5725)



Brugmansia plants on sale in the UK should now carry the warning label 'CAUTION toxic if eaten'.

Hazardous Plant Labelling

TO increase public awareness of the hazards of plants on sale in the UK, staff at Kew and the Medical Toxicology Unit (Guy's & St Thomas' Hospital Trust) have compiled toxicological reports on almost 280 genera. The Horticultural Trades Association (HTA), which funded the work, met in February to consider which species should be added to their 1994 *Code of recommended retail practice relating to the labelling of potentially harmful plants*.

The Code, which has been widely adopted by plant retailers, includes plants in three categories depending on the severity of their toxicity. *Rhus* species, causing severe allergic contact dermatitis, are still the only plants in the highest toxicity group, category A. However, ten new taxa have been added to category B, and two have moved up from category C, giving a total of 33 plants that carry the warning label 'CAUTION toxic if eaten', with some variations for plants in which contact is a hazard. Category C now covers 82 taxa, including 50 additional plants, and these carry warnings such as 'Harmful if eaten / skin + eye irritant'. The revised edition of the Code was published by the HTA in March 2000.

Contact: Dr Liz Dauncey (020-8332 5699)

Gardens' Interpretation

The success of the Gardens' 250 education panels in educating visitors is being assessed in an ongoing evaluation programme. In feedback from over 1,100 visitors to the Waterlily House summer display, 85% read, appreciated and enjoyed them. Another study found that simply moving a panel by two metres could double its readership.

Contact: Dr Erica Bower (020-8332 5642)



BRITISH VIRGIN ISLANDS

Conservation and Training

A SPECIES and habitat assessment for Gorda Peak National Park (GPNP), Virgin Gorda, British Virgin Islands (BVI), has been completed through two workshops on 'Species Identification, Survey and Monitoring Techniques' hosted by the BVI National Parks Trust. The second workshop was held in November 1999 and was facilitated by Drs Colin Clubbe and Clare Hankamer who were joined by Dr Mike Gillman (Open University) and Dr Pedro Acevedo (Smithsonian). The aim of this training is to help build capacity within the National Parks Trust and government departments in order to evaluate the plant diversity of the Territory.

GPNP is a key protected area of dry Caribbean forest, a globally important habitat, and supports a large proportion of the island's species and significant populations of regionally rare plant species. For example, an initial assessment performed during the workshops revealed more than 30 individuals and many seedlings of *Calyptanthes thomasiana* (Myrtaceae); outside Virgin Gorda this species is known only from two populations numbering 112 individuals. Three trees and one seedling of *Zanthoxylum thomasianum* (Rutaceae) were also found. The discovery of the seedling is particularly important since the populations on St John (US Virgin Islands) suffer from a seed weevil and no seedlings are



Above: **Seedling of *Zanthoxylum thomasianum* found in the Gorda Peak National Park.**

Left: **Gorda Peak National Park.**

known. Two further species, *Machaonia woodburyana* (Rubiaceae) and *Neea buxifolia* (Nyctaginaceae), not previously recorded for Virgin Gorda, were also recorded within GPNP. The former species was first described from St John and was thought to be endemic to the island.

Data from these and future BVI workshops will contribute to species recovery planning and the GPNP Management Plan that is being developed in collaboration with Fauna & Flora International as part of this Darwin Initiative project.

Contact: Dr Colin Clubbe (020-8332 5637)

Threatened Plants

A CONSERVATION audit of the living collections of plants has revealed that Kew holds 2,042 species that bear an IUCN Category of Threat. The audit was undertaken by Dr Wolfgang Stuppy who was appointed as Kew's Threatened Plants Officer in February 1999. This post was created to identify and highlight threatened species in the living collections and to co-ordinate *ex situ* conservation activities. The information from the audit will be incorporated into the Living Collections Database and updated annually.

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Wolfgang Stuppy with *Ramosmania rodriguesii*, a species classified as 'Critically Endangered'.



Botanics

KEW'S plant biologists have worked in association with scientists from Boots to expand the company's range of cosmetics and skin care products. The products contain extracts and essential oils of common plants with well known herbal properties, such as *Aloe vera*, rosemary, lavender and hawthorn. The work involved a literature search and analysing the extracts to investigate their authenticity and confirm that they contained the characteristic ingredients. The products, marketed as the 'Botanics' range, were launched this spring.

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