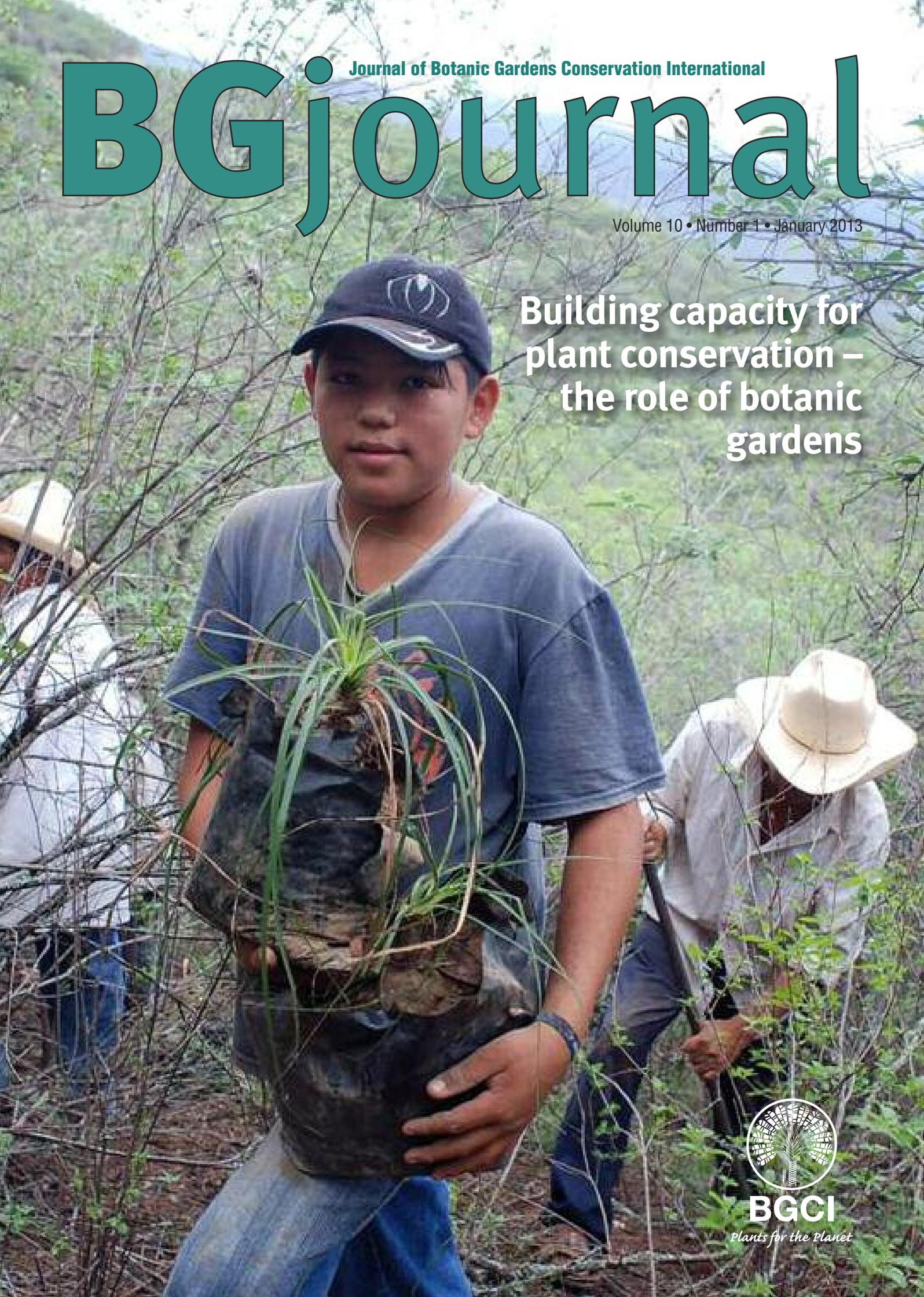


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**Building capacity for
plant conservation –
the role of botanic
gardens**



BGCI

plants for the planet

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Cover Photo: Reintroduction of "pata de elefante" *Beaucarnea gracilis* in Cuicatlán, Oaxaca, México. A collaborative project between the Botanical Garden and the local people (Archive of the Jardín Botánico of the Universidad Nacional Autónoma de México)

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EDITORIAL

SUPPORTING CAPACITY BUILDING

Governments worldwide have signed up to conserve biodiversity with ambitious targets to be achieved by 2020. The so-called Aichi Targets, supported by the targets of the Global Strategy for Plant Conservation (GSPC) with which the botanic gardens of the world are very familiar, will not be realised without sustained commitment and effort. Biodiversity conservation is a major part of the solution for sustained economic growth, helping to ensure water supplies, raw materials for agricultural development, health, construction and new commercial products. Developing the capacity to understand, appreciate, explain and conserve biodiversity is crucial.

BGCI is committed to supporting capacity building for plant conservation worldwide. This issue of BGjournal highlights the essential role of botanic gardens in building capacity. The papers illustrate the dynamic international partnerships that are growing in support of global plant conservation action – through exchange of best practice and training. In a tough economic climate, botanic gardens need to draw on their major attractions and strengths in new ways as highlighted by the article on capacity building and opportunities for Russian botanic gardens. Botanic gardens can take advantage of the declining provision of botanical training in other sectors as noted in the overview article by Mariana Chavez and Suzanne Sharrock. They can also share techniques and approaches as is demonstrated so effectively by the rapidly emerging linkages between botanic gardens in South America and Africa described on p.12. Training programmes developed by well-



Seed collecting in Mali (RBG Kew)

established botanic gardens, such as Kew, Edinburgh and Missouri provide models that can be adapted and replicated elsewhere.

Often a small amount of funding, personal contact and shared ideals can go a long way! The partnership between Kadoorie Farm and Botanic Garden (KFBG) and botanic gardens in mainland China described on p.31, supported by BGCI, has grown from an initiative funded by HSBC through the Investing in Nature Programme and continues through the generosity of KFBG. The impact of the Travel Scholarship Programme extends way beyond the individuals that have been trained.

In 2012, BGCI launched a new fund for capacity building. The Sylvia Scholarship Fund will support training for young botanic garden staff in developing countries. Page 35 provides information on how money generously donated to

the Fund has already provided opportunities for enhancing international learning and collaboration. I greatly appreciate your support in growing the Fund so that we can enhance training opportunities for a new generation of botanic garden leaders. This year we will be re-developing the Darwin Technical Manual for botanic gardens, an essential tool for reference and training in botanic garden establishment, planning and management. Again we will appreciate your input to the development of this initiative. We will be holding a workshop on this issue at the 5th Global Botanic Gardens Congress in Dunedin, New Zealand in October this year. I look forward to seeing you there.

A handwritten signature in blue ink that reads "Sara Oldfield".

Sara Oldfield
Secretary General, BGCI

THE ROLE OF BOTANIC GARDENS IN BUILDING CAPACITY FOR PLANT CONSERVATION

Accelerated and increased investment in capacity building is required to meet plant conservation targets. Botanic gardens are making a valuable contribution

Introduction

The Conference of the Parties to the Convention on Biological Diversity (CBD) decided in 2012, in Decision X/17, to adopt the updated Global Strategy for Plant Conservation 2011-2020 (GSPC). This Strategy, originally established in 2002, has the vision to halt the continuing loss of plant diversity and to secure a positive, sustainable future where human activities support the diversity of plant life and where in turn the diversity of plants support and improve our livelihoods and well-being.

The updated Strategy emphasizes national and regional implementation and its scope goes beyond traditional plant conservation activities to include sustainable use, as well as working with local and indigenous communities. The achievement of the 16 targets included in the Strategy will require considerable capacity-building, particularly to address the need for conservation practitioners trained in a range of disciplines.



Visiting the cactus collection at the Karoo Desert National Botanic Garden, South Africa (BGCI)

In recognition of the fundamental importance of capacity building to achieve plant conservation outcomes, a specific target on this was included in the GSPC:

Target 15:
The number of trained people working with appropriate facilities sufficient according to national needs to achieve the targets of this Strategy.

As well as the conservation of plant diversity, botanical expertise is also required to address a number of current and future grand challenges and issues facing society today. These include: climate change mitigation; land management and wildlife habitat restoration; understanding the provision of ecosystem services; and the management and control of invasive species. Despite the fundamental role botanical capacity plays in tackling each of these issues,

“ Any perceived irrelevance of plant science to the issues of today’s society seems almost incredible given the extreme importance of food security and biodiversity issues in recent years. ”

such capacity is often lacking across all sectors (government, academic and private sector). Indeed in many developed countries, botanical capacity has even decreased in recent years.

A recent study carried out by BGCI (US) and partners in the United States, showed that Government agencies are losing botanical capacity as staff botanists retire and positions are not refilled, either because positions are eliminated, replaced by individuals without equivalent botanical training, or because there is an inability to find appropriately qualified new candidates to fill them (Kramer *et al.*, 2010). Botanical education and training likewise appears to be on the decline, with many botany departments at universities being subsumed into more general or interdisciplinary departments, and subsequently losing resident expertise as professors retire and are replaced by individuals without botanical expertise. For example the study revealed that in

Box 1: Typical tasks performed by botanists at US federal agencies include:

- Perform biological evaluations to assess risk of projects (renewable and non-renewable energy development, logging, grazing, road construction, recreation, fire) on sensitive plant species, and participate in interdisciplinary teams to protect botanical resources during these projects;
- Develop and implement habitat restoration and plant species recovery plans;
- Survey and monitor populations of rare plants;
- Implement recovery plans for listed plant species, in consultation with state and other federal agencies;
- Survey and monitor populations of invasive species, develop and/or implement activities to manage invasive species;
- Carry out public education and outreach programs;
- Regulate sustainable harvest of non-timber forest products, including mushrooms and medicinal plants;
- Manage botanical resources, including during wildfires through post-fire restoration efforts.

Adapted from Roberson, 2002

1988, 72 per cent of the US’s top 50 universities offered degree programmes in botany, but today more than half of these universities have eliminated these botany programmes. Similarly, in the UK, the last student that enrolled in a pure “Botany” degree began in the University of Bristol in 2010 (Drea, 2011).

Recognising the widening gaps in capacity, organizations in the private sector (e.g. botanic gardens and other

non-profit conservation organizations, as well as for-profit businesses and self-employed individuals) are stepping in, providing botanical training, expertise and infrastructure where it otherwise would not exist.

This article provides an overview of the botanical capacity building activities undertaken by botanic gardens around the world. More detailed examples and case studies are provided in other articles in this issue.

The botanic gardens’ response to GSPC Target 15

Capacity building and training for plant conservation is a major activity for many botanic gardens, and such activities can be divided into four main types of activity:

1. Short courses for the general public
2. Diploma / certificate courses
3. Graduate courses
4. Postgraduate research and training

Botanic gardens are of course also very much involved in general education and public awareness programmes, many with a particular focus on children. Although such work is essential in stimulating an interest in plants amongst

Collecting seeds (BGCI)





A training workshop in South Africa (BGCI)

the young, the main focus of this article is on building botanical capacity amongst adults, mainly at tertiary level.

Short courses for the general public

These courses are aimed at a general public who want to learn more about plants and gardens, and although they often do not have a specific conservation focus, can help to inspire people to become more involved in local conservation programmes. The courses range from one day workshops to part-time classes for a few weeks, and they include themes such as horticulture, garden design, plant identification, ethnobotany, cooking with local food, green living etc.

Today an increasing number of botanic gardens are also involved in citizen science programmes where the public are engaged for example, in monitoring the life cycles of plants. This gives the public a chance to learn more about how

plants respond to changes in their environments while contributing valuable data to scientific studies. An example of a particularly successful plant-focused citizen science programme is provided by Project Budburst coordinated by Chicago Botanic Garden (<http://neoninc.org/budburst>).

Diploma / certificate courses

Many botanic gardens offer a range of specialised diploma courses. Such courses generally include a mixture of technical training and practical experience with a focus on horticulture, garden design and management, plant conservation and environmental education.

Gardens such as the Royal Botanic Garden Edinburgh (RBGE) have a long history of providing professional training, in the case of RBGE, dating back to its origins as a late 17th century physic garden when it trained doctors and

apothecaries of the day. Today it offers a comprehensive range of courses for anyone looking to develop their career in botany, horticulture, garden design or botanical illustration.

Similarly, the Royal Botanic Gardens Kew offers a wide programme of specialist training courses for students in higher education. The diverse plant collections held at gardens such as RBGE and Kew provide an excellent learning resource for all students.

Furthermore, in response to the demands of the wider plant conservation community for solutions-oriented training in skills and strategies supporting worldwide efforts to solve the biodiversity crisis, Kew also offers a programme of international diploma courses in herbarium techniques, botanic garden management, botanic garden education and plant conservation strategies.

Graduate courses

Many botanic gardens provide graduate training in association with local universities. According to BGCI's GardenSearch database (www.bgci.org/garden_search.php) 243 gardens around the world offer university courses (see map below).

Some examples from the US serve to illustrate the types of courses on offer:

- The Arnold Arboretum in the USA is affiliated with Harvard University and it conducts educational programs for multiple audiences as a key component of its mission. Graduate and undergraduate students from Harvard University use the Arboretum landscape and collections for curricula ranging from introductory botany to urban ecology.



Seed processing at the Oman Botanic Garden (BGCI)



Botanic gardens that offer University courses

Right: Participants in a plant conservation training course in South Africa (BGCI)

- The Missouri Botanical Garden offers a broad-based program of graduate studies in systematic botany in cooperation with Washington University, Saint Louis University, University of Missouri-St. Louis, and Southern Illinois University at Edwardsville. Students apply to and enrol at one of these universities and complete the degree requirements of that school, but have full access to the staff, facilities, laboratories and research opportunities available at the Garden. The Garden's strong commitment to conservation and tropical research provides students with outstanding opportunities for field-oriented studies.

- The Longwood Garden, in association with the University of Delaware offers a renowned Graduate Program, preparing students for a leadership career in public horticulture. Students take graduate courses from amongst those offered at the University of Delaware, while also working closely within the many aspects of Longwood Gardens.

- New York Botanical Garden, which has maintained a graduate studies program for over a century, provides degrees in systematic and economic botany in association with six universities in New York.

- In California, Rancho Santa Ana Botanic Garden is home to the botany department of Claremont Graduate University, offering graduate degrees in plant systematics and evolution.

- In Florida the Fairchild Tropical Botanic Garden partners with two universities in Florida to offer graduate degrees in tropical plant biology and conservation.

Post-graduate research and training

Botanic gardens around the world are centres for plant science research and many offer opportunities for post graduate research and training at Masters and PhD levels. For example the Wuhan Botanic Garden in China, has been recruiting graduate students since 1983. It runs PhD programmes in botany and ecology, and offers MSc degrees in



botany, ecology, garden plant and ornamental horticulture, biotechnology and environmental engineering.

International cooperation and partnerships between botanic gardens are well established and often include training and research activities. For example, the Xishuangbanna Tropical Botanic Garden (XTBG) in China has developed a programme of student exchanges and collaborations with foreign universities including Wageningen University (Netherlands), University of Miami (USA), Chiangmai University (Thailand). Long-term research collaboration partners also include the National Tropical Botanic Garden (USA), Queen Sirikit Botanic Garden (Thailand), National Natural History Museum and Smithsonian Institution (USA). Furthermore, taking advantage of the academic resources of XTBG and in order to promote collaboration and exchanges with Southeast Asian

countries, XTBG offers opportunities for postgraduate studies (PhD and MSc) to Southeast Asian countries, with a focus on effective biodiversity conservation and sustainable socio-economic development in the region.

International partnerships are particularly important in helping to build capacity in countries which are rich in biodiversity but which presently lack the skills and expertise to conserve such diversity. An inspiring example of such cooperation between botanic garden organisations is provided by the South Africa – Brazil partnership described in the article on p12.

Conclusions

It is clear that botanic gardens, together with other non-profit organizations are playing an increasingly critical role in filling gaps in botanical capacity building and training. However, as noted by Kramer et



Learning about plants in South Africa (BGCI)

al. (2011), land managers, conservation agencies, and policy makers in both the public and private sectors face rapidly escalating needs for information in response to the many challenges emerging in the natural world. The urgency of climate change, expanding and changing energy needs, increased demand for water and other natural resources, biodiversity conservation, and landscape level restoration is forcing action. Public and private institutions will increasingly be called upon to help guide and implement these actions, which requires sound science and a strong infrastructure for effective and efficient implementation. Unfortunately, it is not clear that these institutions have the botanical capacity needed to meet these challenges, perhaps because the knowledge and expertise that botanists bring to bear on addressing the grand challenges of this century often goes unrecognized and under-supported.

While most countries have not carried out a comprehensive assessment of their botanical capacity, the study carried out by BGCI (US) in 2010 does give us a picture for the US which highlights a worrying decline in offerings of botanical courses and degree programmes. It is likely that loss of botanic capacity is similar in other developed countries. For example in France, declines in traditional academic botany programmes and infrastructure are noted the book *In Praise of Plants* (Hallé, 2002). And in the United Kingdom, concerns regarding declines in

national botanical capacity led to the production of *The Ghost Orchid Declaration* in 2009 (PlantLife, 2009), a call to arms for governments, conservation organizations and the general public to ensure that botanical capacity is in place so no additional plant species are lost to extinction.

If Target 15 of the GSPC is to be achieved, and if governments are going to be able to address some of the critical issues facing society today, botanic gardens should position themselves to increase their ability to fill what is clearly a critical gap and promote this role more strongly. Botanical capacity needs to be built not only at the national level, but globally, through international partnerships and cooperation. Botanic gardens are well placed to take a leadership role in botanical training and the global network is in place to facilitate the transfer of skills and knowledge to where it is most needed. However, the academic and government sectors as well as private foundations will need to recognize, support and sustain botanic gardens in order for them to fulfil this role.

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Explaining the uses of plants in Mexico (BGCI)

Training students for careers in restoration and conservation

THE UNIVERSITY OF WASHINGTON BOTANIC GARDEN AND RESTORATION ECOLOGY

Dedication of a Native American garden (Kern Ewing)

Introduction

The University of Washington Botanic Gardens (UWBG) consists of two sites, the 230 acre Washington Park Arboretum, and the 90 acre Center for Urban Horticulture/Union Bay Natural Area, separated by Union Bay in Lake Washington (Seattle, Washington, USA). Both sites have substantial natural areas within the urban matrix, providing ample opportunities to practice restoration ecology. As a part of the College of the Environment at the University of Washington, there are also many opportunities to train students for careers in restoration and conservation.

Restoration activities are associated with the UWBG in several ways.

- 1) The Union Bay Natural Area, with its mile-long shoreline along Lake Washington and the man-made University Slough, is a 75 acre former landfill that is part of the Botanic Gardens. It was closed as a landfill in 1970, and faculty and students have continuously worked on its restoration since 1990;
- 2) The faculty members that are associated with the UWBG teach an exceptional variety of restoration courses that are offered to students at the University of Washington;
- 3) Community volunteers have played an important role in supporting and accomplishing restoration projects in the Natural Area and elsewhere on and near campus;
- 4) The restoration faculty, in association with faculty from two other UW campuses (UW Bothell and UW Tacoma) formed the UW Restoration Ecology Network.

One of its most visible initiatives is the Restoration Ecology Capstone course sequence, which is taught by faculty from all three campuses with the assistance of graduate students. The capstone works with community partners to accomplish needed restoration in Seattle and the five county areas around the city.

The Union Bay Natural Area (UBNA)

The Natural Area was a decommissioned municipal landfill that is located between the University Campus and the affluent



Students in the hoop house (Kern Ewing)

Laurelhurst neighborhood. Before it was a landfill, the site was “made land” that was the result of an ambitious late 1800’s-early 1900’s project that connected Lake Washington with Puget Sound. The Lake was lowered, and mudflats appeared. Decades of dumping and filling were culminated when it was briefly a City landfill; neighborhood unhappiness with a landfill in their midst sped its closure. The land was given to the University, but an unstable soil structure of refuse over clay and peat made it unsuitable for construction of any permanent buildings.

When students and faculty began restoration in 1990, the major problems were harsh conditions (it is situated atop a capped landfill) and the occupation of the site by very difficult invasive plant species such as purple loosestrife (*Lythrum salicaria*), Himalayan blackberry (*Rubus armeniacus*) and others. On the plus side, the openness of the area and its lakeside location had created an exceptional urban birding site. Since the beginning of restoration efforts, invasives have been controlled, native species have been installed (mostly by students

in UW classes), and native plant and animal diversity has increased. About 15 acres have been restored, and invasives are controlled on much of the site by a regime of flooding, shading or mowing. Access is free and available at all times.

Restoration courses

The restoration curriculum benefits from the great natural sciences curricula that exist on campus. Restoration students may take basic courses in soils, wildlife biology, ecosystem sciences and landscape management through the School of Environmental and Forest Sciences, the academic home for UWBG. Horticultural courses that are available include plant propagation, native plant production and urban plant protection. Theoretically grounded management courses are both disciplinary and inter-disciplinary, and include the biology, ecology and management of plant invasions, landscape plant management, and wetland ecology and management. Specifically targeted restoration courses include introduction to restoration, the

three quarter restoration capstone, restoration in North American ecosystems, and restoration design. The restoration faculty has their offices at UWBG and students have study desks here, creating a superior collaborative environment for learning.

Community volunteers

It has always been part of the mission of the UWBG to embrace the local community so that they are strong supporters of our programs; at the same time we are able to teach and learn from them. Our restoration projects in the Natural Area always have interpretive signage. The restoration locations that we choose are usually near the trail system so that we may engage passers-by in conversation when we are working on a site, and they are highly visible at any time. We have offered programs, lectures and guided walks that allow community members to learn about us, and if they want, to work with us.

We have worked with community and neighborhood-based groups for two decades to build trust. An example of that is the success of the “Friends of Yesler Swamp.” Yesler Swamp is the easternmost 6 acres of the Natural Area, and was formerly the outfall of Yesler Creek. Initially, some members of the community went on a restoration walk that we hosted. They were very engaged by both the site and thought of restoring it to a place that functions as a wetland and educates the public. They formed an organization that has applied for, and received a \$20,000 grant to design a boardwalk and a \$64,000 grant to build part of it. They continue to seek grants, hold work parties, and have educational “swamp walks”. They have become an important part of our extended organization.

Other groups have provided more short-term restoration assistance. A service group from a large telephone company worked for one year to control invasive species on a hillside in the Arboretum and to provide funding for interpretive signage, winning a national award from their parent company in the process. The national Earth Conservation Corp, the United Way Day of Caring, and various community organizations have given shorter, more focused assistance on restoration work.



Spreading mulch (Kern Ewing)

Restoration Ecology Capstone

A capstone course is one that is intended to allow graduating undergraduates to knit together all of the courses that they have taken in college, and apply the aggregate knowledge that they have gained to the solution of a substantial, multi-disciplinary problem that confronts the community. We teach a restoration capstone course sequence that has been offered since 1999. All of our capstone classes are held at UWBG, and outdoor labs can easily be accommodated in the Natural Area. Tools and equipment are

available and teams can check them out. The students include upper level undergraduates as well as graduate students. Each course is collaboratively taught by faculty members from the three UW campuses. Students work in teams, starting in the fall and finishing in the spring (UW is on the quarter system, and there are three quarters in the regular academic year). To join a team, students must select from among eight to ten projects. Each team then meets their client or community partner, and begins to work on their project. The course is structured, and teams must respond to a

“ I did the capstone program as an undergrad in the 2007-2008 school year. One great thing I got out of it was experience working with a team, especially how to delegate and divide up tasks. It was also great to work with folks outside of the group such as our client and the nurseries we bought plants from. ” Natalie Footen

Request for Proposals from clients with a proposal of work, then develop a work plan, an as-built plan, and a final stewardship plan for the clients. The team must also accomplish the removal of invasive plants, selection and acquisition of plant material, management of volunteers and installation of plants. At the end of the year all the groups present their projects at a symposium, using posters and conversations with interested attendees. Our symposia have regularly had at least 100 people in attendance for the last five years.



Blue tubes mark a recently planted area (Kern Ewing)



Restoration workers (Kern Ewing)

Since the first capstone class in 1999, we have completed over one hundred community projects, successfully building bridges between the University and the community. The projects have been located in five of the counties around Seattle, though our focus has

“ This course allowed for a real level of ownership. Measures of success were so tangible that all of my teammates took pride in high quality work. The outcome of our efforts had a positive effect not only on the park's ecosystem, but also the surrounding community and that was really inspiring for all of us. This kind of class design allowed us all to be fully engaged in one aspect or another. We were also forced to learn how to really work together and draw on individual strengths in order to achieve our group goals. ” Lindsey Hamilton

increasingly been within the city. The work has been published in *Science* as a model for hands-on, community-based learning at the university level (Gold et al., 2006), and the faculty received the John Rieger award (for contributions to the restoration profession) from the Society for Ecological Restoration. Perhaps a more gratifying reward is that former students continue to return to their team sites to see how well their restoration projects are doing.

Conclusion

Our work in restoration ecology may have started out of the necessity to manage a difficult site – a former landfill – in an urban area, but it has become so much more. It has become an opportunity to train students in both the theory and practice of restoration and conservation. It has become a way to engage the wider community in a discussion about the value of urban ecosystems and the services they provide, while also giving them a chance to get to know us better. It has provided a chance for the University of Washington to provide a valuable service to Seattle and the surrounding communities. And our faculty has become better teachers and scientists as we have used our “outdoor

laboratories” to apply our theoretical knowledge to the application of restoration. What began more than 20 years ago as an attempt to restore a patch of land for which we were given responsibility, has become an embodiment of our mission – sustaining managed to natural ecosystems and the human spirit through plant research, display, and education – and our vision – As an international hub for plant science, information, teaching, and stewardship, we will promote an educated, inspired, and engaged society dedicated to sustainable ecosystem management.

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SOUTH-SOUTH COOPERATION FOR CAPACITY BUILDING

Accelerating national progress towards implementing the Global Strategy for Plant Conservation in megadiverse countries.



Field trip to Cedarberg Mountains of the Western Cape, South Africa (Claudine Massi Mynssen)

Introduction

The Global Strategy for Plant Conservation (GSPC) was developed with the ultimate and long-term objective of halting the current and continuing loss of plant diversity. The Strategy is structured by objectives, sub-objectives and targets, providing an innovative flexible framework within which national and/or regional targets may be developed, according to national priorities and capacities, and taking into account differences in plant diversity between countries. Mexico provides an

example of how this can be achieved (Davila *et al.*, 2011). While variation in implementation of the Strategy nationally is important, maintaining a global dimension remains vital as it facilitates the development of a consensus of key objectives, targets and actions and enhances collaboration and synergy at all levels.

The first version of the GSPC was published in 2002. Working with very few resources, nations, government agencies and non-governmental organizations alike were encouraged to

take up the 2010 targets (Wyse Jackson and Sharrock, 2011). Over the following eight years several major efforts were notable, including the establishment of the Global Partnership for Plant Conservation (GPPC); the development of several national response documents or action plans to help individual nations contribute to the overall GSPC targets; the emergence of Botanic Gardens Conservation International as a recognized global leader in promoting plant conservation and supporting capacity-building for several of the GSPC targets; the publication of a global



SANBI and CNCFlora's staff at Cedarberg Mountains of the Western Cape, South Africa (Lize von Staden)

report on the status of plant conservation around the world by the Secretariat of the CBD in 2009; and the publication of the first global on-line list of the world's known plant species (www.theplantlist.org), in December 2010, essentially achieving Target 1 of the GSPC.

The successes of the GSPC were partly due to the formation of networks that promoted the Strategy and guided its implementation and the identification of a facilitating organization that would be responsible for progress towards each target. Little or no progress was often a symptom of lack of engagement between, or availability of, appropriate actors and passive facilitation (Chase *et al.*, 2011). However, many of the original targets set for 2010 were not achieved and they have proved to be especially challenging for megadiverse developing countries which struggle to promote conservation actions while trying to fill gaps in the coverage of biodiversity information (Ghanzanfar, 2008). Such governments are striving to balance response capacity with increasing rates of biodiversity depletion and ecosystem transformations. The lack of infrastructure, inadequate capacity and insufficient financial support continue to be a barrier for more consistent advances, considering the enormous plant diversity hosted by these countries.

“ Many of the targets have proved to be especially challenging for mega-diverse developing countries. ”

Encouraged by the success of the GSPC in mobilising action from a variety of sectors, updated GSPC targets were adopted in 2010. However, practical solutions for how to tackle some of the challenges faced by megadiverse developing countries remained unclear. Representatives from these countries are needed at international meetings of the conservation community in order to raise awareness on some of the common problems faced by these countries. South-south collaboration is one possible mechanism to speed up national advances towards achieving the GSPC targets. This paper aims to share some of the lessons learnt from the collaborative cooperation between South Africa and Brazil, two megadiverse countries committed to the national implementation of the GSPC.



SANBI staff hiking at Cedarberg Mountains of the Western Cape, South Africa (Tainan Messina)

Outlines of the partnership

Implementing the Global Strategy for Plant Conservation in megadiverse countries such as Brazil, with the largest national flora in the world (c. 43,000 plant taxa) and South Africa, with the world's richest temperate flora (c. 20,500 plant taxa) is a significant challenge. However both countries are seriously committed to meet this challenge and have realized that by working together and sharing lessons they can speed up their progress towards achieving the GSPC targets. One of the most challenging targets in the GSPC, and a foundational one for the rest of the strategy, is Target 2: 'An assessment of the conservation status of all known plant species, as far as possible, to guide conservation action.' Brazil and South Africa are collaborating to make progress towards achieving Target 2.

The relationship started in May 2010 when a Brazilian delegation visited South Africa to learn about a range of conservation initiatives taking place there. The timing was perfect as South African botanists had just completed the first ever comprehensive assessment of all South African plant taxa. During this visit Domitilla Raimondo, Threatened Plant Manager at the South African National Biodiversity Institute (SANBI) met Gustavo Martinelli from the Brazilian National Centre for Flora Conservation (CNCFlora), based at the Rio de Janeiro Botanic Garden Research Institute. Gustavo and the CNCFlora team were

just starting a large project to reassess all plant species that had ever been included in any Brazilian legislation or Red List project. Their target of assessing 4,722 plants within 2 years was an ambitious one and they were eager to pick up any tips of how best to tackle this project. After studying more about the South African red listing process, it was clear to the Brazilians that the strategic approach adopted by SANBI had some interesting practical solutions that could help CNCFlora to meet its aspiring target.

As a first step, in June of 2010, South Africa's threatened plant team went to Rio de Janeiro, Brazil, to take part in a technical workshop for planning the requirements of CNCFlora's Threatened Species Information System, which was being developed to facilitate the red listing process in Brazil. During this workshop the Brazilians asked the South African's to present their lessons and recommend whether conducting conservation assessments using the IUCN Red List Categories and Criteria was a good approach. The South Africans were able to show that it is possible to use the IUCN Red List system even on large floras, and highly recommended following this system as it is scientifically sound and has been internationally endorsed. However, in addition to adopting the IUCN framework, they recommended that it was important to structure a robust national database that would facilitate dataflow from national herbaria and botanical research institutions into the

red listing process. In addition, it was important to consider that at the national level, Red Lists influence public policies, and for that purpose thorough documentation needed to be kept accessible. The South Africans offered to train the Brazilians to conduct conservation assessments using the IUCN system and to share technical specifications of the database architecture structured to support the red listing process. The offer was accepted and in October of 2010, five Brazilians representatives arrived in Cape Town and spent a week at Kirstenbosch Botanic Gardens doing Red List Training and exploring technological solutions for practical problems. They were also taken into the field with volunteers from SANBI's Custodians of Rare and Endangered Wildflowers Programme (CREW), a citizen science project that involves members of the South African public in monitoring and conservation of threatened plants. The Brazilians were most interested in this model of including citizen scientists in plant conservation work and were keen to see if they could start such a programme in Brazil.

As part of both exchange visits, the botanists from each country took the opportunity to learn more about the floras of the two countries. For the South Africans, the high altitude grassland flora in the Itatiaia National Park, Brazil was notably different to their native grassland flora, including many diverse genera such as *Eriocaulons*. Other beautiful plants that the South Africans could admire were the giant



Domitilla Raimondo's presentation at CNCFlora's training workshop on Threatened Species and IUCN Red Listing assessments (Eduardo Fernandez)

carnivorous plant from the Scrophulariaceae *Utricularia reniformis* and the beautiful Amaryllid *Hippeastrum morelianum*. The South Africans were stunned by the diversity of epiphytes with hundreds of different Araceae, Orchidaceae and Bromeliaceae seen growing in the Brazilian cloud forest. A particular focus were the Bromeliaceae which were studied in the high altitude grasslands, and in the cloud forests as well as at the Rio Botanic Garden where over 1,000 species are represented in a living collection. When the Brazilian's visited South Africa they were taken to see both the Fynbos and Karoo vegetation types. Despite the international fame of the Fynbos vegetation, the Brazilians were most taken with the strange diversity of succulents in the Karoo vegetation.

After the October 2010 training, the CNCFlora team returned to Brazil with a copy of the South African Red Listing database. They used this to determine which were the crucial fields for capturing data on their flora and also how best to structure their database to facilitate efficient assessment. They then developed their own database which includes the important basic information they learnt from South Africa but also has many additional functions needed for assessments in the world's largest and most biodiverse tropical country, where experts on particular plant groups are scattered across Brazil and the whole globe. The Brazilian Red Listing data capturing system is online, has a spatial component and has a mechanism for experts, no matter where they are, to verify data captured by the CNCFlora team and to input into the assessments. The Brazilians followed this route for assessments, also taking



CNCFlora's training workshop on Threatened Species and IUCN Red Listing assessments held at the Research Institute of Rio de Janeiro Botanical Garden (Tainan Messina)

into account work done to achieve Target 1 of the GSPC in Brazil - the development of an online Flora (<http://floradobrasil.jbrj.gov.br/2012/>). They now have an integrated system that links their online flora with their conservation assessments. CNCFlora's information system is divided into modules. Each module offers different services for a variety of end-users, who can search biodiversity data and information on threatened plant species across a wide range of different datasets, all organized from the conservation perspective. Data and information are readily available on threatened indigenous species, their habitats, distributions, and on ecosystems. This innovation is something the Brazilians can share with other developing countries and as a token of appreciation to the South Africans have offered to help South Africa to develop an integrated online plant conservation information system. Technical IT Staff will visit South Africa in February 2013 to investigate this possibility.

Conclusions

Effective advocacy of the importance of the GSPC is highly challenging when basic needs such as housing, sanitation, primary education and basic health care are the priorities of many governments with economies that are least developed, developing or in transition (Crouch and Smith, 2011). In this regard, mutual collaboration has proved extremely useful to both countries.

Collaboration between South Africa and Brazil was so productive that both countries are already planning the next steps of such a valuable partnership. Our goal is to provide support for Portuguese speaking countries of Africa, in order to leverage other red listing initiatives, especially in those regions that are still underrepresented in the IUCN global red list of threatened species. In this way,

“ We strongly encourage other developing countries, particularly megadiverse countries, to set-up exchange partnerships in order to facilitate the implementation of the GSPC. ”



Field trip at Itatiaia National Park, Rio de Janeiro, Brazil (Eduardo Fernandez)

SANBI and CNCFlora are also working to engage other South American countries in the red listing process. The outlines of a new collaboration with Colombian institutions are beginning to take shape and we hope to be able to share all the lessons learnt in order to streamline their national process.

Another important outcome of the collaboration between South Africa and Brazil is that despite being focused on a very specific target, both countries ended up advancing the national implementation of the other parts of the Strategy. To be able to meet Target 2, several methodological and technical procedures needed to be defined and shared through printed and online publications. These results contributed for achieving GSPC Target 3: *'Information, research and associated outputs, and methods necessary to implement the Strategy developed and shared.'* The Brazilians even launched a web portal to share information on threatened species, conservation trends and best practices. Advances were also achieved with regard to Target 15: *'The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this Strategy'*; and Target 16 *'Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this Strategy'*. In this way, consolidating cooperation for specific targets of the Strategy may help to create the proper momentum for advancing on other targets, slowly building up to the ultimate objective of halting the current and continuing loss of plant diversity.

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ACHIEVING CONSERVATION IN TROPICAL COUNTRIES: AN INTEGRATED APPROACH TO CAPACITY BUILDING

Building capacity in science and conservation and inspiring citizens to take action to protect their biological heritage requires an integrated, comprehensive and long-term program of activities

A commitment to strengthening in-country capabilities

As widely acknowledged, tropical countries contain the largest number of plant species, have the greatest potential for finding new species, and are most at risk for loss of biodiversity. The future of these countries rests with the capacity of committed, well-trained citizens to carry out effective, sustainable conservation of their exceptional biological resources. How can capabilities in tropical countries best be developed and stewardship of this heritage best be fostered, and how can botanical gardens outside these countries, where educational resources are often lacking, best support these efforts? Over the last several decades, the Missouri Botanical Garden (MBG) has demonstrated that an external organization with a long-term commitment to a country—and a close acquaintance with its people, institutions, and biological diversity—can play an important role in this process.

The Missouri Botanical Garden has worked in tropical countries for more than 50 years, conducting programs that combine research and exploration, capacity building, and community-based conservation. Underlying these programs

is the conviction that robust, enduring conservation and environmental sustainability depend upon in-country planning and implementation, at national, regional, and local levels, and upon development of in-country scientific and technical expertise and local understanding of and engagement in key issues. To achieve these goals, MBG has



Top: Successful university graduates are supported to pursue Master's and Doctoral degrees in botany and ecology (Burgund Bassüner)

Above: Community-based conservation project in Selva Central of Peru (Missouri Botanical Garden)

developed an integrated approach to training that encompasses human, social, and institutional capacity building.

The Missouri Botanical Garden's commitment to the countries in which it works is long-term and continuous. Over several decades we have developed close collaborations with each country's research and conservation institutions, governmental as well as non-governmental, with its universities, and with local communities—partnerships vital to shaping capacity building programs that respond to the needs of individual countries. We also make long-term commitments to specific areas within each country, commitments that allow us to gain a deep understanding of an area's biological resources and to nurture the relationships with local communities that will help build their capacity to manage their resources sustainably and encourage them to do so.

Integrating research, capacity building, and community-based conservation

Within each country, MBG focuses its work in areas that are predicted to be rich in biodiversity yet are poorly inventoried. The information we gather about species and their interrelationships is crucial to understanding the roles that organisms play in different natural communities and under different conditions, and to conserving the genetic diversity needed to construct a sustainable world. Working hand-in-hand with in-county partners,



Community environmental education programme (Missouri Botanical Garden)

MBG's programs integrate capacity building with botanical investigation. Trainees benefit from the experience of working within the context of large, multidisciplinary scientific projects, which affords them the knowledge they need to preserve and manage their country's biological resources. Fieldwork and associated field training are linked in turn to MBG's commitment to help rural and indigenous people in tropical countries assume responsibility for conservation of the biodiversity crucial to sustaining their livelihoods. The programs integrate research and capacity building with community-based conservation in the same geographical areas so that the

information gained may be directly applied to local environmental planning and improved living conditions.

Building a cadre of plant biologists and conservationists: An integrated sequence of learning experiences

MBG's experience in tropical countries over decades has reinforced our strongly held belief that a single training course, even if offered on multiple occasions, or an individual project conducted in isolation from other capacity building components, even if conducted over a multi-year period, is insufficient to build capacity in science and conservation and inspire citizens with a sense of ownership for their biological heritage. Accomplishing these goals requires an integrated, comprehensive program—a sequence of well-considered learning experiences and a gradual establishment of trust with local people. Our human capacity building programs therefore take a multi-tiered approach to training for people of several different educational backgrounds, from professional botanists and conservationists to university students and recent graduates to people in rural communities. These programs provide a range of formal and non-formal training. Their goal is to provide opportunities for professional development, raise the level of education in biology and related fields, increase the number of individuals qualified to conduct field research and conservation planning



Training in conservation and botanical interpretation for park guards (Missouri Botanical Garden)



Fellowships are provided for professional development at MBG or MBG's field stations (Burgund Bassüner)

and implementation, and develop knowledge and skills in rural communities that will improve the lives of residents.

Our tiered training programs for students and professionals include four components. The learning experiences for undergraduates are especially important in countries where these students have few opportunities to participate in fieldwork and where, after completing their coursework, they lack the mentors and the financial resources to conduct their required research theses and earn their degrees—an important factor in gaining employment after graduation.

- Field-based internships for advanced undergraduates at in-country universities;



Luzmila Arroyo and colleagues (Missouri Botanical Garden)

- Mentoring and support for thesis research enabling university students to complete their undergraduate professional degrees;
- Support for the most successful university graduates to pursue master's and doctoral degrees in botany and ecology;
- Fellowships for professional development at MBG or MBG's field stations.

The training programs also help university graduates to network inside and outside their country, to sustain their connection to the scientific and conservation communities and to stimulate cooperation and exchange of information.



Community-based conservation project in Selva Central of Peru (Missouri Botanical Garden)

Luzmila Arroyo

Luzmila Arroyo began as a young biologist in MBG's training program in Bolivia and today is an accomplished professional. As an undergraduate at the Universidad Autónoma Gabriel René Moreno in Santa Cruz, Bolivia, she served as an intern assisting with inventory of Noel Kempff Mercado National Park. She completed her Licenciatura degree in MBG's mentored program supporting undergraduate research theses and later traveled to the United States, where she earned her Master's degree in Biology at the University of Missouri-St. Louis and the Missouri Botanical Garden. Subsequently, she returned to Bolivia, where she worked as an MBG Research Associate at the Museo Noel Kempff Mercado in Santa Cruz and as assistant to MBG's resident curator in Bolivia, helping with all MBG activities in Bolivia and taking a leadership role in capacity building for undergraduate interns, undergraduates and graduates conducting research theses, protected area staff, and conservation practitioners. Currently, she is Professor and Head of the Biology Department at the Universidad Autónoma Gabriel René Moreno.

To extend capacity building to a wider circle of conservation practitioners and residents of biodiversity-rich areas, the training programs also include additional tiers providing specialized training for diverse groups:

- Curation and other herbarium work (for students and for staff of research and conservation institutions);
- Fieldwork, including specimen collection and ecological monitoring (for students and members of rural communities);
- Environmental planning (for students, conservationists, staff of protected areas, and members of rural communities);
- Conservation and botanical interpretation (for park guards);
- Training in conservation and sustainable development for residents of all ages in rural communities.



Community-based conservation project in Selva Central of Peru (Missouri Botanical Garden)

Building sustainable communities

Because we believe that both the well-being of communities and the long-term conservation of biological diversity depend upon local peoples' coming to value and assume responsibility for an area and to gain the abilities needed to

manage and conserve it, we have focused on building links between research on a country's flora, conservation decision-making, and on-the-ground activities—for example, creation of native plant nurseries, use of the species cultivated to improve local livelihoods, and development of other low-impact alternatives to overexploitation of plants and animals. Conservation actions such as these, when formulated through

scientifically-based management plans developed and implemented collaboratively with communities adjacent to biologically-rich areas, directly engage local people in addressing environmental problems facing their country. Through this approach, MBG is motivating citizens of tropical countries to take responsibility for conserving the biodiversity and ecosystems on which their well-being depends.

Program components integrate the following elements:

- Community environmental education to build community engagement in protecting the environment. Educational programs for children and adults raise awareness of the importance of protecting their biodiversity, the environmental impact of current practices of unsustainable harvesting of plant and animal resources, and the key role of sustainable productive activities in improving community livelihoods;
- Development of tools and educational materials that enable local people to preserve their biodiversity and ecosystems;
- Training of teachers who will in turn train other teachers in nearby communities;



Mentoring and support for thesis research allows university students to complete their undergraduate professional degrees (Missouri Botanical Garden)

Community-based conservation

In the Selva Central of Peru, MBG has conducted a coordinated program of botanical research, capacity building, and community-based conservation for the past decade. Working with several Peruvian partners, including the Ministerio del Medio Ambiente's Servicio Nacional de Áreas Naturales Protegidas (SERNANP) and communal and native organizations such as the Asociación para el Manejo de la Reserva Comunal Yanéscha (AMARCY), MBG recently conducted a project to revitalize Yanéscha traditional knowledge of sustainable medicinal plant use. The project engaged Yanéscha high school students with older community members to gather and record these traditions and practices and to renew them in school gardens of medicinal plants and other

educational resources for the benefit of Yanéscha young people and communities. The students, their parents, teachers, community leaders, and Yanéscha parataxonomists trained previously by MBG installed and now continue to cultivate the gardens and established interpretive ethnobotanical trails preserving Yanéscha knowledge and sustainable practices of medicinal plant use. The gardens serve as a resource for healthcare in an area remote from clinics and help to reduce overharvesting of medicinal plants from the wild. The project also integrated Yanéscha knowledge of medicinal plants with scientific knowledge to create a comprehensive tool for conservation of the plant diversity on which Yanéscha traditions depend.



Field-based interns at in-country universities (Missouri Botanical Garden)

- Development of the knowledge, skills, and understandings of local leaders so that they can create the necessary organizational infrastructure to plan for, develop, and implement community management of natural resources;
- Cultivation of a sense of community ownership and responsibility for sustainable development;
- Training of community members in the skills needed to plan and implement sustainable development activities.
- Support for curation of herbaria by providing determinations of plant specimens, both for the collections resulting from collaborative projects and for other collections;
- Repatriation of information and data sharing;
- Support for conservation planning by providing results of analyses of scientific data.

Conclusion

The Missouri Botanical Garden is dedicated to discovering and sharing knowledge about plants and their

Building institutional capacity for conservation

The Missouri Botanical Garden helps build the infrastructure of research and conservation institutions in tropical countries and provides professional development opportunities for biologists working in these institutions. MBG provides several kinds of support to help in-country institutions effectively research and document the plant resources of their countries or to participate in regional, national, and international research and conservation efforts:

- Support for institutional infrastructure such as construction or remodeling of herbarium facilities and purchase of herbarium and field equipment;
- Assistance to institutional libraries by providing bibliographic materials;

environment in order to enrich life. As MBG's international capacity building programs illustrate, botanical gardens external to tropical countries are uniquely situated to help them develop a solid, sustainable base of local capacity for biodiversity conservation. Two factors in particular contribute to the success of such programs: a commitment to ground capacity building in ongoing study of a country's plants and to join with local partners in bringing the knowledge acquired to bear on the development of sustainable practices, and a long-term presence in a tropical country that allows for creation of a coherent set of learning experiences integrated over time. Equipped with the knowledge and tools necessary to design and implement conservation and sustainable development, and energized through their participation in activities responsive to their needs and priorities, local people can become a driving force for conservation in tropical countries.

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Community conservation programme (Missouri Botanical Garden)

BUILDING CAPACITY THROUGH TEACHING ESSENTIAL SKILLS



Dr Heather McHaffie (centre) teaching students in the field (Nigel Franklin)

The Royal Botanic Garden Edinburgh (RBGE) has been developing short practical training courses on plant conservation since 2006.

Introduction

The theme of this issue of *BGjournal*, ‘building capacity for plant conservation’ couldn’t be more apt for the short practical courses that RBGE has been developing since 2006. For many people, attending a full time training course or undertaking study that would last several years is not possible. This in itself is therefore a barrier to capacity building. However, RBGE has developed a series of short certificated courses that are skills-focused and easily adaptable to different

settings, making them great tools for capacity building and importantly giving people the confidence to use them after the initial training has ended. Each of the four courses covers skills that are essential for different aspects of plant conservation and each can be taught intensively or spread out over a longer period.

Horticultural Training

The RBGE Certificate in Practical Horticulture (CPH) was the first of the courses to be developed by Leigh Morris

in 2006 when he recognised the need for internationally standardised practical qualifications. The RBGE CPH, endorsed by BGCI, is a short, highly practical ten day course, comprised of eight teaching days, a revision day and a practical assessment day. Each teaching day is a discrete unit, focusing on a different topic such as propagation, potting or planting. Following the initial development of the course, the RBGE CPH was refined by working in partnership with staff from the Eden Project, who have been delivering the course since 2008. At the same time staff from Nezahat Gökyiğit Botanik Bahçesi (NGBB), Istanbul, were trained to deliver the course and have been running up to four courses per year since. The course at NGBB is really helping to raise the profile of horticulture in Turkey as a skilled career.



Pamela Smith (left) with students in South Lanarkshire and fellow tutor Chris Walsh (far right) (Leigh Morris)

Since it began, staff from RBGE have taught the CPH at other gardens, including Oman Botanic Garden and Pha Tad Ke in Laos, where the material was translated to aid teaching. However, a more recent development has been to build capacity by training staff from other gardens to deliver the CPH themselves. Early in 2011 Leigh and Laura, along with Mark Paterson and Steve Burrell from the Eden Project, delivered a CPH Instructor/Assessor course at Queen Sirikit Botanic Garden (QSBG) in Chiang Mai, Thailand to 15 students from eight different countries. Pamela Smith, a Youth Worker from South Lanarkshire Council in Scotland was one of the students. She had previously done the CPH at RBGE and could see that it had huge potential as a training tool for young people, offering an alternative to school based qualifications. Pamela and her colleagues delivered the first of many CPH courses over the summer of 2012, in an old council parking lot no less! On receiving their certificates, Pamela said *“the guys were mega impressed with themselves!”* A second Instructor/Assessor course is planned for delivery at the National Tropical Botanic Garden, Hawaii in November in 2013.

2012 has seen a few other developments for the CPH. Horticulture staff from Benmore Botanic Garden assisted Laura and Johanna Lausen-Higgins (RBGE Tutor) to deliver the

course there over two weeks. This was a great opportunity to reach out to locals who can't get to RBGE but needed the qualification for their own business or to begin a career change. Two staff from Chester Zoo, Mark Sparrow (Horticulture Programme Coordinator) and Paul Shippides (Team Leader in Horticulture and Botany) came as Instructor/Assessor Interns. They helped with set-up, delivery and assessment of the course and are now qualified to teach it.



Ismail Al Rashdi from Oman instructing Nikone Soutthivong from Laos on the CPH Instructor Assessor course in Chiang Mai (Laura Cohen)

“ A key development has been to train others to deliver the course. ”

They are particularly keen to deliver the CPH to their conservation partners in Mauritius, to help with plant, and therefore animal, conservation.

Lesley Cunningham from St Andrews Botanic Garden (SABG) followed the CPH as an Intern in Summer 2011, before delivering it over 10 weeks in spring 2012. This was an important step for SABG, since recent funding cuts mean it is vital for botanic gardens to highlight the role they play in training. She is currently planning their schedule for 2013.

Field identification skills

The RBGE Certificate in Practical Field Botany (CPF), co-ordinated by Dr Heather McHaffie has been running since 2008. As with the CPH, the emphasis is on practical skills training. Over eight days, students spend time becoming familiar with the terminology used for plant and flower structures and keying out plants, first as a whole class and then in smaller groups and on their own as they gain confidence. Students also learn the skills needed for habitat surveys, vegetation classification,

collecting and pressing herbarium specimens in the field and field recording, including using GPS to pin-point the location of plants. As Heather says:

“ the key thing is that it’s all about building up people’s confidence so they can do it on their own. ”

Like the CPH, a diverse range of students take the course. Some have a leisure interest in plants and want to find out more or often they are volunteering with a local wildlife centre and want to assist with recording. For some, the CPFIB is the first step to a career change whereas for other students, who already have an environmental degree, they need to learn plant survey skills as unfortunately these are not taught on most degrees today. Two groups of professionals find the course particularly helpful in their work but for very different reasons. Ecological consultants with specialisms in animal surveying often need to develop their plant surveying skills and professional horticulturists are finding they need to expand their knowledge of native plants, which are increasingly popular with clients who wish to encourage native flora and fauna in their gardens.

As with the CPH, the CPFIB is adaptable to different situations and settings. It is fully incorporated into the MSC

programme at RBGE, with students completing the CPFIB as part of their annual field trip to Belize. Each year RBGE funds two students from the University of Belize to join our MSc students and develop their field identification skills and gain the CPFIB. The BSc in Horticulture with Plantsmanship students also get the opportunity to do the CPFIB as part of their degree and each year they are joined by some of RBGE’s Horticulture staff who want to develop their field identification skills. They will then put their skills into practice when collecting seeds and material for the garden.

Training botanical illustrators

The third certificate course to be developed is the RBGE Certificate in Botanical Illustration (CBI), which has been running since 2010. Jacqui Pestell, Course Director for Botanical Illustration developed this ten day course to carefully lead students through the rudiments of botanical illustration using a step by step approach. The course can be taught as a two week block or over a longer period. Again the focus is on developing practical skills such as pencil work, mixing and applying watercolour and using fruit, flowers, foliage and bark as ideal models to practice. The techniques are transferrable to other areas of art and illustration but sadly they are seldom taught in our colleges or universities these days.



Lesley Cunningham from St Andrews Botanic Garden demonstrating potting on (Laura Cohen)

An interesting mix of students from different backgrounds join the CBI. No experience is necessary, and people who have been told throughout their lives that they can’t paint or draw are often surprised by what they can achieve! Some students come with more experience but want to develop specific skills before going on to start a degree at art college. Many people do the CBI purely because they have a real interest in the subject and a passion for plants and want to develop the skills to record them accurately, and then they get hooked. The CBI has proved to be an excellent feeder for the two year RBGE Diploma in Botanical Illustration, and by the end of that course many are taking on professional commissions.

In October 2010, a block course was taught in Chile by Jacqui and Gülnur Ekşi (a professional botanical illustrator and lecturer). Following on from that, Geraldine MacKinnon, a professional artist and illustrator from Chile came to RBGE for three months, to follow the CBI so that she can deliver the course at the Catholic University in Santiago next year. One of the hopes is that Santiago will become a major hub for training people in botanical illustration for South America. Continuing RBGE’s links with Turkey, Işık Güner (a professional botanical illustrator and tutor) will be delivering the CBI at NGBB, starting in 2013.



Jacqui Pestell discussing techniques with a student at RBGE (Işık Güner)

“ By building the capacity of tutors, RBGE can ensure that the tutors can in turn build capacity within their local communities. ”

Just like Heather, Jacqui sees that giving people the confidence to continue painting is one of the most important outcomes of the course.

Supporting and training the tutors

As well as our staff delivering courses to the public we felt that we needed to do more to support them to teach these courses with confidence. To this end we developed our own four day course ‘Successful Demonstration and Teaching Skills’, which delivers some of the key skills of a teacher/trainer in a fun and interactive way. Just like the other RBGE courses, the focus is on practical experience of training. On the course there are opportunities to put teaching theory into practice as well as delivering two micro-teaches. For some students this was quite a nerve wracking experience, standing up in front of colleagues and afterwards listening to their feedback and suggestions. All of the students found it invaluable and really appreciated being able to see how other people teach and pick up tips for their own delivery. This course has been taught at RBGE and also jointly to Horticulture staff at Wisley by Leigh and Sarah Cathcart (Learning & Families Manager at Wisley).



Paul Shippides demonstrating to students at Benmore Botanic Garden (Laura Cohen)



Tutors and students at QSBG Thailand (RBG Edinburgh)

RBGE have now set up their own on-line virtual learning environment (VLE) ‘PropaGate Learning’ which will be used to support tutors and learners on all our programmes. The VLE system contains the course material for students to look at in their leisure, quizzes to test knowledge, links to useful videos and websites selected by tutors as well as discussion forums for the students. The vision is that before, during and after the short RBGE courses, learners are supported and further developed through the VLE <http://propagatelearning.rbge.ac.uk/>.

Building the capacity to build capacity

RBGE had the vision of creating capacity building programmes in a range of vocations, which can be easily translated and adapted to conditions in botanic gardens anywhere in the world. This has been possible because the courses are short, well-designed and flexible, with resources to support tutors as well as students.

This is essential to meet local conservation needs and train local people to record, document, grow and conserve plants for the future.

The latest course under development is joint Certificate in Botanic Garden Establishment in collaboration with Denver Botanic Gardens in the USA. This programme aims to deliver the key pointers in how to set up and develop a botanic garden and will be launched later this year.

To find out more about our courses please visit the RBGE website where you can download the handbooks for the CPH, CPFEB and CBI. <http://www.rbge.org.uk/education/professional-courses>

To see images of the CPH course in different locations, please visit our facebook page. www.facebook.com/certph

For more background please see the articles listed below.

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BUILDING CAPACITY AND FACILITATING NETWORKS FOR PLANT CONSERVATION: KEW'S ON-GOING COMMITMENT



Seventy people took part in the plant conservation workshop held in Puerto Rico in June 2012 (Martin Hamilton)

Introduction

The Royal Botanic Gardens, Kew has long recognised the importance of sharing skills, information and expertise to counteract the threats facing the world's diverse plant communities. In response to the targets set by the Global Strategy for Plant Conservation (GSPC), Kew's activities have become increasingly focussed on building the capacity needed to safeguard plant diversity and ensure its sustainable use, through knowledge transfer and partnerships with botanical and conservation organisations around the world. In this way we are helping to improve the skills base needed to implement the GSPC (www.plants2020.net) and the Aichi Targets (www.cbd.int/sp/targets/).

Kew's goal is to support partners worldwide in meeting their own national goals related to plant conservation



Home page of The Plant List



Students from the Imperial College MSc in Conservation Science carried out fieldwork projects in the Turks and Caicos Islands (Marcella Corcoran)

Shared resources

Throughout its history, Kew's collections of preserved plants and associated data together with the accompanying botanical literature have been available to scientific visitors able to come to the UK. These resources are now being made more widely accessible through large-scale digitisation programmes so that researchers elsewhere can view high-definition specimen images and information online, through the Electronic Plant Information Centre (<http://epic.kew.org/searchepic/searchpage.do>). The Plant List, developed in collaboration with other major botanical organisations, provides an authoritative listing of accepted plant names, as a preliminary stage in meeting the GSPC's first target of an online world flora, and represents an invaluable resource for botanists worldwide (www.theplantlist.org/).

Kew's Conventions and Policies team works with partners to produce information resources in the form of training modules, user guides and checklists, that can be used by plant scientists elsewhere to support global implementation of the Convention on



Participants on the Tropical Plants Identification course learn characteristics of plant families (Andrew McRobb)

Biological Diversity and the Convention on International Trade in Endangered Species (www.kew.org/data/cbdbotanists.html; www.kew.org/data/cites.html).

A key area of Kew's capacity building activities is the development of specialist equipment and software tools to facilitate conservation work. Within the Millennium Seed Bank partnership, improvements in seed technology practices are shared to meet needs to process and store wild plant seeds as effectively as possible under different conditions and constraints. These include modified hygrometers to provide a rapid method of measuring seed-moisture content and adapted incubators for use as seed driers (<http://www.kew.org/science-research-data/kew-in-depth/msbp/sharing-our-expertise/technology-transfer/index.htm>). Kew's Geographic Information Systems Unit is part of a consortium which has

produced a conservation assessment software tool, GeoCAT, to support the IUCN Red-Listing process by enabling conservation scientists to carry out rapid initial Red-List conservation assessments (<http://geocat.kew.org/>). Interactive keys available online provide identification resources for a range of plant families (<http://www.kew.org/science/tropamerica/ikey.htm>).

Sharing skills and expertise

Kew offers specialist training in various aspects of plant science, plant conservation and horticulture. A range of short intensive professional development courses are run at Kew, bringing together students from many different countries. Among these are Botanical Nomenclature (1 week); Tropical Plant Identification (2 weeks); Vegetation Survey (2 weeks); Seed



Participants from the 2012 Seed Conservation Techniques course (Wolfgang Stuppy)

Conservation (3 weeks); and International Diplomas in Botanic Garden Education (5 weeks) and Botanic Garden Management (8 weeks). A recent survey of alumni from the longer International Diploma courses has indicated that alumni still value the skills they gained during the courses and are maintaining many of the links formed during their training. The alumnus network now comprises more than 400 people from 107 countries. Full details of all Specialist Training courses at Kew are available on our website www.kew.org/learn/specialist-training/index.htm.

More recently, Kew has developed a regional training programme in association with overseas partners. These regional courses and workshops support the development of networks within neighbouring countries. Since 2006, the Herbarium Management course has been hosted in Brazil, Thailand, Turkey, Trinidad and the USA. A recent workshop for conservationists in the Caribbean resulted in the formation of a Plant Conservation Task Force for countries within the Puerto Rican Bank area (<http://herbaria.plants.ox.ac.uk/bol/prvi>).

Kew also welcomes postgraduates from many countries at both MSc and PhD level. Through presentations and visits to the plant collections, MSc students are made aware of the need for accurately identified plant specimens and meticulous recording of scientific data, as the basis for all successful plant conservation and sustainable use projects. PhD students



The 2012 International Diploma in Botanic Garden Education students represented the USA, Canada, Falkland Islands, Turkey, Germany, Kyrgyzstan, India, Nigeria, Australia and Finland (Pat Griggs)

carry out their research alongside Kew's plant scientists, working in the field, herbarium or Jodrell Laboratory, and gaining practical skills and experience. Kew researchers supervise more than 50 PhD students based at universities across the world (www.kew.org/learn/specialist-training/higher-education/phd/phd-titles/).

Partnerships with botanical and conservation organisations continue to underpin all Kew's fieldwork activities. These collaborative partnerships help to strengthen capacity, both locally and at Kew, through opportunities for staff development, joint research projects and publications.

GSPC Target 15 highlights the need for 'appropriate facilities' to implement the Strategy and efforts to achieve this include joint fund-raising initiatives and technical support with the design of new facilities, such as seed banks and herbaria, and the acquisition of laboratory or horticultural equipment.

Our overall goal is to support partners worldwide in meeting their national goals related to plant conservation by increasing the number of trained people with access to appropriate facilities to achieve all the targets of the GSPC as well as contributing to the achievement of the Aichi Targets.

For more information about our capacity building activities see:

Website:
<http://www.kew.org/learn/specialist-training/index.htm>

Online brochure Growing expertise for plant conservation -
http://www.kew.org/ucm/groups/public/documents/document/ppcont_016194.pdf

Pat Griggs and Colin Clubbe
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Modified hygrometer allows field measurements of seed moisture content (Robin Probert)

CAPACITY BUILDING NEEDS AND OPPORTUNITIES FOR RUSSIAN BOTANIC GARDENS

Russian gardens have a strong base as scientific and educational institutions and they can play a key role as centers of environmental education and biodiversity conservation.



Working with disabled children at the Moscow Main Botanical Garden (Igor Smirnov)

Introduction

There are 101 botanic gardens and arboreta officially registered by the Botanic Gardens Council of Russia, the highly acknowledged Russian botanic gardens network. The Council was established in 1953 and since then has been the main focal point for a number of scientific areas and collections policies for botanic gardens. According to the database maintained by the Botanic Garden of Petrozavodsk State University,

there are even more institutions in Russia that identify themselves as “botanic gardens”, with the current number reaching 147. It is a reasonably number for such a large country as Russia, with a flora of immense diversity and importance. However most gardens are situated in the European part of the country, and as is also reflected at the global level, their spatial distribution is negatively correlated with the natural floristic diversity.

are conserved and 26 species of fern listed in the Red Data List are represented by 13 species in botanic gardens.

Recent background

The major problem that has dominated Russia’s botanic gardens in recent years has been a lack of funding. It is a miracle that the main Russian botanic gardens have survived at all, since most of the gardens suffered in real terms something like an 80% reduction in income in the period 1990-2000 (Wyse Jackson *et al.*, 2001). This was reflected in the low salaries paid to staff at all levels, the steady and very serious deterioration in the physical condition of the gardens, their buildings and facilities, and the tiny amounts of money available for research and related activities. Nevertheless, the gardens have largely maintained their collections, including herbaria, and the valuable living collections of economic plants, as well as Russian and other northern temperate region endemics.

According to the latest report (Demidov, 2012), Russian botanic gardens provide a platform for the conservation of 64% of the vascular plants included in the national plant red data list. Thus, botanic gardens in Russia have come very close to reaching the GSPC-2020 target of 75% of threatened species conserved *ex situ*, and they have actually achieved the 2010 target of 60%. Of the 474 threatened species of angiosperms in Russia, 303 are cultivated in Russian gardens; all 14 species of gymnosperms



Conference devoted to the 80th anniversary of Lev Andreev (Igor Smirnov)

The position today and opportunities

Capacity building in the area of financial development

The current period could be well characterized as a time of ongoing recovery, with noticeably positive dynamics in certain garden activities. The major financial donor is still the government, with direct federal support or indirect redistribution of resources through universities, academies etc. In some regions there is a trend towards increased contributions and support from local authorities.

The international funding and donor agencies have a clear perception of Russia as a rich country, due to its oil-gas oriented economy, and are not as willing to provide support as they did in the 1990s and early 2000s. So, for regular funding the gardens largely rely on: a) federal funding; b) local funding (city and region); c) commercial activities.

As far as the regional and city authorities are concerned, the attitude has often been that the main botanic gardens are the responsibility of the federal authorities. The need is to demonstrate the benefits the gardens bring to the cities and regions where they are located – in terms of conservation, education and of course as places for the recreation of local people. It is very good news that in some places at least this message is beginning to have impact. But it is in the area of commercial activities where the gardens can do the most to help themselves. Several obvious opportunities for Russian gardens to earn significant amounts of money for their own use are:

- Consultancy and other services;
- Visitors (entrance fees and catering);
- Plant sales;
- Landscaping;
- Ecotourism;
- Conferences, meetings and events;
- Publications.

These activities are being tried by most gardens in Russia nowadays but they do not always get the necessary support from senior executives and entrepreneurs in the region. This is primarily the result of weak leadership by the botanical gardens in this area.



Participants at the Conference at the Moscow Main BG dedicated to the 80th anniversary of Former Director of Main BG Prof. Lev Andreev (Igor Smirnov)

There is considerable scope to develop nursery and plant sales activities at each garden. Some gardens are already making a great success of this business and it is evident that an unsatisfied demand exists across Russia for house and garden plants – annuals, perennials, bulbs, shrubs and trees. There is also much scope to develop the gardens as outstanding visitor attractions – for example the Japanese garden within the Moscow Main Botanic Garden which is able to charge realistic entrance fees and which is also earning money from catering for visitors by providing food and refreshments.

Although environmental charitable giving and other support from the private sector remains a minor part of gardens' funding, there does appear to be great potential for growth in this area and signs of changes in attitudes to this in Russia are noticeable.

However, federal funding initiatives still remain the only source of "large support" for most gardens, and this can be very significant when political motivations are involved. For example, in 2012, the Ministry of Natural Resources allocated US\$10 million for the reconstruction of two century-old natural parks ("Arboretum" and "Southern Culture") in the city of Sochi on the Black Sea coast (Sochi will host the next Winter Olympics). This will provide major support for the Sochi Arboretum which is a green treasure of the Russian subtropics, with more than 2,000 exotic and rare plants that were brought to the Park from all over the world.

Botanic garden staff need business management skills, as well as scientific skills if they are to run their gardens

effectively. However, with Russian gardens being initially scientific and educational institutions they generally lack senior staff members with essential business skills (Wyse Jackson *et al.*, 2001). Nevertheless, over the last 5 years, more and more gardens have been trying to create professional fundraising positions amongst their staff teams.

Capacity building in human resources

The largest groups of Russian gardens belong to: the Russian Academy of Sciences (18 gardens); universities and other academies (50 gardens) and all others (33 gardens). The high number of university and academy gardens suggests that multidimensional educational activities are a strong feature of gardens in Russia. Botanical disciplines in these gardens are closely linked with the priorities and programmes of their parent institutions as well as reflecting the specializations of students. These disciplines include: plant morphology, systematics, physiology, dendrology, phytosociology, biology and ecology of plants, botanical geography and many others. Many of the priorities and activities of gardens are related to the greening of urban areas: floriculture, landscape design, vertical gardening and plant breeding. Established educational practices are often aimed at increasing the interest of students after graduation and to engage them in science and botanic garden activities. Regular summer field courses,

“ Botanic gardens today – in Russia as in other countries – operate as substantial businesses as well as scientific institutions. ”



The Arboretum in Sochi (N. Mergelov)

workshops and training programmes organized and held by gardens in their own and neighboring regions are also good examples of how to get students involved in education activities.

Botanical gardens are also greatly involved in the practical development of many other academic courses as well as those in the biological faculties. Such courses include those in the natural and engineering departments of universities, and involve a wide range of students, schools, colleges and other educational institutions.

Currently, in Russia as well as in other developed or developing countries there is a trend towards the modernization of traditional botanic gardens and their transformation into socially-oriented environmental gardens of the 21st century. The main purpose of the tangible and intangible resources of botanic gardens is to maintain the life-support functions of natural ecosystems. Such natural resources are essential for the sustainable development of cities and society, to ensure environmental and social security and to improve environmental and human welfare. Through specially designed recreational activities, tourism, and environmental education programs, such gardens can aim to spiritually rehabilitate the population (Kuzevanov, 2010).

A unique team of thousands of highly trained specialists in Russian botanic gardens are also developing educational programmes adapted to the changing needs of society - giving hope for a new rise in popularity of botany. Botanic gardens also prepare qualified specialists in biodiversity conservation and conservation biology, in collaboration with international and regional environmental organizations through the development of collaborative national and international environmental education programmes. Gardens satisfy a rapidly growing demand

for specialists in landscape design and gardening, whose training is impossible without the practical work and training they receive in the botanic gardens.

Nevertheless, there are a number of factors that prevent the successful development of multi-functional social activities of some botanical gardens (Egorov *et al.*, 2006):

- no strategy developed for the garden;
- a narrow focus of the work to maintain and develop only part of the botanic garden functions (educational practices and commercial nurseries);
- a low level of activity in searching for additional funds.

In fact the main cause of the problems is often the lack of strong leadership from individual botanic gardens and the botanic garden community and a misunderstanding of the role that gardens can play as a center of environmental education and biodiversity conservation.

Given the lack of governmental funds, the most promising possibility for botanical gardens is the expansion of their business activities beyond the traditional sale of seed and plant material towards education, including various trainings in floriculture, horticulture, fruit growing, gardening, etc. However, commercial activities in the field of education do not have a clear legal basis or policy framework within which to operate (Egorov *et al.*, 2006).

Capacity for *in situ* conservation

Given their significant achievements in *ex situ* conservation, Russian botanic gardens should shift the focus of their effort towards broader efforts in biodiversity conservation – with particular emphasis on the *in situ* conservation of the flora of their own regions. A survey carried out by BGCI revealed that more than 100 plant species are included in recovery and restoration programs

implemented by Russian botanic gardens and nature reserves. However, only 28 of these species are listed in the National Red Data Book, equivalent to about 4% of the total number of threatened species in Russia. Thus restoration activity should be increased significantly to reach the 20% of threatened species, as proposed in GSPC-2020 Target 8. Linked to this is a recommendation that the work of botanic gardens in *ex situ* conservation, education and research should all give priority to supporting these conservation tasks. Since most of the gardens are recognized and designated as specially protected areas themselves or have strong connections with other nature reserves and parks, along with excellent professional staff teams, the future potential and capacity for *in situ* conservation is estimated to be very high.

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BGCI-KADOORIE FARM AND BOTANIC GARDEN TRAVEL SCHOLARSHIP PROGRAMME

Celebrating a decade of collaboration for capacity building in plant conservation

Introduction

As part of its endeavour to foster capacity building for plant conservation worldwide, BGCI initiated in 2003 a new, advanced training opportunity for junior and mid-level staff from mainland China and Hong Kong SAR-based botanic gardens. Funded through the HSBC Investing in Nature initiative from 2003 until 2007, BGCI's scholarship exchange programme grew to offer training in a wide range of botanical disciplines at institutions in the People's Republic of China, including the

Chinese Academy of Sciences (CAS) associated botanic gardens in Guangzhou, Xishuangbanna, Beijing and Kunming as well as Kadoorie Farm & Botanic Garden (KFBG), Hong Kong SAR.

Following the tremendous success of this capacity building opportunity, KFBG decided in 2007 to continue with awarding travel scholarships for botanic garden personnel from mainland China. To date, some 60 participants have benefited from this training programme, which is held every year over a period of two to three weeks.



Organic farm (Huang Xiaofeng)



Studying the anatomy of Orchids (Sun Guofeng)

Kadoorie Farm & Botanic Garden (KFBG)

Located on the northern slopes of Hong Kong's highest mountain – Tai Mo Shan, Kadoorie Farm & Botanic Garden (KFBG) extends over 148 hectares of land with deep-set valleys and streams, woodlands and vegetable terraces. Established in 1956 to provide agricultural aid to farmers in need of support to help them lead independent lives, today, KFBG plays an active role in promoting biodiversity conservation in Hong Kong and South China, through the promotion of sustainable agriculture, scientific research, capacity building and creative nature education. With its mission to harmonise our relationship with the environment, KFBG aims to demonstrate how people can live sustainable lifestyles with respect for nature and each other.

The BGCI-KFBG Travel Scholarship Programme

Designed to support closer working relations and linkages between botanic gardens of the People's Republic of China and Hong Kong SAR, the BGCI-KFBG Travel Scholarship Programme has been influential at various levels. While the focus of this capacity building endeavour has been on developing individual competence and skills in various botanical disciplines, including horti- and arboriculture, native plant conservation, botanic garden management and urban greening, it has also nurtured new collaborative initiatives. For instance, as a direct result of the training, joint research activities were initiated between KFBG and Beijing Botanic Garden to enhance the *ex situ* conservation of threatened pteridophytes. In another example, following their participation in the training, staff from Xishuangbanna Tropical Botanical Garden developed *Sound of Nature*, an environmental travelling exhibition calling for people to



Organic farming (KFBG)

care for their environment, appreciate traditional cultures and protect biological and cultural diversity. The exhibition was eventually viewed by over 50,000 visitors.

Since the inception of the exchange training programme, the feedback from the trainees has been overwhelmingly positive. A selection of individual statements illustrates both the participants' personal gain, as well as the broader influence on strengthening relationships between botanic gardens as a result of new contacts established.

I established connections with many botanic garden staff. This training not only gave me the opportunity to initiate partnerships with specialists in Hong Kong, but also helped me build very good relations with staff from seven other botanic gardens in China. Fostering connections is one of the major gains from this training. Since plant conservation work needs also a macro-level perspective, reinforcing regional exchange and cooperation is really essential.

Han Gui-jun, Xi'an Botanical Garden, attended the course in 2006.

I learned a lot from the orchid conservation programme regarding the distribution, characteristics, key reference points in taxonomy, growth habit, propagation and conservation methods of Orchidaceae. This has helped me to significantly improve my knowledge, which will be a good foundation for orchid research and conservation at my botanical garden.

Liao Ju-yang, Hunan Province Forest Botanical Garden, attended the course in 2006.

Left: KFBG landscape in the past (above) and present day (below) (KFBG)



The professional skills, advanced management ideas, rich experience in plant conservation and various types of public education tools [taught and available at KFBG] will be very helpful for my work at Hangzhou Botanic Garden. This is an excellent capacity building opportunity. I hope it will continue to provide training in plant conservation for many more people in the future.

Lu Yijun, Hangzhou Botanical Garden, attended the course in 2008.

I gratefully acknowledge BGCI and KFBG for giving me this opportunity to learn in Hong Kong. The core of the training I received was on concepts and techniques for tree management and native tree conservation. I will share and apply what I have learned from this training in my garden, such as tree risk assessment and skills in tree climbing, chainsaw operation and tree pruning. Over the next two years I will undertake a tree risk assessment and review the actual situation of the trees in my garden.

Yu Zhishui from Beijing Teaching Botanical Garden attended the course in 2009.



Training in tree climbing (Yu Zhishui)



Seed bank (KFBG)

I learned a lot from this training. I not only understanding tree management, including tree climbing, tree pruning and risk assessment, but I also now have a greater understand of the functions of botanical gardens especially in the area of public education. I shared what I have learnt from this training with my colleagues. The director of my garden (Kunming Botanical Garden) was most impressed, and now wants to train all our staff in tree management and upgrade the equipment that we have at our garden.

Dr. Han Chunyan from Kunming Botanical Garden attended the course in 2010.

In 2013, from 20 January – 3 February, the BGCI-KFBG Travel Scholarship training programme will focus on conservation genetics and implications for ex situ conservation collections.



Han Chunyan from Kunming Botanical Garden (KFBG)

Joachim Gratzfeld and Xiangying Wen
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Model plot demonstrating fruit-forest inter-planting (Huang Xiaofeng)

A TOOLKIT TO SUPPORT NATIONAL, REGIONAL AND GLOBAL IMPLEMENTATION OF THE GLOBAL STRATEGY FOR PLANT CONSERVATION

The Global Strategy for Plant Conservation (GSPC), with its 16 out-come oriented targets, was first adopted by the Parties to the Convention of Biological Diversity in 2002. Updated and revised targets for 2020 were adopted in 2010.

In order to support implementation, Parties requested the CBD Executive Secretary to develop an on-line plant conservation toolkit that should be available in all the official languages of the United Nations. In 2010, BGCI was tasked to develop the toolkit and following a series of consultations and surveys, the website www.plants2020.net was launched in 2011.

The toolkit

The toolkit includes background information on the GSPC, sections aimed at policy makers and plant conservation practitioners and a searchable database of plant conservation tools and resources.

The targets of the GSPC are addressed in detail, with the following information being provided for each target:

- Introduction;
- Learn more;
- Practical guidance on how to implement the target, including a relevant video clip;
- A list of relevant tools and resources;
- Information on progress towards implementation;
- A 'share information' page where users can suggest tools, resources etc. to add to the toolkit.

Visit the toolkit and find out more at: www.plants2020.net

The GSPC toolkit

This section is the toolkit

This section provides the website for the Global Partnership for Plant Conservation

Search box

Choose language

New resources and latest relevant news are highlighted here

Implementing the targets

Colour coding for the 5 objectives of the GSPC

Tabs to move between targets

Tabs to move between sections for each target

THE SYLVIA SCHOLARSHIP FUND



The **Sylvia Scholarship Fund** was established by **BGCI** in 2012, this new Fund supports training in essential plant conservation skills for young people who work in botanic gardens in developing countries. The Fund is dedicated to the memory of Sylvia Oates who taught and inspired for over 40 years and loved the natural world.

So far we have provided funds for 12 people from around the world to attend the BGCI Education Congress in Mexico. Future grants will provide bursaries to young botanic garden staff to participate in training courses and exchange visits.

If you are able to make a donation to this Fund, it would be sincerely appreciated, enabling future conservation leaders to carry on the vital work of botanic gardens.

How to make your donation

Go to our website:

Pay online through WorldPay
<http://www.bgci.org/joinin/donate>

Send a cheque:

Payable to BGCI to:
Botanic Gardens Conservation International
Descanso House, 199 Kew Road,
Richmond, Surrey, TW9 3BW, U.K.
Please mark your donation for the
Sylvia Scholarship Fund.

Comments from scholarship recipients after BGCI's education congress:

Meeting educators and environmental specialists from different parts of the world was very important for me as I was able to learn new educational methods for implementing the GSPC.

Since returning to Cuba we have held a workshop to share our experiences and materials with Central Cuban Botanic Gardens.

Ramón Cristóbal Ríos Albuerne,
Villa Clara Botanic Garden, Cuba

Attending the congress gave me an opportunity to see the big picture and to understand the challenges and achievements of other countries. It's really important we work together as botanic gardens and adopt a community approach.

Morelia Amante Calderón,
Cerro Punhuato National Park,
Mexico

BGCI's education congress has opened my eyes to what can be achieved in education in botanic gardens. As a result of the congress, I have made contacts with people and institutions and this will enable me to develop an education programme in Saburo Hirao Park focusing on medicinal and aromatic plants, among other themes.

José Gabriel Cerén López,
Natural History Museum, San Salvador,
El Salvador

Please **JOIN** Botanic Gardens Conservation International (BGCI) and help us to **save plants** from **extinction**

Established in 1987,
BGCI links more than
500 botanic gardens and
conservation organizations
in 115 countries,
working together to save
Plants for the Planet.

BGCI's INSTITUTION members receive numerous benefits:

- Opportunities for involvement in joint conservation and education projects
- Tools and opportunities to influence global conservation policy and action
- Botanic Garden Management Resource Pack (upon joining)*
- Our twice yearly e-publications:
 - *BGjournal* – an international journal for botanic gardens
 - *Roots* - Environmental Education Review
- A wide range of publications and special reports
- Invitations to BGCI congresses and discounts on registration fees
- BGCI technical support and advisory services

Institution Membership		£ Stlg	US \$	€ Euros
A	BGCI Patron Institution	5500	7500	8500
B	Institution member (budget more than US\$2,250,000)	1000	1200	1500
C	Institution member (budget US\$ 1,500,000 - 2,250,000)	550	700	900
D	Institution member (budget US\$ 750,000 - 1,500,000)	400	500	650
E	Institution member (budget US\$ 100,000 - 750,000)	220	280	350
F	Institution member (budget below US\$100,000)*	100	120	150

INDIVIDUAL members and donors

support BGCI's global network for plant conservation, and are connected to it through our publications and events.

BGCI's INDIVIDUAL members receive

- Regular e-publications (these publications are sent as a pdf file via email):
 - *BGjournal* - an international journal for botanic gardens (2 per year)
 - *Roots* - Environmental Education Review (2 per year)
- Invitations to BGCI congresses and discounts on registration fees

Individual Membership		£ Stlg	US \$	€ Euros
J	Conservation donor (<i>BGjournal</i> and <i>Roots</i> publications & special reports)	275	375	400
K	Associate member (<i>Roots</i> and <i>BGjournal</i>)	80	100	125
M	Friend-available through online subscription only (www.bgci.org)	15	20	25

*Contents of the Botanic Garden Management Resource Pack include:

Darwin Technical Manual for Botanic Gardens, A Handbook for Botanic Gardens on the Reintroduction of Plants to the Wild, BGjournal - an international journal for botanic gardens, *Roots* - Environmental Education Review, *The International Agenda for Botanic Gardens in Conservation, Global Strategy for Plant Conservation, Environmental Education in Botanic Gardens*, additional recent BGCI reports and manuals.

Many of these publications have been translated into Chinese. Please contact us for more details.

I wish to apply for BGCI's INSTITUTION / INDIVIDUAL membership (circle one).

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**Botanic Gardens
Conservation International**

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The 5th Global Botanic Gardens Congress

will be held in Dunedin, New Zealand from 20-25 October 2013,
hosted by the Dunedin Botanic Garden.

The Congress will be held in association with the
6th Biennial Botanic Gardens Australia & New Zealand Congress.



Call for papers

Participants are invited to submit ideas and proposals for the scientific programme.
All abstracts to be submitted on-line at www.5GBGC.com by 28 February 2013.

Further information about the Congress is available on the Congress website:

www.5GBGC.com



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