



PlantNetwork

The Plant Collections Network of Britain & Ireland

Seed Collection and Storage

Training Day

22nd October 2015

Wakehurst Place

www.plantnetwork.org

@plantnetwork

Programme

- 9.30 - 10.00** **Registration in the Mansion dining room**
- 10.00 - 10.05** **Welcome**
- 10.05 - 10.40** **An introduction to the basic principles of seed collecting and storage**
Stephanie Miles, UK Collections coordinator,
Millennium Seed Bank (MSD)
- 10.40 - 11.10** **UK tree seed project – collecting the UK’s trees MSB project**
Simon Kallow, Project Officer UK National Tree Seed project
- 11.10 -11.25** **TEA AND COFFEE**
- 11.25 -12.00** **Collecting and banking our living collections at Kew – controlled pollination**
Noelia Alvarez and Michelle Sanchez, Botanical Horticulturists RBG Kew Tropical Nursery
- 12.00 - 12.35** **Heritage Seed library – collecting vegetable cultivars in the UK**
Neil Munro, Manager of the Heritage Seed Library, Garden Organic
- 12.35 - 13.00** **Plant hunting and wild seed collecting – a collaborative approach**
Dan Luscombe, Forestry Commission and Guy Horwood Oxford Botanic Garden

13.00 - 13.20 **Questions**

13.20 - 14.00 **LUNCH**

Split into groups for afternoon demonstration sessions

Group 1 **Practical seed collecting demonstration**
14.00 - 15.00 Iain Parkinson, Jo Wenham, Chris Jenkins,
Plant Propagation & Woodland Conservation
Group 2 Units at Wakehurst Place. In the gardens at
15.00 - 16.00 Wakehurst

Group 2 **Herbarium specimen collecting and Seed**
14.00 - 15.00 **cleaning demo**
Frances Stanley, Seed Processing Assistant
Group 1 and Janet Terry Seed Collections Manager,
15.00 - 16.00 MSB. In the MSB.

16.00 **Questions and close**

Pam Smith, PlantNetwork Administrator

PlantNetwork website

All presentations from our training and conferences are shared through our website. www.plantnetwork.org. Our website search facility also allows you to find previous newsletter articles, presentations and downloads.

Speaker Biographies

Stephanie Miles, UK Collections Coordinator

Stephanie coordinates the seed collection programme of the UK flora through cooperation with a range of organisations and individuals. This includes management of projects designed to strengthen the range and quality of seed bank collections available for research, education and restoration. She assists with seed collection and propagation initiatives for priority species in support of in-situ restoration and recovery projects via the UK Native Seed Hub. Stephanie also provides advice and training to UK seed collectors to ensure that appropriate collecting protocols are followed, including accompanying data, herbarium specimen and tissue sample wherever possible.

Simon Kallow, UK National Tree Seed Project Officer

Simon is the Project Officer on the UK National Tree Seed Project. This involves building a multi-provenance seed collection of all woody trees and shrubs from across the UK at the Millennium Seed Bank. He develops seed collecting partnerships with forestry and conservation organisations, and arranges and carries out fieldwork. Simon also works on project management and building the infrastructure of the project, including developing sampling strategies, prioritising targets, building a database, contributing to research and public engagement.

Kallow, S. (2014). *UK National Tree Seed Project: Seed Collecting Manual*. Royal Botanic Gardens, Kew, Surrey.

Kallow, S. (2014) Making a national tree seed collection in the UK, *CFA Newsletter* (65), 9-10.

Noelia Alvarez, Botanical Horticulturist

RBG Kew Tropical Nursery Glasshouses, Nurseries and Decorative Horticulture

Noelia qualified as an Agronomist Engineer at the Polytechnic University of Madrid in 1997, a 6 year full time degree in the speciality of phytotechnology, and is also a qualified teacher. Noelia started working at RBG Kew in 1998, firstly in the Arboretum as a botanical horticulturist and later as propagator horticulturist in the Temperate & Arboretum nursery. The nursery specialises in propagation and cultivation of woody plant species from sub-alpine to tropical rain forest. In 2003 Noelia became Team Leader of the Temperate & Arboretum nursery leading a small team of staff, students and volunteers and joined a new project in partnership with the Millennium Seed Bank, collecting seeds from our Living Collections at Kew In 2006.

Michele Dani Sanchez PhD, BSc, Botanical Horticulturist

RBG Kew Tropical Nursery, Glasshouses, Nurseries and Decorative Horticulture and Caicos Pine Project Co-ordinator, Conservation Science, Herbarium

Michele gained a PhD in Biology at Birkbeck University of London, UK (2012) and BSc in botany at UFRGS, Brazil (1998)

and has been a botanical horticulturist at Kew since 2002, gaining the three-year Certificate in practical training in botanical horticulture and the RHS General Certificate in Horticulture in 2004. Michele has been a member of staff at the Tropical Nursery at Kew since 2005 and team member of the Kew/MSB/Wakehurst project 'Seed collection from the living collections' since 2009. Experienced in cultivation and propagation of tropical and temperate plants, curation of living collections, controlled pollination and seed collection, horticultural training and database.

**Neil Munro, Manager of the Heritage Seed Library
Garden Organic**

The Heritage Seed Library which maintains and makes available a wide range of around 800 varieties of vegetables. Also providing training in saving seed and how to maintain small collections.

**Dan Luscombe, Assistant Curator
Bedgebury National Pinetum.**

Dan is also co-founder of the British Conifer Society and takes part in plant hunting expeditions. Dan manages the National Pinetum nursery and masterminds the landscaping of Bedgebury's tree collection.

Iain Parkinson, Conservation and Woodlands Manager. Wakehurst Place

Responsible for managing Wakehurst's unique tree collections, nature reserves and woodlands. Iain has worked at Wakehurst for the past 28 years helping to restore the tree collections following the Great Storm in 1987. He has a particular interest in traditional woodland management and more recently has been involved in restoring and creating a suite of quintessential Wealden meadows across the Wakehurst estate. He enjoys the challenge of developing the botanic tree collections whilst protecting the inherent natural beauty of Wakehurst.

Jo Wenham, Plant Propagation and Conservation Manager Wakehurst Place

Jo studied a BSc degree in Land based enterprises, before joining Kew Jo worked in the commercial nursery sector for 6 years. Jo is responsible for managing the nurseries, parterres, UK Seed Hub production site and Children's Heritage Garden at Wakehurst. The Wakehurst's nursery grow thousands of plants for the Botanical collections and the Millennium seedbank. Jo has a particular interest in plants species from the southern hemisphere and has travelled to Tasmania, North America and Chile to collect seed. Jo also started Kew's project group which aims to collect and bank Kew and Wakehurst's own living collections. Jo has recently developed the Children's Garden at Wakehurst inspired by her two little boys Elliott and Alfie.

COLLECTING AND BANKING OUR LIVING COLLECTIONS AT KEW – CONTROLLED POLLINATION

Noelia Alvarez and Michele Sanchez Tropical Nursery, Royal Botanic Gardens Kew, Richmond, TW9 3AB, UK

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Background

The 'Seed Collection from Living Collections' project at RBG Kew started in 2006 as an inter-departmental effort to bank seeds from the living collections and to contribute to the MSB target to conserve 10% of the world's flora by 2010. Since then, the project has developed gradually into banking the many wild collected, conservation rated and historical specimens found at RBG Kew living collection to preserve these important plants for future use. RBG Kew living collection holds 14139 accessions which are IUCN red listed. Updating this information on RBG Kew database and identifying priority plants to be targeted has been essential to the success of the project. Unfortunately, many of these plants cannot be banked since they have recalcitrant seeds. Other problems encountered are self-incompatibility, lack of male and female plants in dioecious species, crossing of related species requiring isolation to avoid hybridization and unsynchronised pollen release and stigma receptivity.

Since the beginning of the project, more than 1382 accessions have been banked in the MSB. Circa 31% of these accessions are red listed species and 67% are from natural source origin. During this process many of the collected plants have been vouchered and verified by experts from RBG Kew Herbarium. A photographic

catalogue and a pollination/seed collection database have also been developed and maintained. Pollination and seed collections are carried out in the glasshouses, nurseries and outdoors, including tropical, subtropical and temperate plants.

Two examples of Living Collections species banked in the MSB during this project are *Begonia salaziensis* (IUCN, Critically Endangered) and *Solanum trisectum* (IUCN, Endangered). *Begonia salaziensis* (accession 2008-1911, growing in the Tropical Nursery at Kew) is the only native begonia in Mauritius and the total population is recorded as being less than 50 individuals. *Solanum trisectum* (accession 2000-1342, in display at the Princess of Wales Conservatory) is endemic to the island of Madeira and extremely rare, being rediscovered in 1994 in that island after its disappearance for about 100 years. Seeds from both species were collected after isolation and controlled pollination at RBG Kew and are now banked at Millennium Seed Bank.

Skills in pollination and isolation of flowers were gained and developed through practical experience. This knowledge is now shared with other staff, students and volunteers throughout the departments providing a practical link between science and horticulture. Training sessions are held in the Tropical nursery at Kew in regular basis, covering description of the project, practical demonstrations of controlled pollination, isolation and seed collection techniques, data collection, seed cleaning methods and short-term seed drying and storage.

Future objectives include the creation of a network aimed at sharing experiences, information and seeds.

Identification of Target Species from Living Collections

Our list of accessions from RBG Kew living collections to be targeted for seed banking at the MSB is run every year to capture new entries and changes in IUCN status. The criteria followed in order to identify the species for the collection of seeds are:

- 1) IUCN red listed species
- 2) Natural source material (species collected in the wild)
- 3) Historical value of the collection
- 4) Species rare in cultivation
- 5) Ornamental value and others

The conservation ratings in the Living Collections Database (LCD) at RBG Kew are updated every two years with data from the IUCN Red List (1997 Red Book and the newest online version released at IUCN website <http://www.iucnredlist.org>). The accessions listed on the Red List have all been tagged with Red Dots on the labels, in the nurseries and public Display Houses, to make them easily identifiable.

List of equipment required for isolation and pollination

Controlled pollination

Paintbrushes of different sizes (brushes with natural hair are better for pollen adherence)

Sewing head pins or toothpicks (for orchid pollination and handling pollinia)

Absolute alcohol (98%) for sterilising tools

Tweezers

Tuning fork (for buzz pollination)

Magnifying lenses

Plastic tags (used to mark pollinated flowers and write down pollination information)

Pollen collection

Small air tight container with silica gel for pollen collection

Paper tissue

Isolation

Polyester bags (fine mesh polyester, e.g. bridal veil)

Film front bags (clear film on one side and paper on the other)

Pollen-proof bags (only needed for wind-pollinated species outdoors; available @ <http://www.pbs.co.uk>)

String

Record keeping

A5 notebook (record information on on-going pollination and seed collection)

Camera

Database software (e.g. Access)

Isolation of the plants

It is very important to isolate plants before and during pollination to avoid unwanted visits by pollinators and the risk of hybridization.

Spatial isolation can be achieved by keeping collections physically separated in different areas or in a propagator's case. However, this simple method is not always possible due to space restrictions and movement of pollinators.

In many cases isolation bags (polyester or paper) are necessary to avoid cross-pollination. Fine mesh polyester and paper are not pollen-proof, but they are effective to avoid pollinator's contact with the flowers, so best used in insect pollinated flowers. Paper bags are mostly used indoors in low humidity and temperature conditions, as they hold moisture and heat causing the flowers to go mouldy or drop. Paper is also eaten by cockroaches, what can ruin your isolation effort. Polyester fabric is breathable and dry quickly, working better in high humidity, heat or outdoor conditions.

The fabric can also be sewn in different sizes and shapes to accommodate your plant material or used to cover a plastic frame. Another advantage is that it can be re-used after washing.

For wind-pollinated flowers it is best to use spatial isolation or a pollen-proof bag (e.g.PBS). These are resistant to outdoor conditions and can be re-used after autoclaving, but they are quite costly.

Pollination of the plants

When the target species are flowering, pictures are taken, stored in the hard drive and added to a photographic catalogue in Lightroom. Flowering times are updated on the LCD and pollinations are carried out.

Contamination by accidentally introducing pollen from one collection of a species onto plants of another collection of the same species or its close relative can be avoided with some simple steps. Clean tools carefully with absolute alcohol after pollination and use sensible isolation procedures.

Pollination has preference over getting the plant verified and vouchered when there is only one flower present. After pollination the plants will be labelled with an **orange tag** which reads:

- Accession number
- Name of the plant
- Date of pollination
- Name of person who carried out the pollination
- Self or cross pollination

This information will also be recorded in the 'Pollination Book' and pollination spreadsheets in Excel (see Appendix 2). Pollination data is transferred to the Database when seed collection is complete and ready to be sent to the MSB.

Verification and vouchering

Plant material not fully verified or verified before the year 2000 will need a voucher taken (with a jewellers tag with the accession number) and will be sent to the Herbarium for verification.

Collecting and sending the seeds to the MSB

The timing of seed collection is very important, as the seeds must be able to tolerate drying and be able to germinate. The signs to look for are:

- Some seeds already dispersed
- Fruit dehiscing
- Changes in fruit colour
- Changes in seed coat colour
- Seed storage tissue consistency

After the seeds are collected in a paper envelope or cloth bag, the collection data is recorded in a standard form (see Appendix 1) and both are sent to the MSB for processing.

A collection will be considered complete when all the seed has been collected and sent to the MSB with all the necessary data (including verification and picture). Just then the collection will be given an MSB number and stored at -20°C.

References and electronic resources:

Wilmer, P. (2011). Pollination and Floral Ecology. Princeton University Press, Princeton.

Kearns, C.A. Inouye, D.W. (1993). Techniques for Pollination Biologists. University Press of Colorado.

Seed Collection Project inter

Seed Information Database-MSB
<http://data.kew.org/sid/sidsearch.html>

National and Regional Checklists <http://www.nationalredlist.org>

The International Plants Name Index
<http://www.ipni.org/ipni/plantnamesearchpage.do>

The Plant List <http://www.theplantlist.org/>

Tropicos <http://www.tropicos.org>

	5) New collection for the MSB	
	6) Not backed up elsewhere in other gardens	
Location at site		
Serial no. (SCD only)		
HPE accession no.		
Genus		
Species		
Infra-specific taxon		
Conservation status (if any)		
Date seed collected	First	Last
Collector(s) of seed		
Isolation (please tick)	No control: open pollination Spatial: nearest member of same genus at leastmetres Spatial: nearest member of same species at leastmetres	

	Physical barrier to pollen/insects (specify) Other (specify) Unknown
Controlled pollination (please tick as appropriate)	Date pollinated: Self pollinated Cross pollinated with same accession Cross pollinated with another accession (specify other HPE accession no.) Details:
No. plants in accession	
No. plants seeds taken from	
Relation of seeds to original collection made from wild (please tick)	Seeds harvested from plants raised from vegetative material taken from wild (generation 0) Seeds harvested from plants grown directly from wild-collected seed (generation 1) Seeds harvested from plants grown from generation 1 seed (generation 2) Unknown generation = 9

Plant height (metres)	
Other description of plant	E.g., habit, flower colour, odour, latex and anything not apparent from the herbarium specimen:
Live specimen sent to Kew (please tick)	Yes N/A
Photograph taken (please tick)	Yes No Location of photograph:
Details of previously verified material	Verifier: Institute: Date: Material verified (wild living, wild cultivated, herbarium specimen etc):
Notes	

Appendix 2

POLLINATION SHEET TEMPLATE

Date Seeds Sent to the MSB	Photograph	New seed Collection	Date Pollination	Seed Collection	Pollination Notes	Pollination Date	Needs new verification	Natural Source	IUCN Criteria	Species	Genus	Family	Accession #
	Y/N						Y/N	Y/N					

The Millennium Seed Bank Partnership

The largest ex situ plant conservation programme in the world. Our focus is on global plant life faced with the threat of extinction and plants of most use for the future. The seeds we save are conserved in seed banks as an insurance against the risk of extinction in their native habitat.

Working with our network of partners across 80 countries, we have successfully banked over 13% of the world's wild plant species. With your help, we are going to save 25% of those species with bankable seeds by 2020 (75,000 species). We target plants and regions most at risk from the ever-increasing impact of human activities, including land use and climate change.

Seed Conservation Standards for 'MSB Partnership Collections'

To be recognised as a global resource and satisfy the needs of anticipated users of collections and associated data, MSB Partnership seed collections must be of high quality. The proposed standards provide a framework to recognise Millennium Seed Bank Partnership Collections ('MSB Partnership Collections'), including material not duplicated at Kew's Millennium Seed Bank. The standards assure users of the utility of the collections and also provide a basis for technology transfer amongst partners and capacity development within the MSBP network as a whole.

Setting standards for seed conservation of wild plant species is particularly difficult. In comparison with most crop species, populations of wild plants tend to be heterogeneous, with widely spread flowering and fruiting times. This may affect initial seed viability and vigour and, consequently, seed longevity. Seed dormancy is frequently encountered, creating difficulties for germination testing. Many ex-situ conservation programmes focus on collecting seeds from small populations of rare and threatened species, meaning that desired seed numbers are difficult to obtain.

The proposed standards represent current best practice for long-term conservation of orthodox seeds. They draw on and reference various existing protocols and guidelines (see Annex). Such protocols may have been developed for a particular activity (e.g. seed testing), a particular set of species (e.g. sampling guidelines for rare and endangered plants), or to meet the needs of regional networks.

http://www.kew.org/sites/default/files/MSBP%20Seed%20Conservation%20Standards_Final%2005-02-15.pdf

Technical Information Sheets

A collection of technical information sheets produced by Millennium Seed Bank staff, covering various aspects of seed conservation practices and facilities. These are aimed at practitioners already working in seed conservation, although they are also used as resource materials in our training courses with university groups and to provide detailed information to visitors of the seed bank. The following sheets are available:

1. Protocol for comparative seed longevity testing
2. Assessing a population for seed collection
3. Seed collecting techniques
4. Post-harvest handling of seed collections
5. Measuring seed moisture status using a hygrometer
6. Selecting containers for long-term seed storage
7. Low cost monitors of seed moisture status
8. Small-scale seed drying methods
9. Equilibrating seeds to specific moisture levels
10. Identifying desiccation-sensitive seeds
11. Seed bank design - seed drying rooms
12. Seed bank design - cold rooms for seed storage
13. Not yet published
14. Cleaning seed collections for long-term conservation

<http://www.kew.org/science-conservation/research-data/resources/millennium-seed-bank-resources>

Kew's UK Native Seed Hub

The UK Native Seed Hub aims to enhance the resilience and coherence of the UK's ecological network by increasing the quality, quantity and diversity of native wild flower plants and seeds available for conservation and habitat restoration.

We do this by:

- providing high quality UK native plant material for conservation and habitat restoration
- supporting UK native seed and plant producers, conservationists and others through the provision of training, technical advice and research
- building awareness and demand for best practice habitat restoration and conservation using high quality UK native plant materials

<http://www.kew.org/business-centre/welcome-uk-native-seed>

Heritage Seed Library at Garden Organic

Garden Organic's Heritage Seed Library (HSL) aims to conserve vegetable varieties that are not widely available. We are not a gene bank and all of our collection, once we have enough seed, will become available for our members to grow and enjoy. The collection consists of mainly European varieties, including:

- rare landrace varieties, which are adapted to specific growing conditions.
- heirloom varieties that have been saved over many generations. These are unique to the Heritage Seed Library catalogue.
- varieties that have been dropped from popular seed catalogues over the past decade. This occurs for a number of reasons; their lack of popularity with customers, their unsuitability for commercial scale production or simply the prohibitive cost of trialing and National Listing.

How does the Heritage Seed Library work?

The seed library currently holds approximately 800 accessions of open-pollinated varieties. These varieties have been donated by HSL members or other members of the public, sourced through past HSL projects such as The Seed Search, or passed to us by seed companies who are no longer maintaining them. Each year, approximately 150 varieties within the collection are chosen for inclusion in the Heritage Seed Library Seed Catalogue.

Subscribing HSL members receive the catalogue annually in December, from which they can choose six free packets of seeds.

<http://www.gardenorganic.org.uk/hsl>

Why Do We Have Seed Banks?

Extract from www.bgci.org

The storage of material in the form of seeds is one of the most widespread and valuable *ex situ* approaches to conservation. Extensive expertise has been developed in this field by agencies and institutions involved with plant genetic resources over the past 30 years. Seed banking has considerable advantages over other methods of *ex situ* conservation such as ease of storage, economy of space, relatively low labour demands and consequently, the capacity to maintain large samples at an economically viable cost.

Why Store Seeds and Not Whole Plants?

Seeds are a convenient means of long term storage of genetic diversity, as the samples are small in size, are easily handled, require low maintenance and frequently remain viable for long periods. In general, conditions of low temperature and desiccation allow seeds to maintain viability, in many cases indefinitely. Seed banks take up little space, but can be expensive to run, both because of the need to maintain low temperatures and the necessity for germination tests, growth trials and regeneration. They are not suitable for species with recalcitrant seeds.

How are Botanic Gardens Involved?

Botanic gardens in many countries have developed seed banks for the storage of seeds, mainly of wild species. BGCI

figures (2015) indicate that there are currently 400 botanic gardens that have seed banks maintaining seeds in long term and medium-term storage.

Several botanic gardens have developed the capacity to store isolated embryos, minute seeds and tissues under conditions of cryopreservation, maintaining samples in liquid nitrogen at temperatures of -196°C . Such techniques offer great potential for the maintenance and conservation of biodiversity, particularly plant species that cannot be stored by conventional means.

Botanic gardens should be aware of the vulnerability of stored material to external factors such as power cuts, civil disturbance, adverse weather conditions and natural disasters.

Setting Up Your Own Seed Bank

Not all seed banking needs to be on such a scale. In essence, seed banking involves

- (a) random and even sampling of mature seed,
- (b) checking that the seeds of the species can be dried without killing them, either by reference to the literature, experimentation or even a considered guess based on small seed size, fruit type or habitat,
- (c) cleaning and drying as soon after harvesting as possible, (d) careful packaging and placing at a low temperature and
- (e) the monitoring of viability.

At a low technological level, seeds can be effectively dried using desiccants such as silica gel or even other dry seeds. Once properly dried and sealed inside a foil bag, seeds will often live years or decades even at room temperatures, though lower temperatures give significantly longer storage and are obviously preferred if affordable.

It is stages (b) and (e) which lend certainty to the operation but which present the most difficulty for botanic gardens with limited resources. It is hoped that the MSB Project will eventually not only try to help close the gap in our knowledge of species' seed storage behavior but also improve dormancy-breaking treatments necessary for monitoring seed viability. This aside, it could be argued that even in the absence of stages (b) and (e), it is better to conserve seed collections, albeit at a lower standard, that safeguard some but not all of the species, than do nothing and limit the value of material collected by botanic gardens.

It is surely important that more botanic gardens add seed banking to their armoury of techniques for fighting against plant genetic erosion and extinction. However, in order to have any hope of winning this fight, the botanic gardens community will need to co-ordinate effort, gradually improve standards up to those used in crop germplasm conservation, examine the possibilities for collaboration on storage and research, and capitalise on the political climate afforded by the CBD. In this way, botanic gardens may play an even more crucial role in the final line of defence against plant extinction.

The Global Seed Conservation Challenge (GSCC)

A major new initiative of BGCI. The GSCC will increase the contribution of botanic gardens towards the Global Strategy for Plant Conservation (GSPC) which seeks to halt the continuing loss of plant diversity.

Target 8 of the GSPC calls for **'75% of threatened plant species in *ex situ* collections, preferably in the country of origin and at least 20% available for recovery and restoration programmes'**. The Convention on Biological Diversity's mid-term review of the GSPC highlighted that more needs to be done if the 2020 targets are to be achieved.

Ex situ collections of plant species act as an insurance against extinction in the wild while being available for research, reintroduction and restoration. Botanic gardens are the main institutions involved in *ex situ* conservation of threatened species with nearly one third of all known plants grown in botanic gardens.

More than 400 botanic gardens worldwide are banking seed for conservation.

The GSCC seeks to highlight and commend the progress achieved by the botanic garden community in *ex situ* seed conservation. All gardens that actively contribute to *ex situ* seed conservation are making progress towards the ambitious objectives of Target 8 and are therefore participating in the GSCC.

How can you participate?

Share data

- Upload seed data to PlantSearch.
http://www.bgci.org/plant_search.php

Promotion

- Send us your seed banking stories;
- Enter the seed banking competition.

Conservation

- Collect and conserve seed from more threatened species.

How is BGCI contributing?

Training

- Organise training courses on seed conservation;
- Provide resources on seed banking;
- Support capacity building according to priorities.

Review and reporting

- Collate information on *ex situ* seed collections;
- Baseline study and gap analysis of current seed banking activities within the global botanic gardens network;

- Work towards a major review of seed banking efforts which will be reported on at the 6th Global Botanic Gardens Congress.

Prioritisation

- Provide information on which species are not represented in *ex situ* collections;
- Determine priorities for collection.

Promotion

- Highlight stories/news from botanic gardens on seed conservation;
- Award prizes for seed conservation at the 6th Global Botanic Gardens Congress.
- Set intermediary seed collecting targets and challenges.

Find out more at www.bgci.org

NOTES

