Journal of Botanic Gardens Conservation International

BGjournal

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Report of the Second World Botanic Gardens Congress in Barcelona

Developing Targets for the *International Agenda*

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Plants for the Planet

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M	Friend (*Cuttings*) available through online subscription only (www.bgci.org)	10	15	15

*Contents of the Botanic Garden Management Resource Pack: *The Darwin Technical Manual for Botanic Gardens, A Handbook for Botanic Gardens on the Reintroduction of Plants to the Wild, A CITES Manual for botanic gardens, BGjournal - an international journal for botanic gardens (2 past issues), Roots - environmental education review (2 past issues), The International Agenda for Botanic Gardens in Conservation, Global Strategy for Plant Conservation, Environmental Education in Botanic Gardens, BG-Recorder (a computer software package for plant records).*

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Submissions for the next issue should reach the editor before 31st October, 2004. We would be very grateful for text on diskette or via e-mail, as well as a hard copy. Please send photographs as original slides or prints unless scanned to a very high resolution (300 pixels/inch and 100mm in width); digital images need to be of a high resolution for printing. If you would like further information, please request *Notes for authors*.

BGjournal is produced by **Botanic Gardens Conservation International (BGCI)**. It is published twice a year and is sent to all BGCI members. Membership is open to all interested individuals, institutions and organisations that support the aims of BGCI (see inside back cover for membership application form).

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BGjournal replaces *BGCNews* and will be published twice a year. *BGjournal* has been given a new name as the news section of *BGCNews* and *Roots* (Botanic Gardens Conservation International Education Review) is now contained in Cuttings which is published quarterly. There have been 31 issues of *BGCNews* published twice yearly from 1987-2003.

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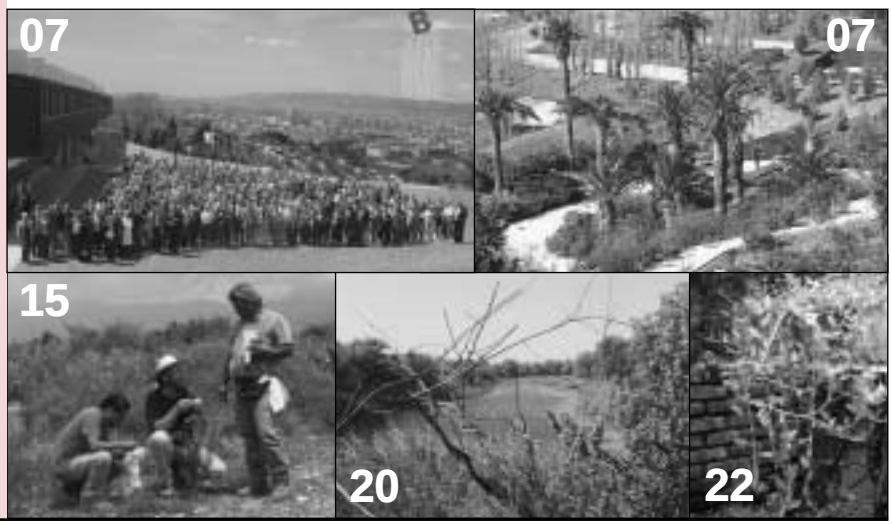

Editorial

It is a pleasure for me to write an editorial for this the first issue of BGCI's new publication, *BGjournal*. It is now seventeen years since BGCI's first serial publication *Botanic Gardens Conservation News* was launched, which has appeared without fail twice a year since then. Remarkably the format of *BGCNews* was changed little over the seventeen years, partly because it has mainly retained the same editors but also because it was developed into a format that readers came to know and expect. It included a list of forthcoming meetings, obituaries (thankfully not too many!), news from the botanic garden community and from BGCI itself, book reviews and announcements and a series of longer feature articles about botanic gardens, their projects and reports of important conferences and other major developments in the botanic garden scene worldwide.

Over a total of 31 issues of the magazine some 380 feature articles have been included covering an impressive range of subjects relevant to botanic gardens. Table 1 shows the number of articles related to global activities, conference reports and activities undertaken by botanic gardens in each region of the world. In total it amounts to an extremely comprehensive and substantial body of published work, a valuable future reference source for botanic gardens worldwide.

Table 1 Feature articles included in BGCI's magazine, Botanic Gardens Conservation News (December 1987 to December 2003).

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Total	380

Over the last few months BGCI has made considerable efforts to ensure that these articles are newly accessible and available to users. Copies of most have now been posted on the BGCI website (www.bgci.org) and later in the year these will be made easily accessible by means of an easy-to-use search facility.

However with the launch of BGCI's new quarterly newsletter, *Cuttings*, in 2004 we felt that the time had come to review the format of *BGCNews* and its purpose. There is clearly a need for an international medium where articles related to botanic garden activities, advances, achievements and results may be published and placed "on the record". For that reason it was decided to re-launch *BGCNews* as a new publication entitled *BGjournal*. In *BGjournal*, we hope to include a range of longer feature articles and shorter notes to provide a means for the publication and dissemination of botanic garden work which might not otherwise be published or be appropriate for inclusion in scientific journals.

We believe that it is important to maintain standards in these articles and will continue to follow the rigorous editorial policy that we have pursued over the last decades to ensure that all articles published meet necessary standards. Up to now the articles have not been formally peer-reviewed (other than by the BGCI editorial team and a range of ad hoc BGCI advisors who have helped us over the years). However we would be interested to have your views as to whether you would wish a peer-review system to be developed for all or some of the articles included in *BGjournal* in the future.

We are keen to ensure that this journal remains accessible for all those working in or with botanic gardens, whether they are scientist, horticulturist, manager, administrator, interested non-professional or others. Nevertheless the increasing sophistication and professionalism of botanic garden activities worldwide, in support of scientific research, conservation, environmental protection, public awareness, sustainable development and the preservation of cultural diversity and heritages places new demands for such a journal to

serve the botanic garden community. The environmental education community is well served by our education review *Roots*, which has also been re-launched in a new format in 2004. We hope that these will be useful and welcome developments for BGCI members and for botanic gardens worldwide. We urge you to work with us to continue to enhance and develop this journal to meet your present and future needs.

This first issue includes a range of important articles, including an extensive report on the 2nd World Botanic Gardens Congress held in Barcelona in April 2004 and the conclusions of each of the sessions held during the meeting. Many of these concluding statements include important recommendations for the future work of botanic gardens. I would also like to draw particular attention to a consultation paper on the development of international targets for botanic gardens, one of the key outputs of the Congress. We would welcome having your feedback on the proposed 2010 targets for the international botanic garden community, helping to measure our specific contributions towards achieving the objectives of the *Global Strategy for Plant Conservation*.

Peter Wyse Jackson
15th June, 2004.

Forthcoming Meetings

June 9 – 12, 2004
DALLAS, U.S.A.

2004 AABGA (American Association of Botanical Gardens and Arboreta) Annual Conference
The How-to Conference

For registration contact Sarah Maietta, AABGA Office Manager, 100 W 10th St Ste 614, Wilmington DE 1980, U.S.A.
Tel: +1 302-655-7100 ext. 11,
Fax: +1 302 655 8100,
E-mail: smaietta@aabga.org or Dan Stark, AABGA Executive Director, Tel: +1 302-655-7100 ext. 16,
E-mail: dstark@aabga.org

July 5 - 8, 2004
BIELSKA, POLAND

Czech-Polish–Slovak Scientific Conference of Botanical Gardens
Biodiversity conservation and ecological education – the challenges in the United Europe

This conference is organized by the Botanical Garden – Center for Biological Diversity Conservation of the Polish Academy of Sciences, the Silesian University in Katowice, the Silesian Botanical Garden – Union of Associations and the State Forests, Katowice Regional Directorate. For further information, contact the Botanical Garden – Center for Biological Diversity Conservation, Polish Academy of Sciences, Prawdziwka 2, 02-973 Warszawa 76, Poland. Tel: +48 22 757 66 45,
Fax: +48 22 757 66 45,
E-mail: obpan@ikp.atm.com.pl

August 7, 2004
AUCKLAND, NEW ZEALAND

Annual NZPCN (New Zealand Plant Conservation Network) Conference

This conference is being held at the Auckland Regional Botanic Gardens in Auckland, New Zealand. For further information contact the NZPCN, c/o Department of Conservation, P.O. Box 5086, Wellington, New Zealand.
Tel: +64 4 472 5821,
E-mail: jsawyer@doc.govt.nz

September 17 - 20, 2004
VALENCIA, SPAIN

4th European Conference on the Conservation of Wild Plants

This conference is being organised by Planta Europa, the network of organisations for the preservation and sustainable use of the wild flora in Europe, Generalitat Valenciana (Regional Government of Valencia) and the Botanical Garden of the University of Valencia.
For further information visit the website at http://www.nerium.net/plantaeuropa/main.htm

September 19 - 22, 2004
TVER, RUSSIA

Living in harmony: botanic gardens and society

The Botanic Garden of Tver State University is holding an international conference, to celebrate the 125th anniversary of the Garden. For further information about the conference contact Olga Volkova, Secretary, Botanic Garden of Tver State University Zhelaybova Str, 33, Tver, Russia, 170000. Tel: +7 (0822) 315318;
Fax: +7 (0822) 321274, E-mail: garden@tversu.ru

November 17 - 25, 2004
BANGKOK, THAILAND

Third IUCN World Conservation Congress

The World Conservation Congresses are held every 3 to 4 years for IUCN members to set the work priorities of the Union and elect its Council for the inter-sessional period. For more information about the World Conservation Congress visit the website at http://www.iucn.org/about/wcc/wcc.pdf

July 18 - 23, 2005
VIENNA, AUSTRIA

XVII International Botanical Congress (IBC 2005)

The International Botanical Congress is held every six years and provides a forum for the presentation and discussion of the latest advances in plant sciences worldwide. It follows the IBCXVI which was held in St Louis, Missouri, U.S.A. in August, 1999, which passed a resolution on the need for the Global Strategy for Plant Conservation (GSPC). The Second Circular will be distributed in the summer of 2004.

For further information contact Dr Josef Greimler, Secretary-General, IBC 2005, Institute of Botany, University of Vienna, Rennweg 14, A-1030 Vienna, Austria. Tel: +43-1-4277-54123,
Fax: +43-1-4277-9541,
E-mail: office@ibc2005.ac.at,
Internet: http://www.ibc2005.ac.at/

June 19 - 25, 2006
SANTO DOMINGO, DOMINICAN REPUBLIC

IX Congress of the Latin American Botanical Society (IX Congreso Latinoamericano de Botánica) Contribuyendo al conocimiento global de la flora nativa latinoamericana (Contributing to the global knowledge of the native flora of Latin America)

The objectives of this Congress are to spread information about the flora of Latin America and bring together the botanical community to develop plans for the conservation and sustainable use of its flora.

For further information, please contact Sonia Lagos-Witte, President Asociación Latinoamericano de Botánica - ALB and Coordinator, IX Congreso Latinoamericano de Botánica, Jardín Botánico Nacional, Apartado Postal 21-9, Santo Domingo, Dominican Republic. Tel: +1 809 385 2611/2612,
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Author: Peter Wyse Jackson

Developing international targets for botanic gardens in conservation: a consultation document

An important outcome of the 2nd World Botanic Gardens Congress was the development of a series of 20 targets for botanic gardens* to be achieved by 2010, to help measure the achievement of the objectives of the *International Agenda for Botanic Gardens in Conservation*** and as a contribution towards the *Global Strategy for Plant Conservation****.

Comments and suggestions on these draft targets are invited and, when consensus has been obtained, it is proposed to publish these targets as a protocol to the *International Agenda*. Comments should be sent to BGCI (peter.wysejackson@bgci.org) no later than 31st August, 2004.

Introduction

In June 2000 the *International Agenda for Botanic Gardens in Conservation* was published to provide a global framework for botanic garden policies, programmes and priorities in biodiversity conservation. It was launched at the 1st World Botanic Gardens Congress (Asheville, North Carolina, U.S.A.) and since then, over 300 botanic gardens around the world have registered their commitment to working with BGCI to implement it.

Since its launch, the *International Agenda* has been recognised and included as a major contribution to the achievement of the *Global Strategy for Plant Conservation* (*GSPC*), which was adopted by the Convention on Biological Diversity (CBD) in April 2002. The *GSPC* itself includes 16 outcome-orientated targets for the conservation and sustainable use of plants throughout the world, to be achieved by 2010.

The 2nd World Botanic Gardens Congress, held in Barcelona Spain from 17th to 22nd April provided an opportunity to review progress on the implementation of the *International Agenda* and through it, consider how botanic gardens can contribute more effectively to the achievement of the *GSPC*'s objectives and its targets.

On Friday 16th April 2004 an *ad hoc* international group met at the Botanic Institute of Barcelona to consider the need for targets for botanic gardens to monitor the achievement of the objectives of the *International Agenda for Botanic Gardens in Conservation* and to outline the explicit contribution of botanic gardens worldwide towards the achievement of the *Global Strategy for Plant Conservation* (*GSPC*). The members of the group were David Bramwell (Spain), David Galbraith (Canada), Douglas Gibbs (BGCI), Alberto Gómez Mejía (Colombia), Huang Hongwen (China), Mike Maunder (U.S.A.), Jan Rammeloo (Belgium), George Schatz (U.S.A.), Suzanne Sharrock (BGCI), Christopher Willis (South Africa) and Peter Wyse Jackson (BGCI).

The international group agreed that such targets are urgently needed, that they should relate to the objectives of the *GSPC* and that they should be developed and presented to the 2nd World Botanic Gardens Congress for review and endorsement. 2010 was proposed as the date by which the botanic gardens community would aim to achieve the targets, harmonizing their implementation with the targets of the *GSPC*, adopted by the Convention on Biological Diversity in 2002. 2010 is also the date set by the World Summit on Sustainable Development (WSSD) (Johannesburg, 2002) for the achievement of a target in relation to biodiversity included in its plan of implementation, viz. "to significantly reduce the rate of loss of biodiversity by 2010".

These draft targets were subsequently distributed for review and revision to all delegates participating in the 2nd World Botanic Gardens Congress and were also considered during a series of discussions workshops held during the

Below: Members of ad hoc international group which met at the Botanic Institute of Barcelona in April

congress. The need for such targets was endorsed by the Congress. It was agreed that following a period of consultation amongst the botanic garden community, and when consensus had been reached, these targets would be adopted as a protocol to the *International Agenda for Botanic Gardens in Conservation*.

It is stressed that the proposed targets relate to the cumulative contributions of the international botanic garden community towards plant conservation. Regional and national network organizations and individual botanic gardens are invited to develop appropriate targets according to regional, national, local needs and institutional priorities and capacities. It is recognized that in some regions substantial new resources and capacity will be required if botanic gardens are to be able to achieve the ambitious targets proposed. It is also recognized and acknowledged that in some countries and regions targets will be adopted which are either lesser or greater than those being proposed for the global level.

Botanic gardens are urged to implement targets wherever possible and appropriate through relevant partnerships and collaborations. In implementing the proposed targets, the group proposed that botanic gardens worldwide should seek to ensure that their activities in conservation are closely linked with activities undertaken in support of National Biodiversity Strategies and Action plans and *GSPC* initiatives developed at national levels.

The Global Strategy for Plant Conservation

The *Global Strategy for Plant Conservation* was itself adopted at the Sixth Meeting of the Conference of the Parties to the Convention on Biological Diversity which was held in The Hague in April, 2002 (Decision VI/9). While the entry point for the *Strategy* is plant conservation, aspects of sustainable use, capacity building and benefit-sharing are also included. The *Strategy* provides an innovative framework for actions at global, regional, national and local levels. A global dimension is important because it can facilitate the development of a consensus of key objectives, targets and actions and enhance collaboration and synergy at all levels. The *Strategy* is backed by a wide range of organisations and institutions – governments, intergovernmental organizations, conservation and research organizations (such as protected-area management boards, botanic gardens, and gene banks), universities, research institutes, non-governmental organizations and their networks, and the private sector.

A really new element of the *Strategy* is the inclusion of 16 outcome-orientated targets, aimed at achieving a series of measurable goals by 2010. This is the first time that the Convention has adopted such targets and the success of this approach will be watched with interest as a potential model for other aspects of the work of the Convention. The *Strategy* acknowledges that the *International Agenda for Botanic Gardens in Conservation* is of particular relevance to the achievement of the *GSPC* as an existing on-going initiative.

Targets in the International Agenda for Botanic Gardens in Conservation

The development of targets for botanic gardens is acknowledged as an important priority in the text of the *International Agenda*. It is notable that the *International Agenda* was developed and adopted by the botanic garden community in 2000 before the issue of developing specific targets in plant conservation had been widely considered and incorporated into what was then only a proposal for a global plant conservation strategy.

The targets identified in the *International Agenda* were not finalised in 2000 prior to its publication through the inclusion of quantifiable achievements within a specified timeframe. As proposed in the *International Agenda*, BGCI has therefore undertaken to assist in the development of a series of internationally applicable, widely agreed, realistic and measurable targets.

It is suggested that the development and adoption of measurable targets for the *International Agenda for Botanic Gardens in Conservation* provides a valuable tool to enhance the achievement of the objectives of the *International Agenda*. Such targets could provide useful reference points for monitoring progress and for rallying public opinion behind issues of priority concern.

The adoption of targets at the global level by botanic gardens may also support or be used to stimulate the development of related targets for botanic garden actions in biodiversity conservation at all levels, helping to address different priorities in biodiversity conservation throughout the world. Targets can also assist in the identification of gaps in work currently being undertaken. Consensus on the development of shared global targets and work for their achievement can also be expected to enhance synergies and result in added value from the actions undertaken by a broad range of players.

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*Within the context of the International Agenda for Botanic Gardens in Conservation and these proposed international targets for 2010, when the term "botanic garden" is used it should be interpreted to include arboreta and other specialised forms of plant collection, as well as their institutional resources and staff. The definition of botanic gardens applied to these targets is as given in the *International Agenda*: 'Botanic gardens are institutions holding documented collections of living plants for the purposes of scientific research, conservation, display and education' (Wyse Jackson, 1999).

**_International Agenda for Botanic Gardens in Conservation._ Wyse Jackson, P.S. and Sutherland, L.A. (2000). Botanic Gardens Conservation International, London, U.K. ISBN 0 9520275 9 3. Copies can be obtained from the Publications Department, BGCI, Descanso House, 199 Kew Road, Richmond, Surrey, TW9 3BW, U.K. Fax: +44 (0) 20 8332 5956, E-mail: info@bgci.org. Language versions available include Chinese, English, French, German, Latvian, Portuguese, Russian and Spanish.

***CBD (2003) *Global Strategy for Plant Conservation* Secretariat of the Convention on Biological Diversity. Further information: www.biodiv.org or www.bgci.org/conservation/strategy.html

THE DRAFT 2010 TARGETS FOR BOTANIC GARDENS

The following targets were proposed for further consideration and refinement during the 2nd World Botanic Gardens Congress. The *GSPC* target to which each 2010 target most closely relates is provided below (in italics) for easy reference.

(a) Understanding and documenting plant diversity:

(i) A widely accessible working list of known plant species, as a step towards a complete world flora;

1) The herbaria of botanic gardens and their living collections contribute to and support the development of a working list of known plant species, by developing local, national and regional checklists, floras and monographs as appropriate;

(ii) A preliminary assessment of the conservation status of all known plant species, at national, regional and international levels;

2) Botanic gardens contribute to, support, undertake and review national, regional and international threatened plant assessments to ensure that a preliminary evaluation is available in every country;

(iii) Development of models with protocols for plant conservation and sustainable use, based on research and practical experience;

3) Botanic gardens develop and disseminate models, protocols and case studies for priority plants, their ecosystems and cultural landscapes, within their area of expertise and interest, as relevant to achieve the targets of the *International Agenda for Botanic Gardens in Conservation*;

Sub-target: Botanic gardens develop, adopt and implement best practice in the implementation of the policies and guidelines of the Convention on Biological Diversity and relevant national laws and regulations in relation to access and benefit sharing;

(b) Conserving plant diversity:

(iv) At least 10 per cent of each of the world's ecological regions effectively conserved;

4) Botanic gardens support and contribute to national, regional and international conservation policies, planning and management of ecological regions, through documentation, research and advocacy;

(v) Protection of 50 per cent of the most important areas for plant diversity assured;

5) Botanic gardens support and contribute to the identification and conservation of the most important areas for plant diversity and the development of policies, planning and management through documentation, research and advocacy;

(vi) At least 30 per cent of production lands managed consistent with the conservation of plant diversity;

6) Botanic gardens contribute to the development and application of protocols and practices that support and promote the sustainable management and conservation of plant diversity in production lands;

(vii) 60 per cent of the world's threatened species conserved in situ;

7) Botanic gardens in every country support, promote and contribute to the integrated conservation and management of threatened species and populations in situ, working with protected area managers and communities at local, regional and national levels;

(viii) 60 per cent of threatened plant species in accessible ex situ collections, preferably in the country of origin, and 10 per cent of them included in recovery and restoration programmes;

8) 50 per cent of threatened plants included in accessible botanic garden ex situ conservation collections, including cultivated and genebank material, preferably in the country of origin;

Sub-target: 75 per cent of critically endangered species (CR) included in ex situ conservation collections by 2010, preferably in the country of origin;

9) Botanic gardens support and participate in recovery and restoration programmes for 5 per cent of the world's threatened plant species;

(ix) 70 per cent of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated indigenous and local knowledge maintained;

10) Botanic gardens in every country support, promote and contribute to the integrated conservation and management of medicinal plants, wild relatives of crops and other major socio-economically valuable plants, and maintenance of associated indigenous and local knowledge;

(x) Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems;

11) All botanic gardens carry out invasive species risk assessments of their collections and management practices;

12) Botanic gardens contribute to best practice for control programmes for at least 100 major invasive species that threaten plants, plant communities and associated habitats and ecosystems;

(c) Using plant diversity sustainably:

(xi) No species of wild flora endangered by international trade;

13) Botanic gardens in each country participate in the national and international implementation of CITES, through research, education and awareness, development of good practices, training and plant rescue;

14) Botanic gardens promote sustainable practices in international trade of wild flora through research, training, education and awareness;

(xii) 30 per cent of plant-based products derived from sources that are sustainably managed;

15) All botanic gardens develop and implement a policy to use plant-based products derived only from sustainable sources and promote awareness of the need for sustainable use of plant resources;

(xiii) The decline of plant resources, and associated indigenous and local knowledge, innovations and practices that support sustainable livelihoods, local food security and health care, halted;

16) Botanic gardens contribute to local, national, regional and international programmes that seek to reverse the decline of plant resources and associated indigenous and local knowledge, innovations and practices, through their research, education and conservation activities;

(d) Promoting education and awareness about plant diversity:

(xiv) The importance of plant diversity and the need for its conservation incorporated into communication, educational and public -awareness programmes;

17) The importance of plants and their conservation promoted by botanic gardens to at least one billion people worldwide;

18) Every botanic garden education programme emphasises the importance of plant diversity and ecosystem services in [sustainable development] /[supporting life];

The following alternative formulations for targets in relation to education and awareness were proposed at a workshop held during the 2nd World Botanic Gardens Congress in Barcelona, April 2004. Views and suggestions in relation to these alternative formulations are also invited:

17) Every botanic garden to have an education programme to promote Target 14 of the *GSPC* including the adoption of outcome-orientated [SMART] measurable targets.

18) All staff in botanic gardens to receive training in communication, education and public awareness.

(e) Building capacity for the conservation of plant diversity:

(xv) The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of this Strategy;

19) Appropriate resources and facilities developed to enable botanic gardens in every country of the world to achieve the targets of the *International Agenda* and the *GSPC*;

Sub-target: Double the number of trained botanic garden staff working in conservation, research and education;

Sub-target: Botanic gardens develop programmes to deliver training and capacity building in plant conservation;

(xvi) Networks for plant conservation activities established or strengthened at national, regional and international levels;

20) Botanic gardens and their networks strengthened to achieve the targets of the *International Agenda for Botanic Gardens* in Conservation and the *Global Strategy for Plant Conservation*;

Sub-target: At least 750 botanic gardens participate in the implementation of the *International Agenda for Botanic Gardens in Conservation*;

Sub-target: All botanic garden networks participate in the *Global Partnership for Plant Conservation*;

Sub-target: All botanic gardens participate in relevant national, regional and international conservation networks and partnerships.

Author: Etelka Leadlay

Report of the 2nd World Botanic Gardens Congress, Barcelona, Spain

The 2nd World Botanic Gardens Congress (2WBGC), held in Barcelona, Spain from the April 17 - 22, 2004, built on the success of the 1st World Botanic Gardens Congress in Asheville in 2000. The theme for the Congress, *Botanic Gardens - A World of Resources and Heritage for Humankind* provided a stimulating, comprehensive and extensive programme. This Congress provided a forum for about 500 delegates from botanic gardens in 62 countries to consider matters of mutual importance and concern for global plant conservation.

BGCI is extremely grateful to the Botanic Garden and the Botanic Institute of Barcelona for hosting the Congress. Barcelona is a wonderful venue for a Congress and the Barcelona Botanic Garden highlights the important role that botanic gardens play in plant conservation and environmental education in the local community and beyond.

There were 13 plenary addresses presented which provided valuable insights on the importance of biodiversity and how to conserve it, 47 symposia, round-table discussions and workshops, over 80 posters and informal lunch-time workshops and debates around the Congress themes. The conclusions from each theme are included in this article (see Box)

The Congress reviewed the implementation of the *International Agenda for Botanic Gardens in Conservation* and developed targets to support *Global Strategy for Plant Conservation (GSPC)*. The consultation paper on *International Agenda* targets is included in this issue of *BGjournal*.

The Spanish section of the Association of Ibero-Macaronesian Botanic Gardens (*Asociación Ibero-Macaronésica de Jardines Botánicos*) produced a document, *Botanic Gardens - An increasing value* (*Jardines Botanicos - Un valor en alza*), released at the Congress, to highlight the role of botanic gardens and proposed the adoption of an International Day for Botanic Gardens through UNESCO. Delegates welcomed this proposal.

Education and raising awareness was recognised as a key area to ensure the conservation of biodiversity for the future – and in this regard, botanic gardens have a pivotal role to play. The launch of BGCI's Plants for Life Campaign was an appropriate, timely and amusing response to the call for greater efforts in public awareness (see website www.plantsforlife.net).

Network meetings were held on Saturday 17th April at the Botanic Institute of Barcelona and were very successful. Regional meetings of staff from gardens in Latin American, Asia and North America were held. There was an all day meeting of the Association of Ibero-Macaronesian Botanic Gardens, a joint PlantNet (Plant Collections Network of Britain and Ireland) and NVBT (Dutch

Left: Peter Wyse Jackson giving a plenary address

Below: View of Barcelona Botanic Garden

Above: Members of the Spanish Section of the Association of Ibero-Macaronesian Botanic Gardens

Association of Botanic Gardens *Nederlandse Vereniging van Botanische Tuinen*) meeting to discuss mutual concerns and a meeting of the French and French-speaking network of Botanic Gardens (*Jardins Botaniques de France et des pays Francophones*).

Two useful training workshops were held on Sunday 18th April, 2004, *The CBD in practice – ideas and examples of implementation in botanic gardens* organized by China Williams and Kate Davis of the Royal Botanic Gardens, Kew, U.K. and *Developing your on-line botanic garden website* by Jamie O'Connell (BGCI).

The inaugural meeting of BGCI's International Advisory Council was also held on Tuesday 20th April at the Botanic Institute.

The Congress was held in the Annex of the Palau Sant Jordi, part of the complex built for the Olympic Games in 1992 and the new Botanic Institute which has the most wonderful views over Barcelona. The weather was fine and delegates were able to enjoy the view while eating their lunch. The Barcelona City Council gave a beautiful reception in the Barcelona City Hall and the Congress Dinner was held in the Palace de Pedralbes.

There was an enjoyable pre-Congress tour to the Ebro Delta and Tortosa –Beseit Passes and a wonderful afternoon during the Congress was spent either in the Garraf Nature Park or the Marimurtra Botanic Garden in Blanes.

Right: The lunch break outside the Botanic Institute

BGCI staff Suzanne Sharrock, Douglas Gibbs and Sarah Kneebone, led by Jamie O'Connell, produced an amusing and informative daily newsletter, *Botànico*, which will provide a happy reminder of the time we spent in Barcelona.

The Friends of the Barcelona Botanic Garden (*Amics del Jardí Botànic*) were very helpful to the delegates during the Congress and on the last day presented each delegate with a rose and a bookmark to celebrate St George's Day (April 23rd).

BGCI would like to thank the staff of our partner organizations particularly Núria Membrives, Director of the Barcelona Botanic Garden and her staff and volunteers, Josep Maria Montserrat, Director of the Botanic Institute and his staff especially Alfonso Susanna and the members of the local organizing and Scientific Committee, Esteban Hernández-Bermejo, Joan Pedrola-Monfort and David Bramwell and Núria Fradera, Representative of the Barcelona City Council.

BGCI is extremely grateful to María José Gallego of Manners Congressos and all her staff especially Anna Benito for providing an efficient and flexible Technical Secretariat by coordinating the venues, the Congress materials, the tours and social events, and all the support personnel, interpreters, hosts and hostesses, technicians and caterers and registering all the delegates.

BGCI is also very grateful for the participation of all the network organizations and would like to thank the plenary speakers, the moderators and both the oral and poster presenters.

Finally, we are very grateful to all the delegates who participated so fully in the meeting, presenting talks and workshops, and posters and moderating session and helping in so many ways to ensure that the Congress achieved its aims and provided a lasting legacy for the botanic garden community through the network links fostered around the world.

Hosts, donors and sponsors

The Congress was hosted by the Botanic Garden of Barcelona and the Botanic Institute of Barcelona and organised by the Botanic Garden of Barcelona, the Botanic Institute of Barcelona, the Institute of Culture (Barcelona City Council), the Commonwealth of Municipalities of the Metropolitan Area of Barcelona, the Spanish Council for Scientific Research, Ministry of Science and Technology (CSIC) and Botanic Gardens Conservation International (BGCI).

We are extremely grateful to the Institute of Culture (Barcelona City Council), the Commonwealth of Municipalities of the Metropolitan Area of Barcelona and the Spanish Council for Scientific Research, Ministry of Science and Technology (CSIC) for providing support for the Congress.

We are very grateful to the organizations which have sponsored Congress themes:
"Policies" and "Conservation" were sponsored by the HSBC *Investing in Nature* Programme, "Ecosystem conservation" by British Airways, "Sustainability" by the Mitsubishi Fund for Europe and Africa and "Horticulture and development" by the Technical Centre for Agricultural and Rural Cooperation (CTA).

We would also like to thank the Caves Mont-Ferrant of Blanes, the Latham Expedition Fund of the Fairchild Tropical Botanic Garden, Miami, U.S.A., The Botanical Research Foundation of Idaho, The Bressler Foundation (USA), the Durban Botanic Gardens Trust, SABONET, the Botanical Society of South Africa and the National Botanical Institute, South Africa for other support given.

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Conclusions of symposia, workshop and discussion round table meetings held at the 2nd World Botanic Gardens Congress, 2004

1 Theme A: Implementing plant conservation policies through botanic gardens

1.1 National experiences on the *Global Strategy for Plant Conservation* (*GSPC*)
Coordinator: Peter Wyse Jackson

- This symposium reviewed early experiences at national level in the implementation of the *Global Strategy for Plant Conservation*, specifically addressing the particular roles, responsibilities and initiatives being undertaken by botanic gardens in relation to the *GSPC* in several regions.

The conclusions were that:

- Significant progress in *GSPC* implementation can be reported in many parts of the world and that botanic gardens are often central to these developments.
- There is a clear need for specific organisations and institutions in each country to support and/or act as drivers or facilitators for the implementation of *GSPC* targets at national levels.
- The importance of incorporating *GSPC* objectives, including relevant targets and indicators into National Biodiversity Strategies and Action Plans (NBSAPs) was emphasised.
- The opportunities for botanic gardens to support the establishment of national *GSPC* focal points in each country was noted, or in some cases to act as such national focal points themselves in support of the relevant national authority.

1.2 Implementing Target 8 of the *Global Strategy for Plant Conservation*
Coordinators: Peter Wyse Jackson, Douglas Gibbs and Ehsan Dulloo

- The report of the International Stakeholder Consultation of Target 8 of the *GSPC* was reviewed and discussed.
- The findings and conclusions of the report were supported by the workshop and it was acknowledged that botanic gardens have a fundamental role and responsibility to assist in Target 8 implementation, including measures in ex situ conservation and to promote the recovery and restoration of threatened plants in situ.
- Efforts being made by BGCI and other organisations to monitor the achievement of Target 8 through the establishment of an on-line plant search meachanism for plants maintained in ex situ collections were noted and welcomed.

1.3 Implementing the *GSPC* through education in botanic Gardens
Coordinator: Julia Willison

This workshop reviewed the draft 2010 targets for botanic gardens proposed for the *International Agenda for Botanic Gardens in Conservation*. The recommendations were that botanic garden targets relating to education, communication and awareness should be as follows:

- Every botanic garden to have an education programme to promote Target 14 of the *GSPC* including the adoption of SMART measurable targets.
- All staff in botanic gardens to receive training in communication, education and public awareness.

It was also recommended:

- That a lay persons' guide on the Convention on Biological Diversity (CBD) and the *Global Strategy for Plant Conservation* (*GSPC*) is produced or one adapted for educators and staff in botanic gardens to use with the public and policy makers. This guide should be translated into different languages.
- That a manual of best practice of relevant and effective education activities is developed and made available to botanic gardens.
- That a mentoring system of educators is established for botanic gardens to support training and development of education programmes.
- That the consultation process to deliver Target 14 considers how to ensure that the *GSPC* targets are full integrated in the broader context of Article 13 of the CBD and CBD work programmes.

1.4 Developing and implementing Action Plans and Strategies in support of the International Agenda for Botanic Gardens in Conservation
Coordinators: Mark Richardson and David Galbraith

- As well as the efforts that are being made by individual gardens, numerous networks around the work are effectively developing action plans for the conservation of regional floras.
- Action plans not only assist in the implementation of conservation projects but also provides a guide for the directors of the botanic gardens for the development of future policy.
- The Investing in Nature programme in India will provide both support for the development of the Indian Action Plan as well as the models that will be of assistance to botanic gardens carrying out the Plan in that country.
- With the development of the *International Agenda for Botanic Gardens in Conservation* and the *GSPC*, existing botanic garden action plans should now be reviewed in the light of these initiatives.
- Of the 400 rare species of plants in Russia, 50% are now represented in Russian botanic gardens, which are incorporating in situ conservation into their programmes as well as the more traditional ex situ conservation measures.

1.5 Developing targets for the International Agenda for Botanic Gardens in Conservation
Coordinators: Peter Wyse Jackson and Suzanne Sharrock

- This workshop reviewed the proposals of a BGCI ad hoc international group which met at the Botanic Institute of Barcelona on 16th April 2004 to consider the need for targets for botanic gardens to monitor the achievement of the objectives of the I*nternational Agenda for Botanic Gardens in Conservation* and to outline the explicit contribution of botanic gardens worldwide towards the achievement of the *Global Strategy for Plant Conservation* (*GSPC*).

- The workshop participants agreed with the conclusions of the international group that such targets are urgently needed and that they should relate to the objectives of the *GSPC*.
- 2010 was agreed as the date by which the botanic gardens community would aim to achieve the targets, harmonizing their implementation with the targets of the *GSPC*, adopted by the Convention on Biological Diversity in 2002.
- The workshop noted that the proposed targets would relate to the international botanic garden community. However regional and national network organizations and individual botanic gardens would be invited to develop appropriate targets according to regional, national, local needs and institutional priorities and capacities.
- The workshop concluded that botanic gardens should implement targets wherever possible and appropriate through relevant partnerships and collaborations.
- In implementing the proposed targets, the workshop agreed that botanic gardens worldwide should seek to ensure that their activities in conservation are closely linked with activities undertaken in support of National Biodiversity Strategies and Action plans and *GSPC* initiatives developed at national levels.
- The workshop participants reviewed the 20 proposed targets and suggested that further consultations be undertaken amongst the botanic garden community worldwide to ensure widespread consensus on each before they are formally adopted as a protocol to the International Agenda.

Left: Mid-Congress tour to Marimurtra Botanic Garden, Blanes

Below: View of Barcelona Botanic Garden

2 Theme B: The practice of plant conservation through botanic gardens

2.1 Implementing ex situ programmes and projects in botanic gardens - Conservation in botanic gardens
Coordinators: Núria Membrives and Maite Lascurain

- Key points for the development of programmes and projects noted during the symposium were:

- Strong cultivation experience is one of the most important factors for successful ex situ conservation.
- Countries with less experience in implementing ex situ programmes are aware of this necessity and are hoping to develop appropriate training opportunities and also to encourage exchanges with other countries.
- It is important to encourage and support botanic gardens to cultivate plants. The design of ex situ conservation projects has to be such that it is appropriate to the plants being conserved.
- Botanic gardens can make important contributions to public awareness of and action related to conservation by communicating about their conservation efforts and research.

2.2 Frontiers for Botanic Garden Seed Genebanks
Coordinators: Esteban Hernández Bermejo and Clare Tenner

- A number of networks of seedbanks have already been formed and are allowing seedbanks to cooperate. Such networks should work together to ensure maximum efficiency in meeting Target 8 of the *GSPC*.
- Several of the presentations looked at ways to improve the quality of collections, and their use for restoration, such as an ecogeographical survey approach to seed collections, passport data, research into seed storage behaviour including finding biochemical markers of the behaviour.

2.3 Implementing the International Agenda for Botanic Gardens in Conservation at international and national levels
Coordinator: Suzanne Sharrock

- Good progress is being made in the implementation of the International Agenda, with the number of botanic gardens and network organizations that have registered their participation currently standing at 243. Botanic gardens in countries covering all regions of the world have registered, with the exception of institutions in North Africa and the Middle East, where the number of botanic gardens is low. The region with the largest number of registered botanic gardens is in Europe.
- The International Agenda is being used to help guide the development of a national action plan for botanic gardens in India and to guide the activities of the botanic garden network in Indonesia.
- At the regional level, the International Agenda has been used as a key resource in the development of the African Botanic Gardens Network strategy and is helping to guide the development of activities in individual gardens in Africa.
- The partnership that has developed between Cleveland Botanic Garden in the USA and the Lankester Botanic Garden in Costa Rica provides an interesting example of the type of international collaboration outlined in the International Agenda.

2.4 Implementing the International Agenda for Botanic Gardens in Conservation at the individual botanic garden level
Coordinator: Suzanne Sharrock

- Six papers were presented during this session which focused on the use and implementation of the International Agenda by individual botanic gardens. Some of the key points that came out of the presentations were:

- The Royal Botanic Garden, Hamilton, Canada has used the International Agenda as a basis for reviewing its activities. In order to do this an Excel spreadsheet has been developed which allows gardens to assess their present, and potential future participation in the 211 activities outlined in the International Agenda. The spreadsheet is available for use by other gardens and can be obtained from BGCI.
- The International Agenda was used as the basis for developing a native plant conservation programme at the Meadowlark Botanical Garden in the USA. The garden also finds the International Agenda a useful public awareness and educational tool and it provides a useful link to conservation programmes at the international level.
- The Latvian National Botanic Garden and the Conservatoire et Jardins Botaniques de Nancy in France are using the International Agenda, together with the Action Plan for Botanic Gardens in the European Union as guides in the development of action plans for their gardens.
- The International Agenda provided the basis for the re-orientation of the goals and objectives of the botanic garden in Geelong, Australia. This garden has undertaken a massive change over the last four years and now addresses many of the key issues and challenges outlined in the International Agenda.

2.5 Implementing ex situ programmes and projects in botanic gardens - Conservation in botanic gardens
Coordinator: George Owusu Afriyie

- An integrated approach to plant conservation is essential to include biogeographical studies, in situ research, population monitoring, molecular methods to the use of mycorrhizal agents and the inocula of wild site fungi for translocation of orchids to wild sites.
- Quantifiable performance indicators of the success of plant diversity conservation are necessary for evaluation of the programmes and implementation of the *GSPC*. These include resources conserved, implementation of improved management, better laws and policies, changes in knowledge, attitudes and behaviours of stakeholders, and reduction of threats to biodiversity.
- The development of protocols is an important aspect of the collection, propagation and ex situ storage of threatened plants as shown by the use of micropropagation for the conservation of threatened bryophytes.

2.6 Models, protocols, practices, practical experience: do we have a full tool kit for botanic garden plant conservation?
Coordinator: Stella Simiyu

- Threat assessment is a key priority and botanic gardens can contribute to this process at national level. In order to enhance the red listing processing, herbaria and taxonomic staff should routinely include threat assessments in their publications and this should be mandatory for publication of new taxa and taxonomic revisions, monographs etc.
- Further refinement of IPA guidelines especially in countries with high plant diversity needs to be undertaken to enable the botanic garden community to utilize them across the board.
- Capacity building in the use of these tools is critical especially in developing countries and there is need for the botanic gardens to strengthen partnerships and share resources in order to achieve this.
- Whilst we have a good indication of tools for targets 2 and 5, there are major gaps for other targets especially the in situ targets. There is need for botanic gardens to identify the key priorities in their regions and develop means and ways to articulate *GSPC* target 3. This is best achieved through a network environment.
- Botanic gardens should aim to develop partnerships with the in situ conservation community in order to effectively contribute to the achievement of the *GSPC* targets, thus development of the necessary toolkits should be undertaken in this context.

Right: Congress delegates to the ZWBGC

Far Right: The Field trip: View of Marimurtra Botanic Garden

3 Theme C: Botanic gardens and ecosystem conservation

3.1 Designation, development and management of protected areas: the role for botanic gardens
Coordinators: Ole Hamann and Bert van den Wollenberg

- Botanic gardens are involved in habitat conservation in many ways, but botanic gardens approach it differently from other nature conservation organisations:

- they can and frequently do work through partnerships, local communities, etc.
- their research, education, information, etc. are also a vehicle for local involvement.
- they potentially possess a powerful awareness and educational role.
- they can be and sometimes are involved in local habitat conservation.
- they are ideally positioned to help integrate in situ and ex situ conservation.

- Nature reserves do not imply that the species in them are automatically protected; species conservation orientated actions such as through micro-reserves must complement the habitat conservation effort.
- Through partnerships, two-way capacity building can be undertaken.
- Political awareness in ecosystem conservation is of key importance.
- Botanic gardens are usually permanent institutions and therefore can provide stable long-term partners where other parties may come and go.
- Important remark: protected areas are sometimes perceived as limiting the local people, whereas in botanic gardens local people can participate in conservation.

3.2 Botanical and zoological linkages
Coordinator: Mark Richardson

- The amalgamation of botanic garden and zoological displays which are based on ecological principles are a logical progression to effective natural history displays.
- The effective and interesting interpretation of plants in zoos is vital with plant talks being particularly well received.
- Determining your targets is vital if you are going to measure environmental achievements.
- To help with the understanding needed to provide the correct plantings for zoos, links between zoos and the botanic gardens in the countries relevant to the animal displays can be extremely valuable.
- There is need to encourage common work and activities between zoological and botanical staff to achieve good links.
- The botanical/horticultural work being done in zoos is expanding to include in situ conservation work – which is beginning to complement the in situ work done with animals.
- The work that the botanical/horticultural sections of many zoos are doing shows that they are already contributing to the goals of the *GSPC* and the registration of zoos for the International Agenda should be encouraged.

3.3 Building and sustaining a national network of botanic gardens in Russia
Coordinators: Igor A. Smirnov and Lev Andreev

- This session included representatives of Russian Botanic Gardens. The participants noted that botanic gardens and arboreta in Russia, whose activities are consolidated by Council of Russian Botanic Gardens and Russian office of BGCI, have made great progress toward the implementation of *International Agenda for Botanic Gardens in Conservation*.
- They noted that this important document and the *Global Strategy for Plant Conservation* (*GSPC*) have been translated into the Russian language and distributed among all botanical gardens, educational and conservancy institutions in Russian Federation. Based on those international documents the *Strategy of Botanical Gardens of Russia in Conservation of Biodiversity* was developed and subsequently adopted during a session of the Council of Russian Botanic Gardens.

- Taking into account the conclusions of the congress it was recommended to the Council of Botanical Gardens of Russia the following:

- To develop an action plan for plant conservation in botanical gardens up to 2010 and approve it on the nearest session of the Council of Botanical Gardens of Russia;
- To assist in wide use of the International Agenda by Botanical Gardens of Russia for development of the local and regional programmes.
- To promote the registration of botanic gardens participating in the implementation of the International Agenda.
- To prepare and publish the next issue of the newsletter of the Council of Botanical Gardens of Russia and Russian office of BGCI to include summaries of most presentations from the 2nd World Botanic Gardens Congress.
- To conduct the special session of Council of Botanical Gardens of Russia to summarize the results of the activity of botanical gardens in the implementation of the International and National Agenda in plant conservation and adopt the action plant on plant conservation up to 2010.

3.4 Managing invasive aliens
Coordinators: Alvaro Bueno and Brian Huntley

- Six presentations indicated the seriousness with which the botanic garden community is taking its responsibilities regarding the problem of alien invasive species.
- The international community is making efforts to address the programme of Target 10 of the *GSPC*, with support of the Convention on Biological Diversity, via the Global Invasive Species Programme.

3.5 Building and sustaining national networks of botanic gardens in Latin America: networking the networks
Coordinator: Alberto Gómez Mejía

- Desde mi punto de vista, los puntos más sobresalientes de las exposiciones en el panel "Building and sustaining national networks of botanic gardens in Latin America: networking the networks" serían:

- Es fundamental contar con las redes de jardines como mecanismo de intercambio de experiencias, de transferencia de tecnologías, de capacitación recíproca y de instrumento político.
- Es necesaria la cooperación internacional para preservar la flora nativa que se encuentra en peligro de extinción en el Neotrópico.
- Es muy meritoria y plausible la labor que BGCI ha realizado en los países latinoamericanos y del Caribe.
- Es urgente fortalecer los jardines incipientes en aquellos países que no tienen una infraestructura adecuada para conservar su diversidad biológica y ecológica.
- La Red Latinomericana y del Caribe de Jardines Botánicos (ALCJB) debe convertirse en una red de redes.
- Valdría la pena reconsiderar la incipiente organización de Caribbean Islands Botanic Gardens porque implicaría una duplicación de esfuerzos frente a la ALCJB.

- Botanic Garden networks are a fundamental mechanism for the exchange of experiences, transfer of technology, mutual training and to exert political influence.
- International cooperation is essential to preserve the threatened native flora in the Neotropics.
- The important work of BGCI in Latin American and Caribbean countries was acknowledged and welcomed.
- It is urgent to strengthen the new botanic gardens in those countries where there is not an adequate infrastructure to conserve biological and ecological diversity.
- The Latin American and the Caribbean Network should become a Network of Networks. It would be worth consider the inclusion of the organization of the Caribbean Islands Botanic Gardens (the Caribbean Botanic Gardens for Conservation (CBGC) network) to avoid duplication with the efforts of the ALCJB.

Above Top: View of Barcelona Botanic Garden

Above Middle: Participants of the joint PlantNet and NVBT meeting

Above: Participants of the North American Meeting

4 Theme D: Environmental education, the sustainable use of plant resources and the awareness of plant diversity

4.1 Interactive multimedia - using new technology for education
Coordinator: Tina Roig

- Putting education resources on-line is a good idea as you can reach a huge potential audience, of different demographical make-up to regular botanic garden visitors and it enables you to share knowledge and ideas with the international botanic garden community.
- Education programmes can be used to address inclusion issues and make contacts between children of different nationalities and cultures based around the European town 'twinning' scheme.
- Story anthologies can be a useful resource for education programmes and their use on the internet can expand their use by other institutions.
- Art shows can attract significant numbers of visitors and media attention to gardens which may suffer from being overlooked by the local community.
- Partnership projects can put a new spin on garden interpretation and educational themes.

4.2 Making plants relevant and accessible to the public
Coordinators: JuanMa López and Paco Villamandos

Recommendations:

- Enfocar los programas de acuerdo con los intereses y expectativas de la comunidad, incluyendo para ello a los diferentes agentes de la comunidad.
- Incluir a los maestros como promotores de los programas educativos de los JJBB.
- Recrear un ambiente educativo que incluya técnicas y elementos diversos, de forma que puedan desarrollarse ambientes con un fuerte potencial educativo.
- El educador debe asumir el papel de moderador y de transmisor de los conocimientos adecuándolos convenientemente a los diferentes niveles.

- Focus programmes according to the interests and expectations of the community, taking into account the various actors in the community.
- Include teachers as promoters of the education programmes of botanic gardens.
- Re-create an education environment that includes diverse techniques and elements, in order to develop an environment with a strong educative potential.
- Educators must assume the role of moderators and assist in the transmission of knowledge, adapting it to the different levels.

4.3 Engaging new audiences
Coordinators: Sue Minter and Alexandra Escudeiro

- It is important to survey who the public are (their profile) and what they want.
- Botanic gardens should address audiences specifically e.g., 'new audiences', children, and teenagers.
- Botanic gardens need a publicity campaign to develop a culture of understanding about the garden among potential and existing visitors and make further surveys with larger sample size.
- All garden staff can have education as part of their job description and give talks to public (including children).

4.4 Presenting Plants through outreach exhibits
Coordinator: Laurel McIvor

- Capacity building in environmental education is important for developing focussed and effective exhibits.
- High quality, effective exhibits require significant financial investment, should "provoke, relate and reveal"; designers and marketing companies are worth their cost; use strong images and test your product.
- Being imaginative, brave, and tenacious with the media will help to attract new audiences.
- Latch on to a media story that captures public interest and take it one step further to communicate your message.
- Establish partnerships that contribute complementary expertise and mutually benefit from the project; clearly define goals and each partners´ responsibilities.
- Acknowledge and include your sponsors continually, endeavour to include them in every media contact.

4.5 Developing a Self-Funding Education Program
Coordinator: Janelle Hatherly

- Regardless of location, size or age of botanic gardens the issues, challenges and solutions are the same when it comes to getting education adequately resourced.
- There is no such thing as a self-funding education program because effective learning takes time and is about thinking and engaging in meaningful dialogue.
- High quality educational activities generally last a few hours, are conducted in small groups and if we are serious about catering for the whole community, they are also inexpensive. Our challenge is to work out 'creative' ways to get more money or more people to run education programs.

Ways to access additional resources for botanic garden education programmes:

More dollars -
- Raise the profile of education within our organisations by relating it to the organisational mission and by doing loads of evaluation and keeping sound statistics. ´Dollars for education are an investment rather than a subsidy.´
- Convince senior management that to allocate appropriate core funding to education units and keep any funds generated from education activities to subsidise those programs that incur high costs but achieve effective educational outcomes.
- Education staff should become familiar with what opportunities for funding are 'out there' and become skilled at writing grant proposals. A golden rule to operate by is: 'at any given time you should have a grant or funding proposal or submission in somewhere'.

More people –
- Create a learning culture - use other staff members to deliver programs occasionally, train a pool of casual staff whose costs of face-to-face delivery is covered by fees for service. (The staff of a botanic garden in Israel spend 10% of their time in education activities).
- Use volunteers but be aware that they aren´t free but have the same needs and rights as paid staff.
- Form partnerships with other organisations to develop socially relevant programs (e.g related to health or employment) and share costs, resources and staff.

Below: Delegates from Wuhan and Beijing Botanical Gardens, China (l. to r. Hongwen Huang, Gong Jinjie, Zhongping Cheng, Houquan Jiang, Shiwei Zhao (Beijing Botanical Garden), Hongtao Liu, Jinqing Wu)

5 Theme E: Sustainability: the contribution of biodiversity to sustainable living

5.1 Environmental sustainability: addressing local issues for conservation and education
Coordinator: [to be added]

- There is a growing urgency to achieve sustainability of natural plants for use by local people for food, fuel and medicinal uses.
- Education programmes provide a key method for providing local urban populations with the necessary skills and knowledge for conservation of indigenous plants in developing countries.
- Several excellent model programmes have been developed to achieve a new awareness of the needs of the local populations to help attain sustainability of their local plant resources e.g., Ghana, South Africa and Argentina.
- Successful programme development for plant sustainability requires development of programmes relevant to the needs of the local community.
- Formalized agreements with local authorities and donors will help ensure successful conservation programmes.
- There is an urgent need to establish appropriate models of propagation of medicinal plants to provide employment and support for local populations and conserve plant stocks.

5.2 Designing and implementing sustainable botanic gardens and evaluating the ecological footprint
Coordinator: Janet Marinelli

- Botanic gardens have a combination of resources and skill-sets found nowhere else that can be tapped to develop new plant-based technologies that help solve environmental problems and encourage the transition to a bio-based economy.
- Research projects at the Montreal Botanical Garden, are already addressing these problems, such as the use of plant species to decontaminate brownfield sites in urban areas, and the construction of living walls made of willow stems to reduce noise along roadways.
- Botanic gardens can be models of sustainable ecological landscape design and maintenance for their communities.
- The Jardi Botànic de Barcelona was designed to be such a model of ecologically appropriate landscape design and maintenance for a Mediterranean climate.

5.3 Botanic Gardens: what is their role in tourism?
Coordinators: David Bramwell and Antoni Aguilella

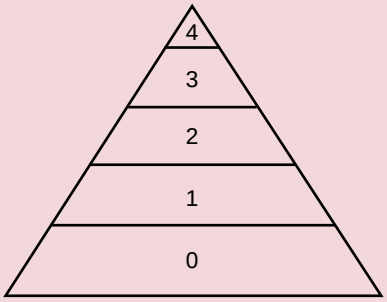
- Botanic gardens have great tourist potential, and if they are developed in a planned and coordinated way, could contribute to expanding and diversifying local tourism and the sustainability of the gardens themselves and the surrounding areas.
- Tourism in botanic gardens can generate profits for both the gardens and the local communities.
- The main priority should be promoting botanic gardens in the fields of cultural and natural tourism (including agro-tourism, rural tourism, ecotourism and nature tourism).
- A single recipe for all botanic gardens does not exist. Each one has to explore its own potential according to the needs and aspirations of the local community.

5.4 Ecotourism - Is there a role for botanic gardens?
Coordinators: Lucy A. Sutherland and Judy du Plooy

- The appropriateness of botanic gardens involvement in ecotourism is dependent on several factors including the status of local and national tourism, perception of the touristic opportunities held by the industry, and the

botanic garden location, setting, mission and availability of resources.
- Ecotourists can play an important financial role in supporting the sustainability of botanic gardens, and contributing to local sustainable development and capacity building of communities.
- Botanic gardens need to mainstream themselves into the regional economy, in areas such as tourism, to ensure their financial sustainability.
- There is a hierarchy of basic needs for botanic gardens to ensure visitation and use:

0 garden site, lawns trees, water
1 parking, toilets, tea rooms
2 clean, safe as an attraction
3 colours, diversity, informative
4 quality goods and services



5.5 Financial sustainability of the garden: an African perspective
Coordinators: George Owusu-Afriyie, Chris Dalzell, Ndam Nouhou, Christopher Willis and Douglas Gibbs

- Botanic gardens have the potential to use fundraising as an opportunity to evaluate their strategies and to develop and strengthen partnerships.
- There is a need for botanic gardens to evaluate their own capacities, in terms of facilities, personnel and operational procedures, in order to maximise the efficiency of their work programme within their local context.
- There is a need for gardens to champion their work and their role within their own local communities, partners, countries and internationally.
- Gardens have an opportunity to increase their relevance and attraction to people, thus opening up the potential to raise funds from a wider range of potential sources, for example enterprise development, job creation and public health grant-making bodies as well as from increased visitor support.
- Botanic gardens can adapt and adopt business models, entrepreneurship and innovative management structures in order to increase their capacity to operate in competitive, changing and challenging socio-economic environments.

5.6 Addressing local needs: evaluating individual botanic garden contributions to economic development
Coordinator: Brian Huntley

- The Eden Project has demonstrated how the right leadership at the right place and the right time can lead to success. The innovation of the Eden Project, the local need for social and economic regeneration and the availability of massive funding from the UK government, the EU and private sources, plus the existence of an available tourist market, resulted in the instant success of the project, contributing to economic upliftment, communication of biodiversity messages and a role model for the botanical garden community.

6 Theme F: Botanic garden horticulture and development

6.1 Volunteers in conservation - using volunteers to implement plant conservation
Coordinator: Laurel McIvor

- Volunteers support conservation research by increasing the research effort, providing financial contributions, promoting conservation education (the participant and the ripple effect of them sharing their experience) and increasing the project profile / media interest in the work.
- Developing countries do not have a culture of volunteerism and therefore need innovative ways to recruit volunteers: e.g., having university students commit to a certain number of hours of work per week in exchange for training, work experience, and a small honorarium.
- Corporate secondments with clearly defined goals and responsibilities can offer valuable assistance with specific skills (e.g., in information technology and networking) and related staff training.
- Volunteers from areas local to botanic gardens help integrate the gardens with community culture, science, and education and help to engage youth for the future.

6.2 New botanic gardens – issues and challenges
Coordinator: Edelmira Linares

- A sound vision was noted for the new botanic gardens as well as those in the planning stage. The presentations demonstrated that botanic gardens develop master plans and missions in a professional and well-documented manner.
- Another notable fact was the regional focus on native plants of the Latin American botanic gardens and the diversification of those in Europe with both native and exotic species of cultural importance.
- Most of the presentations emphasized the importance of education at various levels as in botanic gardens which included the general public to the technicians and professionals such as future agronomists.
- The variation of the presentations included in the session demonstrated that the size of the botanic garden is secondary while its activities associated with education, public awareness building and, in particular, its ability to link itself with the surrounding community are more important; these goals can be accomplished through educational programmes as well as by creating opportunities for visitors to experience contacts with nature in a delightful and invigorating manner.
- The contributions drew attention to the need for consultation and participation of specialists as well as knowledge of the work and objectives of the botanic garden as part of the process of planning and implementing the new botanic garden. These factors can help to ensure success and save time and effort in the development of a modern, successful botanic garden so that they can be major players in biodiversity conservation and generators of the knowledge in this field.

6.3 What should botanic gardens be growing?
Coordinators: David Rae and Tim Upson

- Collection policies should be wider than pure accessions or acquisitions policies and should therefore include information on topics such as representation, labeling, standards of information, plant records and geographical representation. A policy should also be regarded as flexible to allow for change.
- Audit and review are important components of a Collections Policy as they allowed users and managers to see how closely the garden was adhering to its policy.
- Setting a few targets to improve weak aspects of the collection was useful - these could include, for example, targets to improve % verification, % wild origin or total accession numbers.
- National policies that included several regional gardens were an efficient mechanism to collect and maintain a large, but decentralized, collection. Criteria should be set to maintain standards across the whole collection.
- The cultural or heritage value of gardens in terms of their design was now reasonably well accepted but the cultural or heritage value of the plants themselves was not yet valued and we should work to reverse this attitude.
- Useful lessons might be learnt from other organizations that have collections policies such as zoos and libraries.
- As collections take time, money and expertise to amass, they should not be deaccessed at will, if at all. Gardens should think very seriously about deaccessing a collection before doing so and should always consider other avenues for research or should gift the collection to another garden.
- Even though some people might want each plant in a collection to be justified on the grounds of use and value, this was not possible or reasonable. Only a small percentage of library or museum collections are used constantly but the collection is valuable because of its wholeness or completeness and less frequently used plants still have value.
- Garden should put information on their collections on the world wide web. This way it would be easier for researchers and others to find the plants they required and it would also be easier for collection managers to assess their own collections in terms of duplication or omissions.
- The value of horticultural taxonomy to the management of collections was stressed.
- Cultivars were an important component of collections and there was no reason why they should not be managed with the same degree of rigor as wild plant collections.
- The relationship between, and integration of, herbarium and living collections was stressed.
- The importance of good and accurate plant records was stressed.

6.4 Conservation databases
Coordinators: Richard Piacentini and Diane Wyse Jackson

This session concentrated on current databases and their future development within the botanic garden setting.

Major points outlined were:

- Databases should never be seen as static, but need to be flexible to allow for future development of requirements – even if those requirements have not yet have been anticipated.
- Databases are set up as a solution to a address specific problems and applications, as seen in the examples presented to the meeting from India and the Netherlands.
- Multi-lingual international 'Look Up' tables that are readily accessible from a centralized location and downloaded into localized databases look to be a feature of future databases, so that users are all working from a common set of files and field attributes .
- Web-based databases will be increasingly commonplace – therefore custodianship of data and security issues will have to be clearly addressed so that controversy can be avoided at a later stage.

6.5 New botanic gardens – issues and challenges
Coordinator: James Cullen

- The range and diversity of new botanic gardens in development exemplified by the four gardens described in this symposium – from urban to rural, general to specific – is astonishing and hopeful for the future. All had drawn on professional advice, both local and international, in their planning.
- New gardens are able to meet their missions in innovative ways as they not constrained by tradition, infrastructure or older plantings.
- The importance of providing educational and amenity services for children was stressed as a major objective by all four gardens.
- All stressed the importance of the physical environment in which they are being developed: soil condition, aspect, pollution and the need for a guaranteed water supply were stressed.
- All of the gardens stressed their commitment to the conservation, both in situ and ex situ of their local flora.

7 Theme G: Botanic garden research

7.1 Use of molecular techniques in plant conservation
Coordinator: Alfonso Susanna

- The future impact of molecular techniques in conservation cannot be evaluated yet, but they have already caused a revolution on classic approaches to conservation genetic analyses.
- The panoply of molecular tools is now impressive: sequencing, allozymes, RAPDs, AFLPs, RFLPs and microsatellites, they cover all the possible levels of study, from individuals to species or genera.
- Probably, molecular markers will represent, in the long run, as with molecular methods in systematics, a tremendous change both in methodology and in our understanding of biodiversity.

7.2 Research advances on the study of the Mediterranean flora
Coordinator: Pep Ninot

- The comprehensive use of plant collections (herbaria, cultivated plants) and data banks is absolutely basic to any project on the flora, and provides more and more diverse pathways to conduct quality research.
- The ongoing addition of fields such as conservation biology and ecological restoration reinforces the important role of botanic gardens, i.e. linking taxonomic and floristic studies to the practical use of plant diversity, through multiple cultivation techniques and methods in studying biodiversity.

7.3 Science and Horticulture working together
Coordinator: David Rae

- Micropropagation and cryopreservation are important and valuable techniques in the conservation of critically endangered species.
- Horticulture has an important role to play in delivering at least 8 of the targets in the *Global Strategy for Plant Conservation* and horticultural staff should be encouraged to get involved in the Strategy.
- We should acknowledge and celebrate botanic garden horticulture as a distinctive and specialist branch of horticulture and recognise the valuable contribution of horticulture to integrated conservation strategies.
- The breeding of new cultivars of fruit and ornamental plants in botanic gardens should be recognised as a valuable and legitimate aspect of botanic garden research.
- As well as traditional, mainstream areas of research botanic gardens should develop cross cutting themes such as studies relating to aspects of climate change as a way of bringing together different groups of science staff as well as scientists and horticulturists or education staff and scientists.

Below: Participants of the Latin American Network Meeting

- Botanic gardens should investigate areas of applied research such as the use of plant products for construction, the use of plants for the purification of harbour mud or the removal of heavy metals in water from tropical mining.
- Plants growing in both botanic gardens and in the parks and gardens of metropolitan areas can provide a useful resource for, and valuable insight into, the biogeographical and ecomorphological analysis of woody plants.

7.4 Education Research
Coordinators: Julia Willison and Janelle Hatherly

- The only way to measure achievement of educational objectives and corporate missions is through evaluation and research.
- Education research can be part of a learning experience for children by empowering them to become researchers.
- A range of research tools is needed to evaluate education programmes in botanic gardens.
- The results of research can offer excellent opportunities for botanic garden education programmes to evolve.
- Botanic garden education programmes cater for a wide range of audiences. We need to ensure education research is carried out with the diversity of audiences.
- If botanic gardens are going to carry out research then they need to implement the results. If they're not going to use the results of the research then there is little point in doing it.

7.5 Botanic gardens and plant taxonomy: Achieving Target 1 of the *GSPC*
Coordinators: Peter Crane and Etelka Leadlay

- Collaboration and networks are very important for achieving this target
- Botanic gardens should participate according to their own priorities, capacities and interests.
- Those local national and regional botanic gardens with an interest-focus on the production of local, national, and regional lists should do so in conjunction where possible with Target 2.
- An especially useful focus for local, national and regional botanic gardens would be on local, national and regional endemics likely to a of special importance for the *GSPC*.
- It is it important that information from Target 1 is made available as it is produced because of the relevance and contribution of this target to other targets.
- The importance of engaging the non botanic garden community in the effort was stressed (e.g museums, horticulture, community and universities).

7.6 Recent advances in Restoration Ecology and Research
Coordinators: Deanna Rokich and Dave Merritt

- An integrated approach to restoration, incorporating a number of research disciplines (e.g. propagation science, conservation genetics, weed control and restoration science) is the most effective way to achieve results.
- Adaptive management (i.e. management of on-ground works that is guided by information provided by researchers based on good science) is also useful for improving restoration success.
- Weed control and amelioration of other disturbances (e.g., fire and feral animals) are the greatest challenges for restoration, particularly in urbanised areas.
- The use of reference sites (measures of diversity, abundance, vegetation composition etc. at undisturbed sites) to develop measures of success and completion criteria should always be included.
- Collaboration and partnerships with universities and other agencies external to one's own is vital to solving restoration problems.

8 Theme H: Heritage

8.1 Environmental reconciliation: a vision for botanic gardens
Coordinator: Steve Forbes

- The historical and philosophical context of botanic gardens and debated the proper role of botanic gardens in the twenty-first century.
- The importance of botanic gardens in exploring the plant kingdom and in linking plants, people and culture were discussed
- Historical and contemporary case studies explored connections between people and plants locally and globally.

8.2 Ethnobotany, and indigenous knowledge – the role of botanic gardens
Coordinator: Robert Bye

- As botanic gardens expand their role of promoting plant conservation (especially where people have lost direct contact with plants such as in some developed countries and urban areas), the role and recognition of indigenous knowledge is needed for the efficient utilization of plant products for sustainable development.
- Small botanic gardens are able to respond to the changing requirements of communities as long as the botanic garden maintains effective communication, promotes active participation of the local people (e.g., autosuggestion, take the botanic garden to the people), and the people assume their own responsibilities.
- Botanic gardens need to reach out to the people to effectively demonstrate the "plants pay".
- Botanic gardens of the North can facilitate the recognition and respect for indigenous knowledge by facilitating:
  - awareness of the origin and history of the plants that are the basis of the their livelihood (e.g., local industry in urban areas);
  - the initial development (e.g., training, resources, etc.) in response to a community's desire to share local plant knowledge (among themselves, to new generations, to tourists, etc.), and
  - North to South collaboration needs to mature into South to South collaborations (e.g., between communities within the same country, between two developing counties, etc.).
- Communities and botanic gardens need to establish at the initial stages how indigenous knowledge is to going to be documented and shared so that it is clear what, how much, in what format etc, of the information will be available to the public as well as the information that is restricted.

8.3 The value and future of private collections
Coordinator: Rodger Elliot

- Curation of plant collections by amateur and professional holders can make a valuable contribution to plant conservation, provide reference collections and education.
- Collection holders require scientific as well horticultural expertise.
- Networks have fundamental function for information exchange.
- Necessity of ongoing propagation and distribution of propagules.
- Collections can cover ornamental plants, crops and wild flora.

8.4 The botanic garden as a cultural and scientific heritage
Coordinators: Esteban Hernández Bermejo, Joan Pedrola-Monfort and Vernon Heywood

Botanic gardens have increasing value; they are institutions committed to local and regional peoples and societies in the service of socio-cultural and economical development, the sustainable use of biological and cultural diversity, the traditional ways of exploitation of natural resources and environmental values that assure the wealth of humankind and the rest of the biosphere.

Author: Steve Alton

The Millennium Seed Bank Project International Programme

The Millennium Seed Bank Project (MSBP) International Programme is a nine year global conservation programme (2001-2010), conceived, developed and managed by the Seed Conservation Department at the Royal Botanic Gardens, Kew (RBG, Kew). The two principal aims of the Programme are to:

- collect and conserve 10% of the world's seed-bearing flora (some 24,000 species), principally from the drylands, by the year 2010
- develop bilateral research, training and capacity-building relationships worldwide in order to support and to advance the seed conservation effort

The drylands cover a third of the Earth's land surface, including many of the world's poorest countries, and support almost one fifth of its population. The most immediate threat to dryland areas is desertification due to intensive human settlement in areas subject to drought. This concern is reflected in the Convention on

Biological Diversity's drylands work programme, and in the establishment of the Convention to Combat Desertification (CCD).

One of the most important aspects of the MSBP is that, through its bilateral agreements and support of partner institutions, it ensures duplication of conserved seed collections at facilities all over the world, at the same time providing capital input, training and technical expertise for seed banking activities. Where agreements allow and quantities are sufficient, the germplasm stored in the Millennium Seed Bank and the other banks worldwide will be made available to the world scientific and plant conservation communities, and the Project will become a world focal point for ex situ conservation research.

The MSBP International Programme partners include institutions in Australia, Botswana, Burkina Faso, Chile, Egypt, Jordan, Kenya, Lebanon, Madagascar, Mali, Malawi, Mexico, Namibia, Saudi Arabia, South Africa and the USA. These collaborations have as their basis the precepts of the CBD, respecting national sovereignty and supporting national biodiversity conservation strategies. Benefit-sharing, in the form of duplicate seed storage, data exchange, technology transfer and training are all essential components of the Programme, and will help to ensure the long term sustainability of the Programme after 2010.

Collecting work has also been carried out closer to home. In the UK, around 97% of native higher plant species are now represented in the Millennium Seed Bank. This includes 88% of UK species ascribed to an IUCN Threat Category. Of these, 28% are considered to have total or adequate site coverage.

In addition to the major partnerships above, the MSBP is actively pursuing collaborations with a range of other organisations engaged in wild-species seed conservation. One such initiative is the formation of a network of European Seed Banks, which seeks to share expertise and facilities, coordinate the setting of priorities and therefore avoid duplication of effort across continental Europe. To support this work, funding has been secured under the European Commission's 6th Framework Programme for Research, Technical Development and Demonstration.

These initiatives are important steps along the path to achieving Target 8, the ex situ conservation target of the *Global Strategy for Plant Conservation*, but more is needed. To this end, the UK Programme is being extended to

Above: Millennium Seed Bank Project, Mexico (Photo: RBG, Kew)

Left: *Cylindrophyllum hallii* - In 2001 MSBP collectors in South Africa tracked down the only known wild population of this plant. There are only about 219 living plants left, with clear signs of predation. There were many dead plants, possibly victims of drought or utilisation by animals. Fortunately seeds were in ample supply and a good collection was made (Photo: RBG, Kew)

Above: Wellcome Trust Millennium Building Laboratory (Photo: RBG, Kew)

cover the UK's Overseas Territories, with funding from the Foreign and Commonwealth Office. In addition, the Millennium Seed Bank is keen to encourage the use of its state-of-the-art facilities by any organisation seeking long-term storage of seed material. Universities, NGOs, botanic gardens and government departments are encouraged to make use of the Millennium Seed Bank, either as the primary repository of ex situ material, or as a back-up for their own storage facilities. Donated seed samples can either be made available for research or conservation work through the Index Seminum system, or held for the sole use of the donors. Detailed information on initial viability can be provided, and samples of the material can be repatriated along with passport data and germination instructions. There are also opportunities for collaborative research, training and joint fieldwork.

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The Seeds for Life Project (SfLP) in Kenya

In Kenya, five institutions, the Forestry Department (FD), the National Genebank of Kenya (GBK) through Kenya Agricultural Research Institute (KARI), the Kenya Forestry Research Institute (KEFRI), the Kenya Wildlife Service (KWS) and the National Museums of Kenya (NMK) are working with RBG, Kew to strengthen the national capacity to store native seed. As well as strengthening the national institutions, the medium to long term objective is to ensure that this capacity is passed on to local communities, in particular to support on-farm utilisation of indigenous species. This project, the Seeds for Life Project (SfLP) has allowed the five partners to develop a harmonised 'best practise protocol' for collection and handling of plant genetic resources for long-term storage.

Joint research and continuing training programmes are central to the project. Kenyans have undertaken research attachments at the Wellcome Trust Millennium Building at Wakehurst Place (site of the MSB). Research topics have included studies on the germination and storage of both Kenyan orchid seeds and African tree seeds, and data management issues. On-going collaborative research includes research on the suitability of locally available storage containers. These participants have contributed to the development and delivery of an undergraduate diploma course in seed conservation techniques at Maseno University. The three Kenyans who participated in the 2001 International Diploma Course in Plant Conservation Techniques at RBG, Kew developed projects on a community-based element to the SfLP, a standard operating procedure for X-ray examination of seed at KEFRI and the SfLP species prioritisation list for their assignments.

Kenyans have undertaken technical training attachments at the Wellcome Trust Millennium Building which have covered all aspects of seed processing and banking. The training has facilitated the entry of these technicians onto the diploma course at Maseno University in Kenya. Six in-country workshops have been run, on subjects including seed collecting, data and documentation, species prioritisation, project development and the science programme; these have been led by Kenyan experts, sometimes following research or training attachments at the Wellcome Trust Millennium Building.

The SfLP has supported postgraduate and undergraduates studies which includes the course at Maseno University.

Ex situ conservation of endemic, vulnerable and endangered plant species from desert and Mediterranean zones of Chile

In Chile, The *Instituto de Investigaciones Agropecuarias* (INIA) is working with Kew to implement a project on ex situ conservation of endemic, vulnerable and endangered plant species from desert and Mediterranean zones of Chile. Collecting, joint research and a continuing training programme are central to the project, which seeks additional academic and technical partnerships throughout central and northern Chile as it develops.
The project leader, Dr Pedro León, has been discussing with Chilean colleagues ways in which they can participate in the project, for example by contributing data and joining collecting missions. A seed collecting techniques training course was held in March 2002, attended by scientists from 13 different institutes.

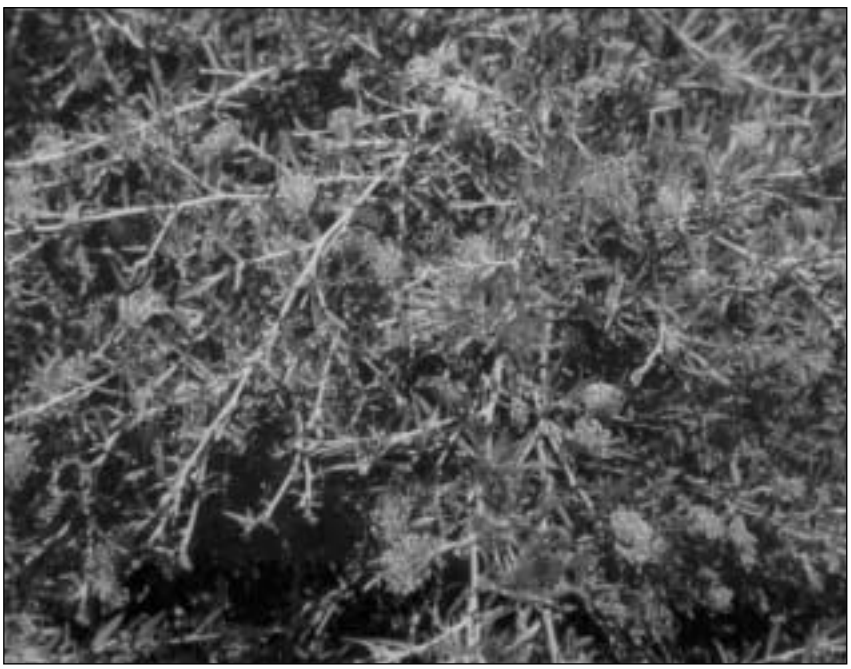
The Chilean fieldwork team is initially concentrating on threatened geophytes and later attention will move to endangered tree and shrub species from central Chile. For these species, research is required into seed storage behaviour. In addition, Kew and INIA will jointly work to gather appropriate information about the Chilean dryland flora. The project database will include information on the biology and ecology of native species, specially focused on information related to seed and fruit characteristics, germination, dispersal and pollination.

Collecting expeditions take place principally between November and April each year. Targeting of species for conservation is helped by access to the specimen data held at the Universidad de la Serena, Museo Nacional, and Universidad de Conceptión (Flora of Chile database).

The project's seed research forms part of the regional CEAZA (*Centro de Estudios Avanzados en Zonas Áridas, Chile*) project investigating the effect of the *El Niño* southern oscillation (*ENSO*) on the adaptation of the flora and fauna.

Author: E.A. James

Conserving *Grevillea williamsonii*: the importance of taxonomic research for appropriate conservation action



Left: *Grevillea williamsonii* (Photo: Neil Marriott)

Background

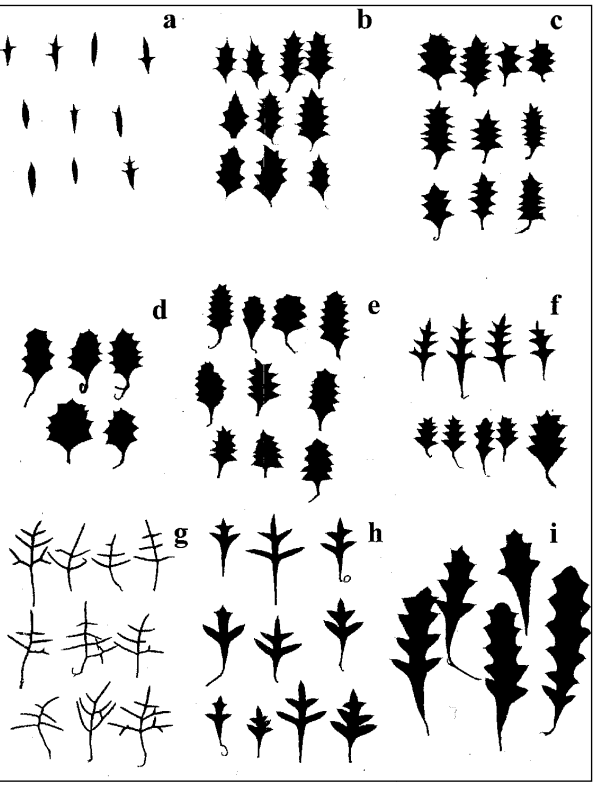
This article summarises the changing fortunes of *G. williamsonii* and is a cautionary tale for the way in which funding is allocated for conservation projects.

Grevillea williamsonii F. Muell. 1893 was described from a collection by botanist H.B. Williamson in 1892 from the only known plant "near Mt. Abrupt" in western Victoria. It grows with *G. aquifolium* but is quite distinct with smaller, often entire or asymmetrically lobed leaves. One of the holly-leafed grevilleas, Mueller considered *G. williamsonii* to have affinities to *G. ilicifolia* and *G. aquifolium* which are both widely distributed in western Victoria and southeastern South Australia. Both species have highly variable leaf morphologies and growth habits (Figure 1). Williamson made several herbarium specimens that remain in the collections at the National Herbarium of Victoria. A couple of years after the initial collection, the area was burnt by wildfire and *G. williamsonii* was thought to be extinct.

However, in 1992, local plant enthusiasts came across a number of unusual plants approximately eight kilometres from the original collection site. After confirmation of their identity by comparison with one of Williamson's herbarium specimens, *G. williamsonii* was reinstated as a rare rather than an extinct species.

Over the years since it was first collected, there has been disagreement regarding the taxonomic position of *G. williamsonii* with some people considering it to be an extremely rare species, others more inclined to it being a hybrid between *G. aquifolium* growing in the vicinity and another unknown species, or simply an unusual variant of *G. aquifolium*. And perhaps the differing opinions should have rung some warning bells regarding activities appropriate for its conservation. However, it was rightly listed as a rare species invoking the precautionary principle because there was scant information and its survival was dependent on the health of less than 20 plants in a single population. Currently, *G. williamsonii*, is considered to be a narrow range endemic restricted to a small area at Cassidy Gap in the northern Grampians, western Victoria and consequently is listed as endangered under state and federal legislation.

Due to its rarity, there was no information about the biology of the species but research funding was not available because a Recovery Plan had not been prepared for the species. Development of the Recovery Plan, based on very limited data, led to



Above: Figure 1 Comparison of leaf shapes for *Grevillea williamsoniii* (a), *G. aquifolium* (b–e), *G. infecunda* (f), *G. ilicifolia* (g-h), *G. renwickiana* (i)

some funding being allocated for site works, monitoring and surveying for further populations but still the question of its taxonomic status had not yet been addressed.

Grevillea williamsonii is vigorous in cultivation and has a dense branching habit. In the wild it tends to develop a more straggly habit with the largest plants about 1 x 1 m. It appears to be suffering from competition from other species because the site has not been burnt for decades and is quite overgrown. Flowering is prolific in cultivation but again, in the wild, is more sporadic and in recent years wild plants have failed to flower. There have been anecdotal reports of seed production but they have not been verified although immature fruit has been seen on some individuals in the wild.

Taxonomic uncertainty and its effect on conservation activities

The taxonomic uncertainty of *G. williamsonii* needed resolution because it affects the actions that are appropriate for the recovery of the taxon and its subsequent management. The following possibilities regarding the taxonomic position of *G. williamsonii* are listed with different conservation management actions.

Firstly, the population could be a relict species. Site conditions suggest that the extant individuals will not be present within 5 years. Conservation would be dependent on the establishment of new populations from cultivated material if surveys do not find more plants. Alternatively, *G. williamsonii* could have resulted from a chance pollination between *G. aquifolium* and another, unidentified, species. In this scenario, management should target the plant community rather than the conservation of hybrid individuals. Finally, *G. williamsonii* might comprise a variant of *G. aquifolium* that occurs sporadically. The plants could be a sibling cohort resulting from a single pollination event. If this is the case, then the sporadic appearance of *G. williamsonii* results from natural reproductive processes combining genetic variation present in *G. aquifolium* even if the extant individuals are a reproductive deadend. Management, therefore, should encompass the species as a whole rather than as isolated populations or individuals to maintain the natural levels of genetic variation and to enable reproductive processes to occur.

To clarify the taxonomic status of *G. williamsonii* and to remove uncertainty with respect to the appropriate management actions for the conservation of a potentially doubtful taxon, genetic analysis and observation of the reproduction structures was undertaken with funding from the Royal Botanic Gardens Melbourne, Parks Victoria (the managing authority) and the Australian Flora Foundation.

Research

Reproductive structures

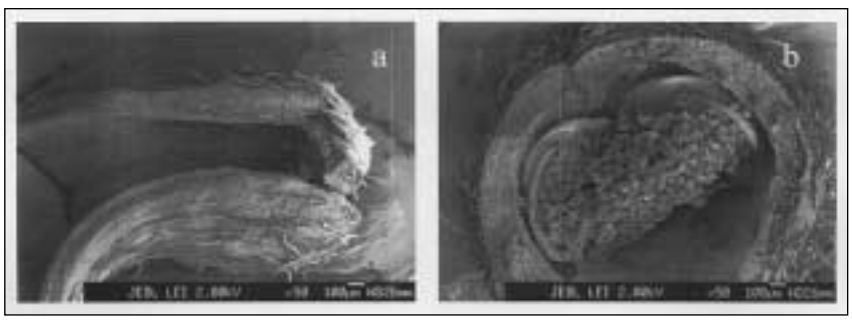
This work was done on ex-situ plants grown at the RBG Melbourne and verified from limited examination of field specimens and plants cultivated elsewhere. The reproductive structures of *G. williamsonii* were compared to *G. aquifolium* and *G. ilicifolia* under a dissecting microscope and a scanning electron microscope.

Genetic analysis

Observations on reproductive structures were followed by genetic comparison of *G. williamsonii* with *G. aquifolium* growing with *G. williamsonii* as well as from other locations within the Grampians and elsewhere, *G. ilicifolia* and *G. renwickiana*, a species found in southern New South Wales.

Results and Discussion

The major stumbling block to reproduction in *G. williamsonii* is that it is male sterile. None of the hundreds of anthers examined contained pollen (Figure 2). It also lacks the ability to reproduce via root suckers unlike some other related species such as the male sterile *G. infecunda* that has only sterile pollen. A noticeable difference between *G. williamsonii* and other holly-leafed grevilleas is the lack of a stigmatic disk. The receptive part of the stigma is usually located in the centre of the disk and becomes receptive after it has acted as a pollen presenter and the pollen removed by pollinators. Typical of holly-leafed grevilleas, the receptive area of *G. aquifolium* consists of slender finger-like papillae. *G. williamsonii*, on the other hand, has papillae that are swollen at the base and some are spherical (Figure 3). Exudate seen on *G. williamsonii* is similar to that found on other species as the stigma becomes receptive so whilst the papillae are



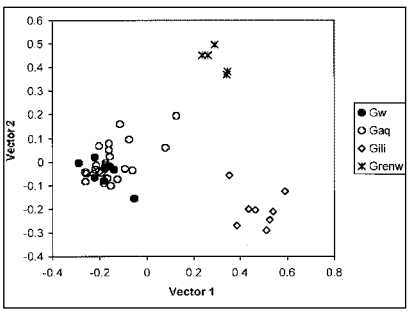
Right: Figure 2 Anther of *G. williamsonii* showing absence of pollen (a). Pollen in anther of *G. aquifolium* (b)

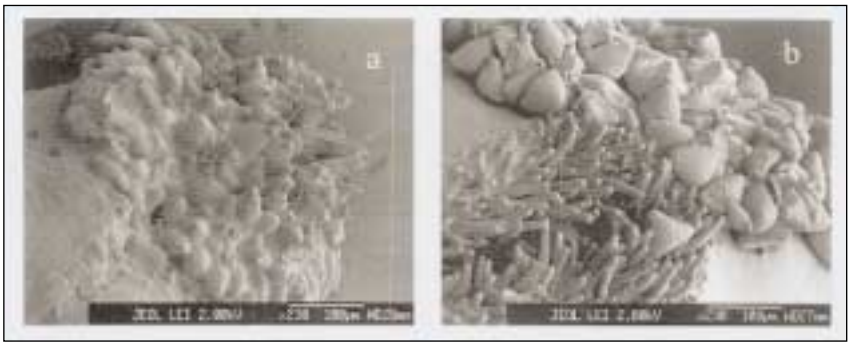
deformed, stigmas might have some reproductive capacity even if it were at a reduced level.

Male sterility can occur for various reasons. For instance, it can be found in relict species that have become reproductively isolated and can also be a consequence of hybridisation. Therefore, even if the stigma becomes receptive and can support pollen tube growth in the style, any pollen would have to come from a source other than *G. williamsonii*. As it grows with *G. aquifolium*, that species would be the most likely pollen source.

The genetic analysis showed that despite morphological differences when compared to *G. aquifolium* sharing the same site, *G. williamsonii* cannot be separated genetically from *G. aquifolium*. Using DNA-based methods, the genetic similarity of *G. williamsonii* was consistent with it being a subset of the variation found in *G. aquifolium*. Samples from two populations of *G. ilicifolia* grouped together despite having distinct leaf shapes (see Figure 1) and *G. renwickiana*, another holly-leafed *Grevillea* was also clearly distinct (Figure 4).

The most likely explanation is that *G. williamsonii* is rare recombinant of genetic characters maintained within the *G. aquifolium* population. A mutation that produces abnormalities in male and female function as well as leaf morphology is undoubtedly rare but cannot be discounted. If *G. williamsonii* can produce seed when pollinated with *G. aquifolium* pollen, any offspring will be true *G. aquifolium*. The occasional production of a variant may be the result of sexual reproduction where rare recessive alleles are combined. Theoretically, such combinations can provide





Left: Figure 3 Stigma of *G. williamsonii* with deformed, bulbous papillae (a). *G. ilicifolia* showing finger-like papillae and triangular pollen (b)

species with a broader range of environmental fitness enabling adaptation to changing conditions. There is no obvious evolutionary advantage in having plants with a reduced reproductive capacity. It would be expected that the "*G. williamsonii*" form will turn up periodically but should not be subject to special conservation efforts.

Conservation implications

As a result of this study, *G. williamsonii* should not be considered as a rare species and therefore its listing as an endangered species is invalid. Instead, its correct taxonomic status should be as a rare variant of *G. aquifolium*. The deformed reproductive structures and lack of pollen suggest that this aberrant form is unlikely to contribute to reproduction in *G. aquifolium*.

The conservation of *G. williamsonii* has been an expensive exercise and is a good example of where a small amount of research funding initially would have freed up funds for other projects. It has been costly conserving this potentially doubtful taxon in terms of the time people have spent in propagating, and maintaining ex situ stock, monitoring plants in situ, carrying out site protection work, preparing survey plans and undertaking surveys for additional plants in similar habitats. The plants have some novelty value and could be of horticultural interest but should not be the subject of specific conservation efforts. Instead, management of areas containing *G. aquifolium* should be designed for the general habitat type and to maintain the patterns of genetic diversity present in *G. aquifolium*. For example, it is no longer appropriate to prevent fires in the area and the site should be included in the on-going fire plan that has been developed for the Grampians.

Since 1992, plant numbers have dwindled from about 16 to 7 probably a combination of competition from other species and the presence of *Phytophthora cinnamomi* at the site. It is these issues that need to be addressed to maintain the integrity of the habitats that support *G. aquifolium*. Meanwhile, *G. williamsonii* will probably turn up again but we mightn't be around to notice it.

Acknowledgments

This article is based on a presentation given to the 5th Australian Network for Plant Conservation National Conference in Geelong, Australia, 24 Feb – 1 March 2002. Many people have contributed information and ideas about *G. williamsonii* and I would particularly like to thank Neil Marriott (Trust for Nature Victoria), Neville Walsh and nursery staff (Royal Botanic Gardens Melbourne), Bob Makinson (Royal Botanic Gardens Sydney) and Parks Victoria staff at Halls Gap.

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Left: Figure 4 Principal co-ordinate analysis of RAPD characters for *G. williamsonii* (Gw), *G. aquifolium* (Gaq), *G. ilicifolia* (Gili) and *G. renwickiana* (Grenw) showing separation of *G. aquifolium, G. ilicifolia* and *G. renwickiana* (Grenw) but no distinction between *G. williamsonii* and *G. aquifolium* from a number of populations.

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Role of St Petersburg Botanic Garden in the establishment of the Lower Choper Nature Park

Right: Floodland lake with rich aquatic vegetation near the mouth of the Choper (Location of *Trapa natans* and the desman (Russian muskrat) (*Myogale moschata*) (Photo: Gennady Firsov)

The Lower Choper (Nizhnechopersky) Nature Park was established in March 2003. This is the largest of six parks in the Volgograd region (southern Russia), covering an area of about 186,000 ha of the Kumilzhensky, Alexeevsky and Nekhaevsky administrative districts. The Choper (or Khoper) flows into the River Don. It was created to conserve its unique flora and fauna, peculiar landscapes with virgin steppes, chalk denudations (chalk hills, 30-50 m high cut with ravines), floodland and upland forests, sand hills and meadows, and the Cossack way of life at the lower reaches of the Choper river.

St Petersburg Botanic garden of the Komarov Botanical Institute RAS took part in preliminary floristic research (2000-2002) of that area (project 99/50/1 sponsored by Fauna and Flora International (UK non-government organization) to identify rare species and to identify factors threatening the flora.

As a result 1015 species of vascular plants belonging to 469 genera of 99 families have been identified. 176 species of native flora may be considered rare, 68 have been added to the Red Data Book of Volgograd region and 23 to the Red Data Book of Russia. 12 species are threatened and vulnerable, being threatened with extinction in Russia (*Allium regelianum, Bulbocodium versicolor, Stipa pulcherrima*). There are endemics of chalkland and sandy areas in the south of the former USSR (e.g. Russia and adjacent areas of Kazakhstan and Ukraine) such as *Anchusa popovii, Erysimum cretaceum, Koeleria talievii* and *Matthiola fragrans*. There are even endemics of the Lower Don floristic district (*Rosa microdenia*). As a result of this research, the habitats and the natural distribution of certain species have been clarified; some were discovered far from the locations cited in the literature e.g. *Allium scorodoprasum, Nonea lutea, Utricularia australis* and others. *Clematis orientalis* was an interesting discovery. It was found on chalk hills near Pustovsky village; the only arboreal climber for the whole large area; it represents the northern point of its European natural area. Many well-known European species also occur here at their southern and south-eastern limits (e.g. *Comarum palustre, Salix pentandra, Tilia cordata*).

Local people may damage certain rare plants because of their highly decorative, medicinal or fruiting

Right: Sand with *Festuca beckeri* (Photo: Gennady Firsov)

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Left: Crataegus rhipidophylla at chalk ravines near stanitsa Bukanovskaya in autumn, profusely decorated with red berries (Photo: Gennady Firsov)

properties, but the main threats are in fact ploughing virgin steppe, afforestation of sand and intensive cattle grazing.

As a result of this project St Petersburg Botanic garden was able to increase its living collections. Russia has considerable plant genetic resources which have not been brought into cultivation. The flora of the lower reaches of the Choper river is rich in bulbs, perennials, shrubs and subshrubs which are not in cultivation nor even tested in the St Petersburg or other Russian gardens. This is true for recently described species (*Rosa microdenia*), but there are also species which have been well-known for a long time by experts on the flora, but unknown by gardeners (e.g. *Atriplex verrucifera*). Species such as *Cerasus fruticosa, Ephedra distachya, Malus praecox* are rare in general cultivation. *Artemisia salsoloides*, *Astragalus zingeri, Thymus pallasianus* and others appear to be absent in Russian botanic garden.

During the process of floristic field investigation many varieties and forms have been observed. These are *Bulbocodium versicolor* and *Scilla sibirica* with white flowers, different flower-coloured forms of *Iris pumila* and *Corydalis solida*, and fastigiate and dwarf forms of arboreal species. Their description and cultivation is the task of forthcoming work.

It is very important to establish a local nursery where rare and threatened species can be propagated and brought into cultivation on a large scale using the advantages of the local conditions of climate and soil. This work is being undertaken by a local farmer and enthusiast Sergei Grishin.

The conservation and education role of the Lower Choper Nature Park is in its early stages. The collaboration between botanic garden experts and local conservationists is critical to protect the area's remarkable biodiversity.

Above: Oak trees (Quercus robur) at Shakinsky oak wood (Photo: Cornelius Sönksen)

Left: Chalk hills of Choper river with a flock of goats near stanitsa Bukanovskaya (Photo: Gennady Firsov)

Authors: Zulma E. Rúgolo de Agrasar, María de Luján Puglia

Ornamental Grasses in Argentina: introduction and cultivation of native and exotic species

Grasses have always been part of the natural landscape of the earth dominating important ecosystems. At present, these versatile plants have won an outstanding place in modern landscaping. The southern territory of America has a great abundance of grasses with more than 1300 species compared with other areas at similar latitudes (Nicora & Rúgolo de Agrasar, 1987; Zuloaga et al., 1994). The specific richness with diverse characters, many of them peculiar or unique is related to the number of different habitats of each type: savannas, prairies, Andean vegetation, forest or jungle vegetation. This biological diversity, with numerous endemic species, is an inexhaustible resource for the selection new taxa for ornamental use. Although the ecosystems of the region provide a great abundance and variety of native grasses, very few are used in landscape design of green spaces; exotic species are better known and used. In 1994, these ideas inspired this project of cultivating native grass species from Argentina and exotic grasses, for which there was no cultivation data in these latitudes (Province of Buenos Aires, Mar del Plata (38º 01' 00" S 57º 31' 00" W).

More than 100 taxa, of which approximately 50% are native species (Rúgolo de Agrasar & Puglia, 2003; Rúgolo de Agrasar & Puglia, in press) have been studied over ten years (see List of species in cultivation). The following methodology was developed: the species were selected, living specimens were collected for cultivation, the material was identified and herbarium specimens were made and deposited in the Herbarium (SI) of Instituto de Botánica Darwinion (Holmgren et al., 1990). The identity of the species have been verified (Zuloaga et al., 1994; Darke, 1999; Soreng, 2000, 2001; Soreng & Pennington, 2003). At the same time, field work was carried out to assess the habitat and the ecological conditions of the grasses in their native habitat and cultivation trials were undertaken at monthly intervals to assess characteristics such as: height and diameter of the tufts, aspect of the foliage, flowering process, speed and forms of growth, self-sowing power and ornamental value. The behaviour of each species was also monitored for a year to evaluate the seasonal changes and methods of cultivation such as time of pruning, division of tufts and transplanting. Cultivation conditions and requirements associated with the different uses were also evaluated. Sustainable practices in landscaping were used in these trials, to promote horticulture that uses native species adapted to the environment, requiring low consumption of chemical products, little watering and minimum maintenance work.

From the analysis of the data taxa have been selected with different characteristics, adapted to particular climatic conditions, capable of diverse uses in relation to micro climates and local ecology; as well as their use in the restoration of natural prairies, drought areas (xeriscape), fixation of dunes, control of erosion and for the production of fresh or dry flower arrangements.

The purpose of this work is not only to encourage the use of native and exotic grasses in both private and public parks and gardens, but also to evaluate grasses in the natural landscape, to ensure the conservation of the floral richness of grasses as a reservoir of valuable species, and the protection of the ground from desertification processes.

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Right: *Oplismenopsis najada* (Hack. & Arechav.) Parodi

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List of species in cultivation

Alopecurus pratensis L. cv. variegatus; *Andropogon gerardii* Vitnam.; *Andropogon lateralis* Nees; *Aristida niederleinii* Mez.; *Arrenatherum elatius* (L.) P. Beauv. var. *bulbosum* (Willd.) Spenn. cv. variegatum; *Arundinaria japonica* Siebold et Zucc. *Arundinaria pygmaea* (Miq.) Asch. & Graebn.; *Arundinaria simonii* (Carriére) A. et C. Rivière var. *simonii*; *Arundinaria simonii* var. *variegatus* Hook. f.; *Arundo donax* L. var. *donax; Arundo donax* var. *versicolor* (Mill.) Stokes; *Bambusa multiplex* (Lour.) Raeusch.; *Brachypodium sylvaticum* (Huds.) P. Beauv.; *Briza maxima* L. *Briza media* L. *Briza minor* L.; *Briza subaristata* Lam.; *Calamagrostis x acutiflora* (Schrad.) DC. cv. Karl Foerster; *Calamagrostis x acutiflora* (Schard.) DC. cv. overdam; *Chasmantium latifolium* (Michx.) Yates; *Chusquea culeou* Desv.; *Coix lacryma-jobi* L.; *Cortaderia selloana* (Schult. et Schult. f.) Asch. et Graebn.; *Cymbopogon citratus* (DC) Stapf; *Deyeuxia viridiflavescens* (Poir.) Kunth var. *viridiflavescens*; *Deyeuxia viridiflavescens* var. *montevidensis* (Nees) Cabrera et Rúgolo; *Eragrostis curvula* (Schrad.) Nees; *Erianthus ravennae* (L.) P. Beauv.; *Erianthus trinii* (Hack.) Hack.; *Eustachys distychophylla* (Lag.) Nees; *Festuca cinerea* Vill. cv. blausilber. *Festuca cinerea* Vill. cv. Elijah Blue; *Festuca glauca* Vill.; *Festuca ovina* L.; *Gynerium sagittatum* (Aubl.) P. Beauv.; *Helictotrichon sempervirens* (Vill) Pilg.; *Hordeum jubatum* L.; *Ichnanthus minarum* (Nees) Döll; *Imperata brasiliensis* Trin.; *Imperata cylindrica* (L.) P. Beauv. subsp. *koenigii* (Retz.) Tzvelev. cv. red baron; *Jarava caudata* (Trin.) Peñailillo; *Jarava ichu* Ruiz et Pav. *Jarava pseudoichu* (Caro) F. Rojas; *Koeleria glauca* (Schrad.) DC.; *Lagurus ovatus* L.; *Lamprothyrsus hieronymi* (Kuntze) Pilg.; *Leymus arenarius* (L.) Hoscht. cv. glaucus; *Leymus cinereus* (Scribn. et Merr.) Á. Löve; *Leymus condensatus* (J. Presl.) A. Löve. cv. Canyon Prince; *Melica altissima* L. cv. atropurpurea; *Melica macra* Nees; *Melica sarmentosa* Nees var. *sarmentosa; Miscanthus floridulus* (Labill.) Warburg; *Miscanthus oligostachyus* Stapf. cv. purpurascens; *Miscanthus sinensis* Andersson var. *sinensis*; *Miscanthus sinensis* Andersson var. *sinensis*. cv. gracillimus; *Miscanthus sinensis* Andersson. var. *sinensis*. cv. Nippon; *Miscanthus sinensis* Andersson var. *sinensis*. cv. rotsilber; *Miscanthus sinensis* Andersson var. *sinensis*. cv. silberfeder; *Miscanthus sinensis* Andersson var. *sinensis*. cv.Yaku Jima; *Miscanthus sinensis* var. *condensatus* (Hack.) Makino cv. cabaret; *Miscanthus sinensis* var. *variegatus* Beal cv. variegatus; *Miscanthus sinensis* Anderson var. *zebrina* Beal cv. strictus ; *Miscanthus sinensis* Anderson var. *zebrina* Beal. cv. zebrinus; *Molinia caerulea* (L.) Moench. subsp. *caerulea*; *Molinia caerulea* (L.) Moench subsp. *caerulea*. cv. variegata; *Molinia caerulea* (L.) Moench. subsp. *arundinacea* (Schrank) H. Paul ex Grabherr. cv. skyracer; *Muhlenbergia dumosa* Scribn. ex Vasey; *Muhlenbergia rigens* (Benth.) Hitchck.; *Nassella tenuissima* (Trin.) Barkworth; *Oplismenopsis najada* (Hack. & Arechav.) Parodi; *Oplismenus hirtellus* (L.) P. Beauv.; *Oplismenus hirtellus* subsp. *setarius* (Lam.) Mez ex Ekman; *Panicum elephantipes* Nees ex Trin.; *Panicum prionitis* Nees; *Panicum racemosum* (P. Beauv.) Spreng.; *Panicum urvilleanum* Kunth; *Panicum virgatum* L. *Panicum virgatum* L. cv. heavy metal; *Panicum virgatum* L. cv. praire sky; *Panicum virgatum* L. cv. rostrahlbusch; *Paspalum ceresia* (Kuntze) Chase; *Paspalum exaltatum* J. Presl; *Paspalum haumanii* Parodi; *Paspalum quadrifarium* Lam.; *Paspalum repens* Bergius; *Paspalum stellatum* Humb. et. Bonpl. ex Flüggé; *Pennisetum alopecuroides* (L.) Spreng.; *Pennisetum alopecuroides* (L.) Spreng. cv. caudatum; *Pennisetum alopecuroides* (L.) Spreng. cv Hameln; *Pennisetum alopecuroides* (L.) Spreng. cv. moudry; *Pennisetum orientale* Rich.; *Pennisetum purpureum* Schumach.; *Pennisetum setaceum* (Forsk.) Chiov.; *Pennisetum setaceum* (Forsk.) Chiov. cv. rubrum; *Pennisetum villosum* R. Br. ex Fresen.; *Phalaris arundinacea* L. var. *picta* L.; *Phalaris arundinacea* L. var. *picta* cv. feesey form; *Pharus lappulaceus* Aubl.; *Phragmites australis* (Cav.) Trin. ex Steud.; *Phyllostachys aurea* A. et C. Rivière. *Phyllostachys bambusoides* Siebold et Zucc.; *Phyllostachys nigra* (Lodd. ex Lindl.) Munro; *Poa iridifolia* Hauman; *Poa ligularis* Nees et Steud.; *Pogonatherum paniceum* (Lam.) Hack.; *Rhynchelytrum repens* (Willd.) C.E. Hubb. *Saccharum oficcinarum* L.; *Saccharum officinarum* L. cv. rubrum; *Setaria poiretiana* (Schult.) Kunth; *Spartina pectinata* Link. cv. aureomarginata; *Sporobolus indicus* (L.) R. Br.; *Sporobolus maximus* Hauman; *Stenotaphrum secundatum* (E. Walter) Kuntze var. *secundatum*; *Stenotaphrum secundatum* (E. Walter) Kuntze var. *variegatus; Thysanolaena latifolia* (Roxb. ex Hornem.) Honda; *Vetiveria zizanioides* (L.) Nash; *Zoyzia matrella* (L.) Merr.

Above: *Paspalum exaltatum* J. Presl

International Agenda for Botanic Gardens in Conservation - Registration Update

We are delighted to announce that since the 5th December, 2003, a further 87 organizations have registered their commitment to work to achieve the objectives and targets of the *International Agenda for Botanic Gardens in Conservation*. We are pleased that this includes organizations from six countries that are new to the list: Belize, Cuba, Estonia, Israel, Malaysia, and Mauritius.

This brings the total of organizations which have registered to 292 from 75 countries (20th May 2004).

This illustrates the increasing awareness of the importance of botanic gardens for the conservation of plants and sustainable living.

The *International Agenda for Botanic Gardens in Conservation* was published in 2000 by Botanic Gardens Conservation International to provide a global policy framework for botanic garden actions in biodiversity conservation, environmental education and sustainable development. Since then it has been widely welcomed by many conservation and botanic garden organisations and institutions worldwide. This has included the Convention on Biological Diversity (CBD) which has recognised the International Agenda as representing the botanic garden community's response and contribution to the achievement of the *Global Strategy for Plant Conservation*.

Organizations which have registered their support for the International Agenda for Botanic Gardens in Conservation - 5th December, 2003 - 20th May, 2004

Africa	BENIN	Botanic Garden of Papatia
Africa	CAMEROON	Central African Botanic Gardens and Arboreta Network (CABGAN)
Africa	KENYA	Plants for Life International
Africa	MAURITIUS	Sir Seewoosagur Ramgoolam Botanic Garden
Africa	UGANDA	Nature Palace Botanical Gardens, Vibrant Environs Uganda
Africa	ZIMBABWE	Vumba Botanical Garden
Asia-Temperate	CHINA	Chengdu Botanic Garden
Asia-Temperate	GEORGIA	Tbilisi Botanic Garden
Asia-Temperate	ISRAEL	The Jerusalem Botanical Gardens
Asia-Tropical	INDIA	Department of Botany, University of Pune
Asia-Tropical	INDIA	Auroville Botanical Gardens
Asia-Tropical	MALAYSIA	Taman Botani Putrajaya
Australasia	AUSTRALIA	"Denbly" Botanical Garden
Europe	ESTONIA	Botanical Garden, University of Tartu
Europe	FINLAND	University of Helsinki Botanic Garden
Europe	FRANCE	Jardin botanique du Montet, Conservatoire et Jardins Botaniques de Nancy
Europe	FRANCE	Jardin botanique de plantes carnivores
Europe	FRANCE	Jardin d'Altitude du Haut Chitelet, Conservatoire et Jardins Botaniques de Nancy
Europe	ITALY	Orto Botanico Università di Modena e Reggio Emilia
Europe	ITALY	Arboreto di Arco
Europe	ITALY	L'Orto Botanico dell'Università di Siena
Europe	ITALY	Orto Botanico di Bergamo "Lorenzo Rota"
Europe	ITALY	Giardino botanico alpino - Viotte di Monte Bondone
Europe	LITHUANIA	Botanical Garden of Vilnius University
Europe	POLAND	Arboretum Glinna Nadleśnictwa Gryfino
Europe	POLAND	Ogród Botaniczny Uniwersytetu Marii Curie - Skłodowskiej w Lublinie
Europe	POLAND	Ogród Botaniczny w Łodzi
Europe	POLAND	Ogród Roślin Leczniczych Akademii Medycznej w Gdańsku
Europe	POLAND	Ogród Dendrologiczny i Gospodarstwo Szkółkarskie Wirty, Nadleśnictwo Kaliska
Europe	POLAND	Arboretum Wyższej Szkoły Humanistyczno-Przyrodniczej w Sandomierzu
Europe	POLAND	Gołubieński Ogród Botaniczny
Europe	POLAND	Arboretum SGGW w Rogowie
Europe	POLAND	Arboretum Przelewice
Europe	POLAND	Ogród Botaniczny Uniwersytetu Wrocławskiego
Europe	POLAND	Rada Ogrodów Botanicznych w Polsce
Europe	POLAND	Ogród Botaniczny Instytutu Hodowli i Aklimatyzacji Roślin w Bydgoszczy
Europe	POLAND	Ogród Botaniczny Uniwersytetu Jagiellońskiego w Krakowie
Europe	POLAND	Ogród Roślin Leczniczych Akademii Medycznej we Wrocławiu

Europe	POLAND	Ogród Botaniczny Uniwersytetu im. Adama Mickiewicza w Poznaniu
Europe	POLAND	Arboretum Bramy Morawskiej w Raciborzu
Europe	PORTUGAL	Jardim Botânico da Universidade de Coimbra
Europe	ROMANIA	Gradina Botanica "D. Brandza"
Europe	RUSSIAN FEDERATION	Botanic Garden of Ural Branch of Russian Academy of Sciences
Europe	RUSSIAN FEDERATION	Polar-Alpine Botanic Garden-Institute of Kolsky Science Centre of RAS
Europe	RUSSIAN FEDERATION	Botanical Garden-Institute of Far Eastern Branch of RAS
Europe	RUSSIAN FEDERATION	Botanical Garden of Solovetzkiy
Europe	RUSSIAN FEDERATION	Botanical Garden - Institute of Ufa Science Center of RAS
Europe	RUSSIAN FEDERATION	Central Siberian Botanical Garden of Siberian Branch of RAS
Europe	RUSSIAN FEDERATION	Botanical Garden of M.K. Ammosov Yakutsk State University
Europe	RUSSIAN FEDERATION	Botanical Garden of Pyatigorsk State Pharmaceutical Academy
Europe	RUSSIAN FEDERATION	Botanical Garden of Kazan State University
Europe	RUSSIAN FEDERATION	Dendrologial Park of the M.V. Frunze Sanatorium
Europe	RUSSIAN FEDERATION	Botanical Garden of Gorskiy State Agricultural University
Europe	RUSSIAN FEDERATION	Dendrological Park of Volga-Kama State Preserve
Europe	RUSSIAN FEDERATION	Botanical Garden of Udmurtia State University
Europe	RUSSIAN FEDERATION	Mountain Botanic Garden of Daghestan Science Centre of RAS
Europe	SPAIN	Jardín Botánico-Histórico "La Concepción" de Málaga
Europe	UKRAINE	National Dendrological Park "Sofiyivka"
Europe	United Kingdom	The Royal Horticultural Society's Garden, Rosemoor
Europe	United Kingdom	The Royal Horticultural Society's Garden, Wisley
Europe	United Kingdom	The Royal Horticultural Society's Garden, Hyde Hall
Europe	United Kingdom	The Sir Harold Hillier Garden and Arboretum
Europe	United Kingdom	The North of England Zoological Society
Europe	United Kingdom	Birmingham Botanical Gardens and Glasshouses
Europe	United Kingdom	Winterbourne Botanic Garden University of Birmingham
Europe	United Kingdom	The Royal Horticultural Society's Garden, Harlow Carr
Latin America & The Caribbean	BELIZE	Belize Botanic Gardens
Latin America &The Caribbean	BRAZIL	Jardim Botânico de Lajeado
Latin America &The Caribbean	CHILE	Jardín Botánico Chagual
Latin America & The Caribbean	CHILE	Arboretum de la Universidad Austral de Chile
Latin America &The Caribbean	COLOMBIA	Jardín Botánico de Cali
Latin America & The Caribbean	COLOMBIA	Jardín Botánico del Quindío
Latin America & The Caribbean	COLOMBIA	Asociación Latinoamericana y del Caribe de Jardines Botánicos
Latin America & The Caribbean	CUBA	Jardín Botánico de Villa Clara
Latin America & The Caribbean	MEXICO	Jardín Botánico de Ciceana
Latin America & The Caribbean	MEXICO	Jardín Botánico del Instituto de Biología (UNAM)
Latin America & The Caribbean	MEXICO	Jardin Botánico "El Charco del Ingenio"
North America	CANADA	Jardin Botanique de Montréal
North America	CANADA	Sherwood Fox Arboretum
North America	UNITED STATES	Meadowlark Botanical Gardens
North America	UNITED STATES	North Carolina Botanical Garden
North America	UNITED STATES	The Morton Arboretum
North America	UNITED STATES	New England Tropical Conservatory
North America	UNITED STATES	North Carolina Zoological Park
North America	UNITED STATES	Waimea Arboretum and Botanical Garden
North America	UNITED STATES	Eddy Arboretum, Insitute of Forest Genetics
North America	UNITED STATES	Missouri Botanical Garden

The 2nd World Botanic Gardens Congress, held in Barcelona, Spain from 17-22 April 2004 provided an opportunity for botanic gardens worldwide to review progress in implementation of the priorities identified for botanic garden actions, and to consider how to address the resource gaps and difficulties faced by botanic gardens in many parts of the world.

The Congress also considered and discussed a proposal for the development of a series of *International Agenda* targets in conservation, outlining the priorities and what can realistically be achieved by 2010, the date also chosen for the achievement of the 16 international targets included in the *Global Strategy for Plant Conservation* as adopted by the world community through the CBD in 2002.

Copies of the registration brochure and the International Agenda itself are available in pdf form on the BGCI website (www.bgci.org). Please contact BGCI if you would like to be involved in its implementation (info@bgci.org).

If you have not already registered, please take the opportunity to complete the registration form (at the back of this issue of *BGjournal*) and send by mail or fax to:
The Secretary General, Botanic Gardens Conservation International, Descanso House, 199 Kew Road, Richmond, Surrey TW9 3BW, U.K.
Fax: +44 0208332 5956.

Authors: Jamie O'Connell, Diane Wyse Jackson

Gardens Online
The BGCI worldwide botanic gardens database and a new international database of plant collections

For the past few years BGCI has been working on an ambitious project to develop a detailed and user-friendly database of all the botanic gardens and arboreta in the world and put it online as a developing resource.

A basic searchable database went online during 2003, however work continued on the project and now BGCI is pleased to re-launch the facility with a host of new features.

For the first time gardens of the world each have their own online garden profile detailing their contact details, facilities, research programmes, plant collections and much more. Anyone wishing to find out anything about a garden in the world can now find that information on the BGCI website. Crucially, to ensure that the data are current gardens themselves are being asked to apply for their own username and password to update it (see example of a garden profile).

It is hoped that garden personnel, local and international visitors to gardens, researchers and scientists will all make use of and benefit from having all this information in one location.

Gardens will directly benefit in many ways:

- Benchmark your services and facilities against other institutions
- Evaluate your gardens contribution to plant conservation by cross referencing your collections with red list data
- Promote your garden to a wider international audience
- Provide researchers and the general public with important information on your garden.

Key features:

- Update your garden records such as: administrative contacts, public facilities, staff numbers, opening times, research activity, education programmes.
- Securely upload your entire plant record database
- Cross reference your plant records with endangered species lists to see how many endangered species you are cultivating.
- Link to your own garden website
- Upload pictures of your garden for your public garden profile page

Web users can search for a garden anywhere in the world by country or region/city. You can also search by 'special collection' type in the keyword search box, so for example you can look for gardens with medicinal plant collections in India, or gardens with Mediterranean collections.

Plant collections

To achieve Target 8 of the *Global Strategy for Plant Conservation (GSPC)* 60 per cent of threatened species need to be in accessible ex situ collections, preferably in the country of origin, and 10 per cent of them included in recovery and restoration programmes by the year 2010.

The problem is that currently there is no definitive record of what is being cultivated in gardens around the world. It was with this target in mind that BGCI embarked on the plant record project. The objective to provide a means by which gardens can contribute their garden records to an overall database that has public access. This list of collections can now be cross referenced with current red list data to get a picture for the first time of what is being achieved to conserve plants ex situ and what still needs to be done.

Right: Complete this form to become a garden editor which is linked to your garden profile

Right: Upload a maximum of 5 images

How to update your gardens data in the World Botanic Garden Database

- To get started go to www.bgci.org and locate your garden in the garden search. Then at the bottom of your gardens profile click 'Apply to edit this garden' – complete the form (page 26) and we will send you an email with your username and password so you can begin.

Once you have received this email, you are encouraged to update your garden online information as soon as possible by following the instructions given below.

- Return to your gardens profile in the garden search www.bgci.org
- At the bottom of the page - click on the login link or click edit this garden.
- Enter the username and password you received in the email from us. Your user name is most likely to be your email address and passwords are automatically generated by the system so as to make your garden site as secure as possible.
- Review and update if necessary the first screen including address details and web address, then press the update button (see below).
- Use the left hand navigation to review and update the other categories such as 'Research Programmes' and 'Garden Staff' or click 'All fields' to view all the data request fields. After you have made any updates click the 'update' button at the bottom of the page.
- 5 Images of your garden can be uploaded for display on your public profile page, simply click on 'Garden Images' in the left hand navigation and source the images from your own computer (see above).
- Click 'Plant List' to upload your plant collection data (see page 28, top).

Below: Update your garden information and submit to the live site

Above: An Example of a Garden Profile (Eden Project) – Please note apply to edit garden link at bottom of screen

Above: Easily upload your plant collections

Below: Cross reference your plant collections against endangered species lists.

How to update your plant records in the World Botanic Garden Database

Gardens with access to this new system can upload, replace or append their garden's plant holdings. This is done by cutting and pasting a CVS (coma separated values) file holding plant name information only.

Seven fields only are requested at the moment. (Abbreviations of field names taken from ITF2 Standard Field Names (1998) (see www.bgci.org):
Genus Hybrid (genhyb)
Genus Name (gen)
Species Hybrid (sphyb)
Species Name (sp)
Infraspecific rank (isprk)
Infraspecific epithet (isp)
Cultivar name (cul)

Any field can hold a blank value, which will be transferred by a comma (which indicates to the computer program that we have moved to the next field. See example for a plant name CSV file:

genhyb,gen,sphyb,sp,isprk,isp,cul,
,Abronia,,turbinata,,,
,Abronia,,villosa,,,
,Acacia,,asepala,,,
,Acacia,,blakelyi,,,
,Acacia,,bussei,,,
,Acacia,,carens,,,
,Acacia,,circummarginata,,,
,Acacia,,cuneifolia,,,
,Acacia,,filifolia,,,
,Acacia,,paolii,,,
,Acacia,,stereophylla,,,

Once material has been added, please go back and review your garden plant holdings. At that point, minor errors can be deleted.

Please contribute your garden's data – it will make a valuable contribution to Target 8 of the *GSPC*. Your plant collection will also be cross referenced against the threatened plant lists and a report of your unique holdings can be downloaded (see left).

Web users can also search for a plant genus or species in the plant search and find out how many gardens are cultivating that plant in the world. For security reasons BGCI will not publicise which gardens are cultivating each species. However if a user identifies a number of gardens that are growing a species they can complete the online form with a query that will email those anonymous gardens. The donor garden(s) may or may not respond to the query depending on their circumstances and inclination. In this way gardens uploading their plant records should have no issues with data security.

Future development

Periodically in the future we may conduct surveys of the botanic garden community, registered users will be encouraged to login to the website and fill in a simple form. It is hoped by using the web to collect information, it will ensure that the data will be collated and analysed within a short time frame, and give a realistic picture of botanic gardens today.

We also plan to offer reporting functionality to our garden members so that they can search and export lists of gardens based on their search criteria, e.g. number of staff, size, education programmes etc.

We may also expand the system so that gardens can upload their job vacancies, give details of job swap opportunities, and event garden events. We would value your thoughts on this. Do you think it would be a good idea and would your garden use it?

We are trying to make this site as user friendly as possible, so please contact database@bgci.org with any suggestions or problems that will help us to streamline our database procedures.

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Short Communications

Plant Diversity Challenge

The Plant Diversity Challenge, the UK's response to the *Global Strategy for Plant Conservation (GSPC)* was published in February, 2004 two years after the *GSPC* was adopted by the Convention on Biological Diversity (CBD) (Decision VI/9). The report is the result of two-stage consulting process with the participation of the following organizations, the U.K Department for Environment, Food and Rural Affairs (Defra), the Joint Nature Conservation Committee, the Welsh National Assembly Department for Environment, Planning and Countryside, Plantlife International, the Royal Botanic Gardens, Kew and the Scottish Executive Environment and Rural Affairs Department.

This is one of the first published national responses to the *GSPC* and Hamdallah Zedan, Executive Secretary of the CBD in his message of support said, "I hope that this report will now be used by all stakeholders to aid implementation of the Strategy in the United Kingdom and that it will inspire similar action in other countries too."

For instance, the scope of the UK response to Target 8 of the *GSPC* (60 per cent of threatened plant species in accessible ex situ collections and 10 per cent of them included in recovery and restoration programmes) is that 'priority should be given to those threatened species in the IUCN Red Data Book category of '*critically endangered*', *with a target of 90 per cent of such species in ex situ conservation*'. The ongoing actions which would contribute to meeting the target include '*collecting and storing vascular plants, primarily in the Millennium Seed Bank at the Royal Botanic Gardens, Kew, and reintroducing them as determined by the Biodiversity Action Plan process*' and '*developing methodologies for the ex situ conservation and reintroduction of bryophytes*'. Additional work given

high priority includes '*researching the storage of pteridophyte spores*' (the Royal Botanic Garden, Edinburgh has a spore bank for a number of threatened pteridophytes, but more research is need into the long-term storage of spores) and '*developing scientific and horticultural expertise for the* ex situ *conservation of vascular plants and reintroductions*'.

The report stated that 'the importance of education and raising public awareness about biodiversity in general is firmly established in the emerging country biodiversity strategies'.
In recent assessments of public attitudes to biodiversity in England:

- The proportion of people in England concerned about the loss of wildlife in the UK has risen from 38% in 1986 to 50% in 2001; and
- Awareness of the term biodiversity has increased from 22% in 1996 to 26% in 2001.

The ongoing actions which contribute to meeting Target 14 of the *GSPC* (Promoting education and awareness about plant diversity – the importance of plant diversity and the need for its conservation incorporated into communication, educational and public-awareness programmes) are implementation of country biodiversity plans for education and awareness with a public launch to help promote this report as the UK response to the *Global Strategy* as high priority additional work.

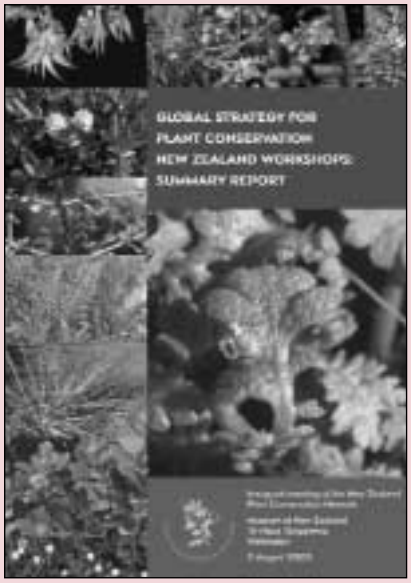
Copies of the report are available from the Communications Team, Joint Nature Conservation Committee (JNCC), Monkstone House, City Road, Peterborough, PE1 1JY U. K.
Tel: +44 (0)1733 562626,
Fax: +44 (0)1733 555948, E-mail: communications@jncc.gov.uk,
Internet: www.jncc.gov.uk

NZPCN Workshop on *GSPC*

The New Zealand Plant Conservation Network (NZPCN) has published a report on their workshops on several targets of the *Global Strategy for Plant Conservation (GSPC)* held at the Museum of New Zealand *Te Papa Tongarewa*, Wellington, New Zealand in August 2003.

Each workshop followed a structure with the aims of the session, the priorities for achieving these aims, the role of the network in achieving these priorities with first steps – recommendations. The report includes the points raised by the participants on which the recommendations were made.

For instance the aims of Target 8 (60 per cent of threatened plant species are in accessible ex situ collections, and ten percent of them included in recovery and restoration programmes) were to determine how threatened plants may be managed more effectively in ex situ collections, how to improve efficiencies at including threatened flora in re-vegetation programmes and how this target was to be met in New Zealand.



The priorities for establishing ex situ collections of threatened plants was to determine current status of ex situ holdings of threatened plants and the extent to which these are available for use in species recovery. The workshop thought that the role of the network in achieving this priority was to:

- Set standards for best practice in collection and management
- Advocate use of threatened species (e.g., to Councils for them to adopt a species)
- Assist in coordination of NZ botanic gardens (with respect to involvement in threatened species programmes).
- Improve training for expert propagators

The workshop recommendations were that the Network should approach the Millennium Seed Bank in London (UK) as a strategic partner in establishing an ex situ repository for native seed, promote utilisation of a percentage of threatened plants in all revegetation programmes and undertake a stock take of the current ex situ status of threatened species at botanic and private gardens and existing ex situ projects. The background to the recommendations included ideas on political involvement, strengthening botanic gardens, income streams, private collections, volunteers and guidelines to ensure genetically representative collections are established.

For Target 14 of the *GSPC* (Promoting education and awareness about plant diversity – the importance of plant diversity and the need for its conservation incorporated into communication, educational and public-awareness programmes), participants were asked to respond to four questions about plant conservation and education:

- What individuals and organisations are responsible for providing education about plant conservation?
- What messages, knowledge and skills should plant conservation education provide?
- What existing plant conservation programmes/resources do you know of? What are the key messages, skills and knowledge provided?
- What audiences should plant conservation education programmes target?

The role of the network in achieving these priorities was thought to build education capacity amongst membership, advocacy for education, especially with government departments and build relationships with other networks involved with plants and environmental education. The workshop recommendations were to identify resources and programmes that currently exist, promote examples of good practice, identify gaps and work at how to fill the gaps by preparing an education strategy for the network.

For copies of the *Global Strategy for Plant Conservation* Workshops: Summary Report, (Price: NZ$15 + $5 for overseas postage) contact John Sawyer, Secretary of the New Zealand Plant Conservation Network, Department of Conservation, P.O. Box 5086, Wellington, New Zealand. Tel: +64 (0) 4 472 5821, E-mail: jsawyer@doc.govt.nz, Internet: www.nzpcn.org.nz

Orchid project in Georgia

The Georgian Society of Nature Explorers – Orchids (GSNE 'Orchis') has received support from BP (international energy company) to protect and conserve the native orchids of Georgia through BP's 'Ecology in Harmony' programme. Almost all native orchid species in Georgia are threatened due to extreme human impact. A book has been produced in two languages (Georgian and English) to describe the general biology of orchids, their diversity and distribution in Georgia. It includes a list of 53 orchid taxa which has been revised on the basis of literature, herbarium specimens and new collections. The distribution of orchid species has been plotted on 50 x 50 Km^2 grids. From this information an attempt has been made to assign IUCN categories of threat (IUCN 2001 Categories & criteria (Version 3.1) http://www.iucn.org).

At present, orchid species native to Georgia do not have legal protection and are not included in the *Red Data Book of Georgia* (1982 Sabchota Sakartvelo, Tbilisi). Many orchids grow in protected areas but these populations need management to secure their future especially the only known population of *Spiranthes amoena* in the Kolkheti National Park. This programme intends to set up living collections in three botanic gardens, Tbilisi Central Botanical Garden, Kazbegi High-Mountain Ecological Station Alpine Garden and Bakuriani Alpine Botanical Garden. The living collections will be made by collecting adult plants from populations exceeding 50 individuals whereas endangered species will only be grown from seed collected from wild populations with the use of in vitro seed germination techniques.

Diversity and Conservation of Georgian Orchids M. Akhalkatsi, M. Kimeridze, S. Künkele, R. Lorenz, M. Mosulishvili (M. Gvritishvili ed), 2003 GSNE 'Orchis'. E-mail: orchisge@yahoo.com, Internet: www.itic.org.ge/orchis

Book Notices

Edward O. Guerrant Jr., Kayri Havens and Mike Maunder (eds), 2004
Ex Situ Plant Conservation Supporting Species Survival in the Wild
Island Press, Covelo, U.S.A. 424 pp. ISBN 1-55963-875-3 (paperback) ISBN 1 55963 874 5 (hardback) Price: US$ 40.00 (paperback), US$ 80.00 (hardback) plus postage US$ 6.75.
For further information and orders contact the Island Press, Dept. 3AU, P.O. Box 7, Covelo, CA, U.S.A. Tel: +1 707 983 6432, (1-800-828-1302 U.S.A.),
Fax: +1 707 983 6414,
E-mail: orders@islandpress.org or service@islandpress.org,
Internet: www.islandpress.org

This book has been eagerly awaited since the conference held in the Chicago Botanic Garden in 1999, entitled "Strategies for Survival: Ex Situ Plant Conservation" on which it is based. It is essential reading for all botanic gardens whether they have formal conservation programmes or not.

Ex situ plant conservation is often seen as irrelevant to in situ conservation which is regarded as the highest priority. There are also many problems, practical, scientific and ethical. This book addresses these problems and shows that properly managed off-site collections can make a critical difference between extinction and survival and moreover that ex situ conservation is a responsibility of botanic gardens. Sir Ghillean Prance, in the introduction also emphasizes the important role of botanic gardens in conservation in response to the challenges of today's world.

Part I discusses the role of ex situ conservation in integrated conservation programmes and the scientific rigour required for the collection, storage and use of the collections. These papers cover philosophical and ethical concerns with examples of integrated conservation in Western Australia and the United States and a chapter on lessons from zoos. Part II reviews the '*Tools of the trade*' from horticulture, seed and pollen to tissue culture. One of the main criticisms of ex situ collections for conservation is that the samples of growing plant, tissues or seed are subject to genetic modification; Part III reviews the effect of selection pressures of the horticultural and storage environment and provides practical steps to mitigate these pressures. Part IV assesses the role of ex situ plant conservation for stemming the loss of biodiversity and makes practical recommendations notably an urgent need for investment in infrastructure and horticultural skills. This Part provides practical guidelines for genetic sampling, seed storage and the management of collections.

It has a Foreword by Peter H. Raven, Director of Missouri Botanical Garden and has been supported by the Society for Ecological Restoration International, the Island Press and the Center for Plant Conservation.

Willis, C.K. (ed), 2004
African Botanic Gardens Congresss 'Partnerships and Linkages' Proceedings of a congress held at Durban Botanic Gardens, South Africa, 24-29 November 2002
Southern African Botanical Diversity Network Report **22**
Southern African Botanical Diversity Network (SABONET), Pretoria, South Africa. 202 pp. ISBN 1 919976 04 3. Copies are free of charge. In English and French.

For copies contact the SABONET Coordinator, c/o National Botanical Institute, Private Bag X101, Pretoria 0001,
South Africa. Tel: +27 12 804 3200,
Fax: +27 12 804 5979,
E-mail: malane@nbi.ac.za,
Internet: www.sabonet.org.

These Proceedings provide a status report and Strategic Framework and Action Plan for the African Botanic Gardens Network up to 2010, as well as the Network Management Structure, as approved during the Congress. The status report was provided by the review articles and needs of the gardens in each region: Eastern, Central, Western, Northern and Southern African with some case studies on specific gardens and projects and recommendations from the pre-congress workshops on plant collecting techniques, Red Data Lists and botanic gardens and environmental education and interpretation in botanic gardens.

The Proceedings also include the background papers on the *International Agenda for Botanic Gardens in Conservation*; its key role for African Botanic Gardens (Peter Wyse Jackson, BGCI), the Southern African Botanical Diversity Network (Stefan Siebert, SABONET), the Millennium Seed Bank Project (Clare Tenner, RBG, Kew) and the *Global Strategy for Plant Conservation* and it's relevance to African botanical gardens (Stella Simiyu, BGCI-CBD).

Claire L. Brown, Fiona Hall and Jeanette Mill (eds), 2003
Plant Conservation: approaches and techniques from an Australian perspective
Australian Network for Plant Conservation, Canberra, Australia. ISBN 0 646 42202 2
Price: AUS$ 50.00 plus postage Australia AUS$ 10.00, International AUS$ 20.00.
To order a copy, contact the Australian Network for Plant Conservation,
GPO Box 1777, Canberra, ACT, 2601, Australia. Tel: +61 2 6250 9509,
Fax: +61 2 6250 9528,
E-mail: anpc@anbg.gov.au,
Internet: http://www.anbg.gov.au/anpc

The Manual contains 39 chapters written by specialists from across Australia, and overseas. The manual is based on the series of training courses that the Australian Network for Plant Conservation (ANPC) has run to date, and covers a comprehensive range of topics to be considered when undertaking conservation and rehabilitation of plant communities. The modules in the manual are: 1. Principles and Ethics of Conservation, 2. Conservation Instruments and Initiatives, 3. Getting Started: Information for Conservation, 4. Conservation in the Field, 5. Rehabilitation and Translocation, 6. Monitoring and Adaptive Management, 7. Ecological Communities, 8. Propagating Threatened Flora for Conservation, 9. Cryptogams, 10. Training, 11. References and Resources. Each chapter includes context boxes, glossaries, key reading, cross referencing, reference lists and web sites.
The material may be copied for personal use and published for educational purposes, provided that any extracts are fully acknowledged. It would be a very useful resource for anyone organising training courses on plant conservation techniques or plant conservation modules of degree courses. Australia posseses a unique flora and Australian scientists and networks have developed unique tools for conservation which are an inspiration to the world wide plant conservation community.

Please register your contribution to the *International Agenda for Botanic Gardens in Conservation*

International Agenda for Botanic Gardens in Conservation Registration Form

Name of Institution			
Type of Registration	**Formal**	Board Resolution or other form of approval from relevant governing bodies (e.g. university authorities, local, regional or national government	*Please Tick*
	Informal	E.g. by Director/Senior staff.	

BGCI would welcome copies of any formal resolution, motion or other form of endorsement.

Name of responsible person	
Position	
Address	

Email		**Date of Registration**	

Declaration

This institution welcomes the International Agenda for Botanic Gardens in Conservation as a global framework for the development of institutional policies and programmes in plant conservation for botanic gardens.

Without imposing any obligations or restrictions (legal or otherwise) on the policies or activities of this institution/organisation, we commit ourselves to working to achieve the objectives and targets of the ***International Agenda for Botanic Gardens in Conservation.***

Signed		**Date**	

Please sign and detach this registration form and send it to The Secretary General, Botanic Gardens Conservation International, Descanso House, 199 Kew Road, Richmond, Surrey TW9 3BW, U.K.

Thank you for registering with the ***International Agenda for Botanic Gardens in Conservation***.

Please keep a duplicate copy of this form for your records.

Botanic Gardens Conservation International (BGCI)
PUBLICATIONS LIST 2003

TITLE	PRICE (£/US$)		POSTAGE		
	Member of BGCI	Non-member of BGCI	U.K. (2nd class)	Europe Economy 7-14 days	Rest of World Standard 14-21 days
POLICY					
Global Strategy for Plant Conservation CBD Secretariat, 2003	Free	Free	£1.00	£1.00	£2.00/$3.00
International Agenda for Botanic Gardens in Conservation	£6.00	£9.00	£1.00	£1.00	£2.00
Wyse Jackson & Sutherland (eds, 2000) English, French or Spanish versions	$9.00	$13.50			$3.00
ACTION PLANS					
Action Plan for Botanic Gardens in the European Union	£4.50	£6.50	£1.00	£1.00	£2.00
Cheney et al. (comp & eds, 2000) English or French versions	$7.00	$10.00			$3.00
Conservation Action Plan for Botanic Gardens of the Caribbean Islands	£4.00	£5.50	£1.00	£1.00	£2.00
Burbidge & Wyse Jackson (eds, 1998)	$6.00	$7.00			$3.00
MANUALS					
The Darwin Technical Manual for Botanic Gardens	£10.00	£14.00	£2.00	£3.00	£5.00
Leadlay & Greene (eds, 1998) English, French or Spanish versions	$14.00	$19.50			$7.00
A Handbook for Botanic Gardens on the Reintroduction of Plants to the Wild	£3.50	£5.00	£1.00	£1.00	£1.00
Akeroyd & Wyse Jackson (eds, 1995)	$5.00	$7.00			$1.50
A CITES Manual for botanic gardens	£3.50	£5.00	£1.00	£1.00	£1.00
Akeroyd, McGough & Wyse Jackson (eds, 1994) English or Spanish versions	$5.00	$7.00			$1.50
PROCEEDINGS					
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(papers from the Eurogard 2000 Congress) Hobson (ed, 2003) CD-ROM	$7.00	$12.00			$3.00
Plants, People and Planet Earth - the role of botanic gardens in	£5.00	£8.00	£1.00	£1.00	£2.00
sustainable living - (5th International Botanic Gardens Conservation	$7.00	$12.00			$3.00
Congress) Davis & Scott (comp, 2001) CD-ROM					
Conservation into the 21st Century (4th International Botanic Gardens	£30.00 $42.00 including postage for members or non-members of BGCI				
Conservation Congress) Touchell et al. (eds, 1997					
Botanic Gardens in a Changing World (3rd International Botanic Gardens	£5.00	£8.00	£1.00	£1.00	£2.00
Conservation Congress) Hobson (ed, 1996) diskette	$7.00	$12.00			$3.00
EDUCATION					
Environmental Education in Botanic Gardens: Guidelines for developing	£3.50	£5.00	£1.00	£1.00	£1.00
individual strategies Willison (ed, 1994)	$5.00	$7.00			$1.50
Teaching for the 21st Century (3rd International Congress on Education in	£10.00	£14.00	£2.00	£2.00	£3.50
Botanic Gardens) Hobson & Willison (eds, 2001)	$14.00	$19.50			$5.00
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	$7.00	$12.00			$3.00

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