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samara

The International Newsletter of the Partners of the Millennium Seed Bank Project

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UK Flora Programme – British Overseas Territories

As an a continuation of the UK Flora Programme, which is now drawing to a close, it was decided to extend the work to the UK's Overseas Territories (OTs). These remaining fragments of the British Empire are largely self-governing, but the UK Government retains formal responsibility for defence, external affairs, security and public services. It also has a nominal responsibility for conservation, though much of the practical work is carried out by local government departments or NGOs.

The Overseas Territories are almost all – with the exception of Gibraltar and the British Antarctic Territory – small islands, and as such face the conservation challenges common to many of the world's islands, such as invasive alien plant species, introduced animals, tourist pressure, etc. However, despite these pressures, many of the OTs remain floristically very diverse, with high rates of endemism.

Above: ***Cordia rupicola*, endemic to Anegada**
Far left: **Andy McGowan, Darwin Project Officer, on Anegada**
Left: ***Acacia anagedensis***

The British Virgin Islands

Though some of the OTs are tax havens or receive a significant income from tourism, many of them have a relatively low *per capita* income. However, the political link to the UK means that they are often regarded as part of the 'developed world' and thus not eligible for the funding which is available to countries with similar economies. This necessarily has an impact on conservation work.

Fortunately, the UK Foreign & Commonwealth Office (FCO) administers an Environment Programme for the Overseas Territories, and this has facilitated a range of projects throughout the OTs, from publicity and awareness-raising to practical conservation action. This Programme generously funded a pilot project of seed conservation work in four of the OTs – Ascension, the Falklands, St. Helena and the British Virgin Islands.

The work in the British Virgin Islands (BVI) was able to take advantage of an existing Darwin Initiative project jointly organised by Kew, the Royal Society for the Protection of Birds and the Marine Turtle Conservation Group. This work was confined to one island, Anegada, and involved vegetation survey, bird census and turtle monitoring work. The main partners in territory are the BVI National Parks Authority and the government's Fisheries and Conservation Department. Steve Alton (Donations Officer, MSBP) visited in November 2003 and was able to tap into the existing network established through the Darwin project, and training in seed collection was carried out as part of a larger training exercise. In addition to work on Anegada, some collecting was also undertaken on Virgin Gorda.

Story continues on page 2

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Ascension Island

Ascension has suffered more than most islands from introductions of humans, and as a result has lost almost all of its nesting seabird colonies and most of its endemic plants. The majority of the island is volcanic, with very little vegetation of any kind. Only the central peak, Green Mountain, supports significant plant communities, and here the majority of species are alien.

The MSBP is working with the Government Conservation Department to conserve the few native seed-bearing plants still found on the island. The endemic Ascension Spurge (*Euphorbia origanoides*) and a grass, *Sporobolus cespitosus*, were collected on a recent trip. The FCO grant is also funding the development of a propagation facility for some of the endemic and threatened fern species.

Above: **Green Mountain, Ascension**

Above, centre: **Ascension Spurge, *Euphorbia origanoides***

Above right: **Stedson Stroud, Ascension Conservation Dept., collecting Ascension Spurge**

Right: **Steve Alton with *Marattia purpurascens*, Green Mountain, Ascension**

The Falkland Islands

The flora of the Falkland Islands is approximately 170 species, and though it has many affinities with that of southern Argentina, it does include several endemics and distinct sub-species. Much of the original vegetation has been degraded by burning and subsequent heavy grazing, and now comprises dwarf-shrub maritime heath.

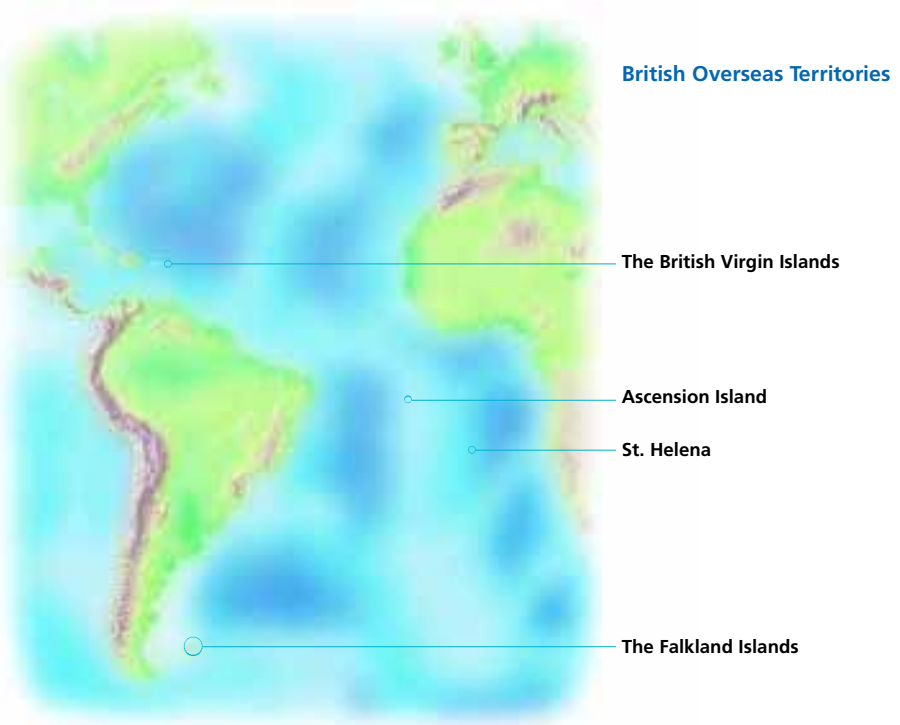
Many of the rarer species are confined to relatively inaccessible islands where grazing pressure is less. The MSBP is working with the newly-created Herbarium of Falklands Conservation, an NGO conservation charity. A successful collecting trip in February 2004, working with volunteers, resulted in collections of 20 species, more than 11% of the islands' flora.

Clockwise from top: **Marsh Marigold (*Caltha sagitatta*), Snakeplant (*Nassauvia serpens*), Balsam-bog (*Bolax gummifera*), Sea Cabbage (*Senecio candicans*), Volunteers collecting near minefield, King penguins.**

St. Helena

St. Helena is similar in origins and geology to Ascension, and has suffered similar losses to its original vegetation. In particular, the original forest cover has been lost to goats, with the remaining semi-natural vegetation confined to the central mountain peak. Of the 320 or so native plant species, a remarkable 80% are endemic, but many of these are reduced to very small populations. RBG Kew has had some involvement in the *ex situ* conservation of St. Helenian plants in the past, and the MSBP looks to further this in the future. A training and collecting trip is planned for November/December 2004.

For more information, please contact:
Steve Alton
s.alton@kew.org



Seed information Database: Latest SID release (v.6) and new Seed-Information Coordinator

Aulax pallasia

Many Partners will be aware of the Project's Seed Information Database (SID) and we hope a good number have actually found it both useful and usable. The more observant will have noticed that version 6 failed to appear at the end of January, following version 5 last August. Version 6 will now appear at the end of August this year. The delay has been largely due to the fact that our former SID Database Officer, John Tweddle moved on to pastures new last year (the Natural History Museum, in fact). Around the time he left, we had begun the process of enlarging the scope of his job, to include both the management of all scientific enquiries coming in to the Seed Conservation Department and research, through large-scale analyses of the growing dataset (e.g. Tweddle *et al*., 2003).

The expanded role is reflected in the post's new title of Seed Information Co-ordinator, and in February we welcomed its new incumbent,

Lavandula stoechas

Sarah Flynn. Irish by birth, Sarah studied in Dundee; and her background is in plant science and conservation. *Primula scotica* plants, which she tissue-cultured in one of her projects with Erica Benson, are now growing happily out of doors, and await re-introduction to a nature reserve in the Orkneys, Scotland. On top of that she has an MSc in Bioinformatics - pretty relevant in her new role!

Ulex europaeus

Sarah's first priorities have been the overdue update to SID and the co-ordination of scientific enquiries. As well as new records for seed mass and germination protocol, SID v.6 will have two new modules. One is an on-line utility allowing users to carry out a variety of seed viability calculations, based on the 'Improved Viability Equation' of Ellis and Roberts (1980), and connected to a recent compilation of available estimates of species' viability constants. The second is a module on seed and fruit morphology and anatomy, initially for around 130 species, but hopefully growing steadily much larger. It will have comprehensive data on external and internal morphological characteristics, as well as high quality images for each species covered.

Acacia cyclops

Adriana tomentosa

Perhaps the most immediate and significant point to make to Partners about Sarah's role with scientific enquiries is that they should contact her in the first instance, rather than going to the International Co-ordinators. Partners are able to request special searches or analyses of SID data for their particular purposes, rather than downloading one record at a time, as is the case for general SID users. This is a service they can expect as part of their status as Partners in the MSBP.

Acacia burkei

For more information, please contact:
Sarah Flynn
s.flynn@kew.org

A selection of international programme activities

Namibia

The NPGRC, with the kind collaboration of the National Herbarium and the Ministry of Environment and Tourism, recently undertook a short field trip to the extreme south-east of Namibia to do Red List field assessments. The area was fairly poorly known. We knew that there is a rich diversity of succulent plants growing in that area, but we had no idea what their true status was, only that many of them are targeted for illegal succulent collecting. The friendly co-operation of some farmers in the area ensured that we saw some of the rarest and most sought after succulents in the country. Some of the farmers are keeping a close eye on the plants in order to protect them and there are some flourishing populations.

Unfortunately the season for seed collecting was not ideal as only a few plants had capsules but we have permission from the farmers to return to the area when they have had some good rains. Timing in this regard is crucial as the plants of some species recede in the dry season to such an extent that they can only be spotted by the keenest eye. We are looking forward to collecting seed of *Lapidaria margaretae*, *Lithops julii*, *Conophytum friedrichiae* and at least two *Dinteranthus* species and *Titanopsis hugo-schlechteri*. There are also other important succulents like *Avonia quinaria* and *Anacampseros karasmontana*, but we foresee that it would be extremely difficult to collect seed of these species as timing for this activity would once again be crucial, especially as seeds seem to be shed very quickly after ripening.

Below, left to right: ***Avonia quinaria* highly sought after by succulent collectors, *Dinteranthus* sp., *Lapidaria margaretae*, *Lithops julii*, rare 'peppermint cream' form.**

Botswana

During its first year of operation the MSBP in Botswana made 128 seed collections during four expeditions. Most importantly, populations of 18 out of Botswana's 43 Red Data List species were found, and seed was collected from 10 of these. The Project partners in Botswana are the National Plant Genetic Resources Centre, the National Herbarium and Botanical Garden, Veld Products Research and Development, and the National Tree Seed Centre. All these partners participated in the expeditions. Exciting collections made this year include *Hoodia currori* (used traditionally as an appetite suppressant) and *Erlangea remifolia* (only 6 plants known to exist).

Contact person **Birgitta Farrington**
Farrington@info.bw

Hoodia currori

Saudi Arabia

An expedition in April-May to the northwest and central west regions of Saudi Arabia yielded 38 collections. The Saudi Arabian part of these are held in trust at the MSB. Our counterpart the National Commission for Wildlife Conservation and Development (NCWCD) has received funds to build a seed bank in at their headquarters in Riyadh. The design has been greatly revised by MSB staff, and the re-design was discussed with the MSB co-ordinator while in Riyadh. We currently await an updated version for further advice. Eventually all Saudi parts of the collections from the Kingdom that are held in trust in the UK will be repatriated to this new facility.

Left to right:
***Adenium obesum flowers* at Wadi Baysh**
Adenium obesum
***Dracena serrulata* at Wadi Baysh**
***Cistanche tubulosa* near Al Jubail**

Malawi

The MSBP in Malawi has concentrated its collecting effort in miombo woodlands during its first year. The collecting programme, co-ordinated by the Forest Research Institute of Malawi, but also involving other project partners the National Herbarium and Botanical Garden and the National Plant Genetic Resources Centre, have made over 100 seed collections so far this year. Our other project partner, the National Research Council of Malawi, have designed a series of educational leaflets to increase public awareness about Malawi's endangered, endemic and economic plants.
Contact person **Paul Smith**
p.smith@kew.org.

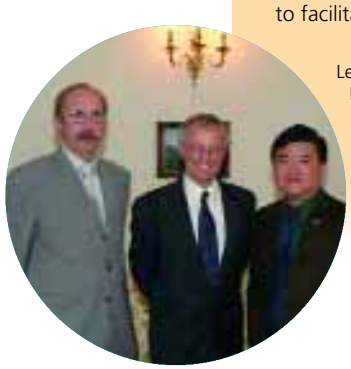
***Brachystegia boehmii* in miombo woodland.**

China

On 10 May China became the latest country to join the MSBP.

Professor Chen Zhu, Director, Vice President of the Chinese Academy of Sciences signed the agreement for the Kunming Institute of Botany and Professor Sir Peter Crane, Director of Kew, signed for RBG Kew. Also present was Professor Li De-Zhu, Deputy Director of the Kunming Institute. The occasion coincided with the visit to London of Wen Jiabao, Premier of the People's Republic of China. Lord Whitty of Camberwell, Parliamentary Under-Secretary for the UK Department for the Environment, Food and Rural Affairs was present at the signing.

The MSBP will be working with the Kunming Institute of Botany (part of the Chinese Academy of Sciences) on their programme to construct and manage the Southwest China Wild Species Bank. Staff at the MSB will share their experiences in relation to development and running of a large-scale seed banking facility, and the partners will work together to collect and conserve seed, data and herbarium vouchers from indigenous and threatened species. The agreement formalises the earlier collaborations with CAS researchers. As part of the MSBP Enhancement Grant from the Millennium Commission a Chinese speaker will be recruited to work at the MSB for three years to facilitate the development of this partnership.



Left: **Roger Smith, Professor Sir Peter Crane and Professor Chen Zhu at the signing.**
Below: **Professor Sir Peter Crane with Professor Chen Zhu.**

Australia

Queensland Seeds for Life: An international partnership in seed conservation and research for the State of Queensland, Australia
Over the next 6 years, the Queensland Seeds for Life program will make a major contribution to the MSBP through the collection and duplication of seeds from some 1000 plant species. The State of Queensland offers a unique opportunity to access a significantly endemic flora, especially from the more Northern tropical forest where the particular seed conservation challenges of desiccation sensitivity will drive a major part of the research programme. Seed collections will also target rare and threatened species as well as those used by the mining industry in revegetation programmes.

The recent signing of an Access & Benefit Sharing Agreement between RBG Kew and the Queensland State Environmental Protection Agency heralds the start of the fourth collaboration within the MSBP Australia Programme. The Queensland Seeds for Life Project will be managed and implemented by a consortium of Queensland research, non-government organisations and Government bodies collectively called the **QSeed Partnership**.*

For further information on Seeds for Life, contact **Geoff Borschmann** (gborschmann@qld.greeningaustralia.org.au) or **Tim Pearce** (t.pearce@kew.org).

*A more detailed article will be available in the next issue.

Flowers from the Chilean desert

Left: ***Leucocoryne* sp. in flower**
Above: ***Alstroemeria pelegrina* flowers**

Every 4 to 5 years, as a consequence of the climatic phenomenon called EL NIÑO Southern Oscillation, the Coastal Desert of the North of Chile (18°30`S to 30°S) becomes green, with a great variety of plants producing flowers of many different colours, a phenomenon known as the 'flowering desert'. Although this event occurs in other deserts of the world, the flowering desert is unique in Chile due to the high percentage of endemic plants. About 58% of the plants are only found in Chile and 32% are restricted exclusively to this geographical area.

Due to their beauty and diversity in colour, these species have great potential as ornamental plants for gardens and for cut flowers. In fact, the development and the economic importance of *Alstroemeria* is known in the cut flower markets world-wide. Other geophyte species of high potential include species of *Leucocoryne*, which at the moment are being improved for cut flowers. Endemic to Chile, the genus *Leucocoryne* has 11 species. Almost 50% of *Alstroemeria* species are found exclusively in Chile, most of them in the north and centre of Chile.

Most of the efforts of the MSBP-Chile, made by members of the National Seed Bank of the Instituto de Investigaciones Agropecuarias (INIA), have been focused on the conservation of the genetic diversity of endemic, vulnerable and endangered plants from the coastal desert zone of Chile. Samples of 130 species have been collected so far from this area, representing around 50% of the total collection in the country, several of these are vulnerable and endangered. In addition to *Alstroemeria* and *Leucocoryne* species, seeds of *Leontochir ovallei*, *Tigridia philippiana, Hippeastrum spp.,* and *Zephyra elegans*, have been collected.

First *Tecophilaea cyanocrocus* seed samples banked

Recently, members of the Philippi Foundation (Santiago de Chile), managed to collect 1,200 seeds from 64 plants of *Tecophilaea cyanocrocus*. For several decades *T. cyanocrocus* was believed to be extinct, but a population was recently discovered (spring 2001) Southwest of the capital Santiago. This material is conserved in the National Seed Bank of INIA, in Vicuña, 500 km north from Santiago de Chile. These samples of *T. cyanocrocus* are the first material coming from a wild population to be conserved in a seed bank. At the moment this material will be used only for conservation purposes, although there are plans to initiate a program of regeneration and to study its reproductive biology, and probably also its genetic diversity. For security reasons, the locality and its geographical coordinates are known only by some members of the Philippi Foundation. There are plans to initiate a new collection this spring together with members of this Foundation in order to obtain a duplicate to 3,000 seeds. This will allow a duplicate collection to be conserved in the Millennium Seed Bank of RBG Kew. INIA and the Philippi Foundation hope to formalise this co-operation as soon as possible, in order to extend the activities of collection to other rare and endangered species in the central zone of Chile.

***Tecophilaea* population**

***Zephyra elegans* flowers**

Red and yellow *Leontochir ovallei* flowers

For more information please contact:
Dr. Pedro Leon
Encargado Banco de Semillas
Instituto de Investigaciones Agropecuarias
pleon@intihuasi.inia.cl

CONABIO grant strengthens **Mexico project team**

FES-Iztacala UNAM have received a grant of 734,200 Pesos (c. $64,400 (US)) to strengthen their seed-conservation project in central Mexico. CONABIO, the National Commission for Knowledge and Use of Biodiversity, made the two-year grant in November 2003 as part of the *ex situ* conservation program.

The funding has enabled recruitment of Ulises Guzmán, a Cactaceae specialist, to extend the seed collecting program into Hidalgo and neighbouring states. This will complement the ongoing work in the Tehuacán-Cuicatlán Valley, led by the senior collector Ismael Calzada.

In recognition of the major effort now going into the collecting programme, the CONABIO grant also provides support for two laboratory staff to help seed cleaning and germination testing of the collections, plus support for data capture using the BIOTICA database. In time, the specimen data will be available through the World Biodiversity Information Network REMIB [1]

Dr Patricia Davila, Head of Postgraduate Studies at UNAM is enthusiastic about the grant because it complements the human and material resources that they need to carry out the project. She said ''It also enables the reinforcement of the collecting effort, in such a way that more species from different arid zones can be obtained within the time frame of the project. Also the grant demonstrates the interest and commitment of the National Government to this *ex situ* conservation project, which has not commonly been the case in Mexico''.

The seed research at FES-Iztacala UNAM will also benefit as a wider range of material is available for researchers investigating the viability and aging of seeds under different conditions.

The Mexican arid and semi-arid lands are home to c. 6000 native plant species, approximately 20% of the biodiversity of Mexico. FES-Iztacala UNAM is working with RBG Kew to submit additional funding proposals to strengthen the project further. Michael Way, Americas Co-ordinator commented "The human pressures on the Mexican drylands are intense, and it is urgent that we continue to expand our project activities in Mexico. We also hope to strengthen links with other organisations in Mexico to learn more about the options for sustainable use of plant diversity from these precious areas".

Above: **Newly appointed collector Ulises Guzmán** (left)**, with Ismael Calzada and Michael Way beside the recently purchased collecting vehicle.**

Left: **Ismael Calzada collecting in the Tehuacán valley during the dry season**

For more information, please contact:
Michael Way
m.way@kew.org

[1] www.conabio.gob.mx/remib/doctos/remib_esp.html

An interesting collection from **South Africa**

Erica margaritacea was once found on the sandy Cape Flats from the Cape Peninsula to Stellenbosch. Farming and urban development has reduced the natural range of this species to a small area within the Kenilworth Race Course. It is therefore categorised as Endangered. The specific name 'margaritacea' is derived from the Latin meaning 'pearl' and refers to its lovely pearl-like flowers.

Erica margaritacea forms an erect shrub to about 50cm tall. It has fine slender branches and small lime-green leaves. Small pearly-white or pink, urn or cup-shaped flowers are borne in clusters near the ends of the branches. Flowering occurs from October to March.

Seed was collected in February 2004 and is being processed by the Cape section of the MSBP. Some of the seed will be lodged in the MSB and some will be used as part of a new conservation initiative involving restoration of disturbed areas at Kenilworth Race Course and Rondevlei Nature Reserve. *Ex situ* collections are also housed and displayed at Kirstenbosch National Botanical Gardens.

For more information, please contact:
Anthony Hitchcock
hitchcockan@nbi.ac.za

NEWS

Latin America Program Officer

Tiziana Ulian joined the Seed Conservation Department at Wakehurst Place in May 2004.

Tiziana, an Italian national, has several years experience of carrying out research on plant biology and ecology for plant conservation and sustainable management. She has recently completed her doctoral thesis on the conservation and impact of harvesting of a medicinal plant in the Venezuelan Andes, in association with the University of Greenwich and the Natural Resources Institute in Kent.

Tiziana will work closely with project partners and the International Team to increase the plant conservation and sustainable use impact of the Latin American projects.

For more information, contact:
Tiziana Ulian
t.ulian@kew.org

Americas Research Officer

Dario Prada joined the Seed Conservation Department at Wakehurst Place this May. He will be supporting Hugh Pritchard and Michael Way to develop an integrated science programme amongst the MSBP's America's partnerships that addresses the constraints to effective seed conservation.

Dario, a Spanish national, has completed a PhD and postdoctoral position on plant genetics at University of Lleida (Spain) working on barley seed dormancy. He has experience of managing science projects in Peru through the characterization of Andean native grains and has carried out research in association with the Washington State University (USA).

Dario will work with partners to assess opportunities for science input to support seed conservation activities in the Americas.

For more information, contact:
Dario Prada
d.prada@kew.org

Samara available electronically

All issues of Samara are available electronically in English (French and Spanish versions from issue 2) from the MSBP Samara web page **www.kew.org/msbp/samara**

Fruit and Seed Morphology Workshop

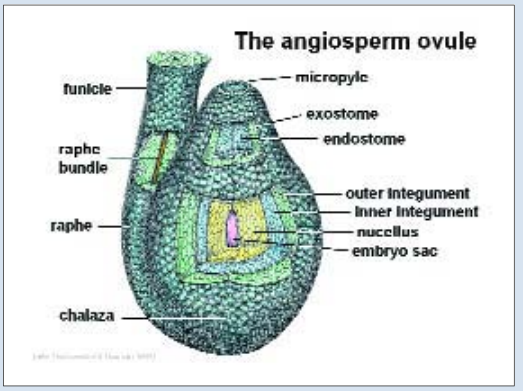
A fruit and seed morphology workshop was run by the University of Queensland's Seed Biology Group, March 1 to 3, 2004, at the University's St Lucia campus, Brisbane, Australia.

The Workshop presenter was Dr Wolfgang Stuppy, the MSBP seed morphologist. The workshop consisted of two lecture programs providing an introduction to the morphology of fruits and an introduction to the morphology and anatomy of seeds.

The first lecture program focused on the morphology and development of the different fruit types and covered aspects such as the difference between gymnosperm and angiosperm fruits, the criteria used for the morphological classification of fruits and a description of the different fruit forms found.

The second lecture program was an introduction to the morphology and anatomy of seeds and included a discussion of the development of the angiosperm ovule, the different types of ovules, internal seed morphology, seed coat anatomy and seed appendages and seed dispersal.

The workshop was an outstanding success and provided an invaluable introduction to the theory behind fruit and seed morphology and development for the 30 attendees from eastern Australia.



The workshop was the first of several that may be anticipated in the coming years as a large RBG, Kew, MSBP initiative gets underway in eastern Australia.

Steve Adkins (University of Queensland)

A similar workshop was held at Kings Park and Botanic Garden, Western Australia.
For more information, please contact
Wolfgang Stuppy
w.stuppy@kew.org

1st International Meeting on Seed Ecology

A range of individuals from the MSB, as well as partner countries including Australia and South Africa, attended the 1st International Meeting on Seed Ecology held in Rhodes, Greece from 29 April to 4 May 2004. This conference showcased the latest developments in seed ecology from across the world: 180 delegates from 33 countries attended and in total presented 67 talks and 96 posters. These covered topics such as seed dispersal, smoke and germination, dormancy and the ecological relevance of seed mass. The 2nd International Meeting on Seed Ecology will be hosted by our partners at King's Park Botanic Gardens in Western Australia in September 2007 and promises to be as exciting as the first meeting!

For more information, please contact
Matt Daws
m.daws@kew.org

Millennium Seed Bank Collection Figures to 21 June 2004

	total in MSB	since Phase III started
Collections	20 538	9 054
Species	9 414	4 995

WE WANT TO HEAR FROM YOU!
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Please let us know if you want to be removed from the mailing list.

Contact the editor **Anne Griffin**,
Librarian & Information Officer
Royal Botanic Gardens, Kew
Wakehurst Place, Ardingly, West Sussex, RH17 6TN, UK.

tel: +44 1444 894178 fax: +44 1444 894110 email: a.griffin@kew.org

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