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Safeguarding China's Botanical Heritage*
——BGCI's integrated conservation programme in China

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Abstract: China's rich floral diversity includes more than 33 000 vascular plant species, representing approximately 10 percent of all known plant species. Over half of these species are endemic to China. However, China's rapid economic development in the last 30 years and continuous population growth have seriously damaged plant resources in the wild and the ecological environment, resulting in a dramatic increase in the number of endangered species. There are nearly 4 000 to 5 000 higher plants that are now threatened or on the verge of extinction. To help halt the loss of Chinese plant diversity, Botanic Gardens Conservation International (BGCI) has developed a China programme and opened its first office based in Guangzhou in 2008. This office works along with Chinese partners aiming to secure Chinese plant diversity through integrated conservation approaches with reintroduction/population reinforcement, engagement of local communities in conservation activities, capacity building in horticulture and environmental education and public outreach.

Key words: Integrated conservation; Capacity building; Reintroduction; Environmental education; Public outreach
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Introduction

China's rich floral diversity includes more than 33 000 vascular plant species, representing approximately 10 percent of all known plant species in the world. Over half of these species are endemic to China. However, China's rapid economic development in the last 30 years and continuous population growth have seriously damaged plant resources in the wild and the ecological environment, resulting in a dramatic increase in the number of threatened species. It is estimated that nearly 4 000 to 5 000 higher plants are now threatened or on the verge of extinction (Huang, 2010).

The tremendous diversity of the native flora in China and a strong history and interest in botanic garden development within the country form the main grounds for one of BGCI's largest regional programmes of work. BGCI's engagement in China spans almost a decade of plant conservation action. Initially, BGCI's work mainly concentrated on capacity building for professionals from botanic gardens and public education. A series of training courses in botanical gardens management and plant conservation was held in various Chinese botanical gardens and, through a collaboration with Kadoorie Farm and Botanic Garden (KFBG-Hong Kong), a scholarship programme was established in 2003.

Building from education and capacity building, BGCI's China programme has expanded to also encompass environmental policy and practical conservation action. BGCI opened its first office in China in 2008 to help halt the loss of Chinese plant diversity. A broad overview of how we operate is provided by this paper.

A diverse conservation programme

At a policy level, BGCI supported the develop-

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ment and launch in 2008 of, *China's Strategy for Plant Conservation* (CSPC). This provides the overarching national guidance framework for the botanic garden community and conservation organizations to devise their plant conservation programmes. Increasingly, the Strategy enjoys support by a wide range of organizations and institutions in China including the corporate sector, thereby demonstrating a growing concern for safeguarding China's botanical heritage for future generations. From then on, BGCI's activities in China have concentrated on Targets 7, 8, 14, 15 and 16 of the CSPC. Operating through this small office hosted by South China Botanical Garden, CAS, BGCI's China Programme works along with numerous Chinese botanic garden members and conservation partners (see Table 1) towards the objectives of BGCI's Five Year Plan 2007–2012:

Securing plant diversity: Securing this rich natural heritage through various collaborative actions in areas linking practical field projects to maintain species and ecosystem functions that provide a vital basis for livelihoods of rural communities.

Enabling people and botanic gardens: Capacity building in horticulture, botanical gardens management, environmental education and public outreach to enhance proficiency and capacity of stakeholders to implement practical conservation initiatives.

Influencing decision-making and policy: Linking practice and policy, as well as replicating and scaling up successful conservation interventions.

Securing plant diversity

BGCI's practical efforts on conserving threatened tree species mainly focus on Magnolias and Maples, groups of woody plants that have a high number of threatened and endemic trees in China (Cicuzza *et al.*, 2007; Gibbs and Chen, 2009). Certain other threatened tree species have also been selected for conservation attention including representatives of *Euryodendron*, *Bretschneidera* and *Davidia*.

Table 1 BGCI's current partners and projects in China, including priority species (chosen for combined *ex situ* and *in situ* projects)

BGCI institutional partners	Partner organizations involved in field conservation activities	Threatened species of trees chosen for conservation action
Institute of Botany, CAS, Beijing	Cangshan Mountain Protection & Administration Bureau, Dali, Bai Autonomous Prefecture (BAP)	*Acer yangbiense*, *A. leipoense*
South China Botanical Garden, CAS, Guangzhou, Guangdong	1. Nan-kun-shan Nautre Reserve (NR), Longmen, Guangdong 2. Dongguan Institute of Forestry, Dongguan 3. Ehuangzhang Nature Reserve, Yangchun Forestry Bureau, Guangdong 4. Shimen National Forest Park	1. *Bretschneidera sinensis*, *Magnolia longipedunculata* 2. *Bretschneidera sinensis* 3. *Eurodendron excelsum* 4. *Magnolia longipedunculata*
Kunming Botanical Garden, CAS, Kunming, Yunnan	1. Malipo Forestry Station 2. Wenshan Forestry Bureau 3. Cangshan Mountain Protection & Administration Bureau, Dali, Bai Autonomous Prefecture 4. Yunlong Forestry Bureau, Caojian Forestry Station, BAP	1 & 2. *Magnolia coriacea*, *M. phanerophlebia* 3. *Acer yangiense* 4. Woody flora conservation of Zhi-Ben-Shan
Lushan Botanical Garden, CAS, Jiangxi	Lushan Nature Reserve Jiujiang City Forestry Institute	*Ex situ* conservation of threatened Chinese Taxus
Hubei University for Nationalities, Enshi, Hubei	1. Qizmeishan National Nature Reserve, Enshi, Hubei 2. Xingdoushan National Nature Reserve, Enshi	*Davidia involucrata*
Yunnan Institute of Environmental Science, Kunming, Yunnan	Da-wei-shan National NR, Pingbian, Yunnan	*Dipteronia dyeriana*, *Magnolia odoratissima*, *M. aromatica*
Kadoorie Farm and Botanic Garden, Hong Kong	Hong Kong Zoological and Botanical Gardens Hong Kong Park Kowloon Park	Training in plant conservation techniques and botanic garden management

Recovery projects are designed in a novel way within the Chinese context by linking *ex situ* and *in situ* conservation activities. The principal activities have included comprehensive field survey, propagation of the targeted species in *ex situ* nurseries and subsequent re-introduction of young plants into the wild. Institutionally, the work has involved collaboration between botanical gardens, research institutes or universities with organizations concerned with the *in situ* management of plants, notably protected areas agencies and forestry departments. In all cases efforts have been made to engage with local communities. Table 2 summarises the recent progress made in the conservation of the selected woody species.

BGCI seeks to promote the active involvement of all relevant stakeholders in its conservation programmes. Local level stakeholder workshops are held to help decide on and sanction appropriate conservation action. Fostering dialogue among local communities as the ultimate natural resource custodians, and authorities from local to national levels (e. g. protected area personnel, forestry department staff) is considered essential to define locally appropriate conservation and management approaches. BGCI supports its project experts from botanic gardens to facilitate and strengthen this dialogue, capitalizing on both their botanical expertise and public outreach skills.

Building on the work with single species reintroductions that involve local communities, BGCI is exploring new opportunities for interventions that endeavor to meet both plant conservation and livelihood development objectives. A task shared by every contemporary conservation organization, this entails the conception and testing of novel functional links between species conservation and ecosystem management that will both guarantee ecological services and enhance human well-being.

Table 2 Summary of Progress Made in *Ex Situ* & *In Situ* Conservation between 2008–2010

Plant Species	Location of Project Site	Propagation of Seedlings	*Ex Situ* Planting	Reintroduction
Bretschneidera sinensis	Nan-Kun-Shan Nature Reserve	3 600	3 000	500
Taxus spp.	Lushan Bot. Garden Arboretum	200	200	—
Eurodendron excelsum	1. South China Bot. Garden 2. Yunnan University 3. EhuangZhang NR	80 11 000	80 500 —	— — 160
Dipteronia dyeriana	Da-Wei-Shan NR	5 000	—	1 296
Magnolia odoratissima,	Da-Wei-Shan NR	2 000	—	500
M. aromatica	Da-Wei-Shan NR	500	—	120
M. hebecarpa	South China Bot. Garden	—	200	—
M. longipedunculata	South China Bot. Garden	2 200	200	1 000 in Nan-Kun-Shan NR, 1 000 in Shimen National Forest Park
M. angustifolia	South China Bot. Garden	—	200	—
M. ingrate	South China Bot. Garden	—	200	—
Davidia involucrata	Hubei University for Nationalities	12 500	10 000	1 500 in Xindoushan NR and 800 in Qizimeishan NR
30 spp. of Red listed plants and ornamental plants from Zhi-Ben-Shan Mt.	Kunming Botanical Garden	15 000	—	500
M. coriacea	Kunming Bot. Garden	—	1 500	174
M. phanerophlebia	Kunming Bot. Garden	800	—	50
Acer yangbiense	Kunming Botanical Garden	1 700	1 700	

Enabling people and botanic gardens

Advancement of conservation knowledge and dissemination of related information is at the core of BGCI's mission to engage its members and partners in securing plant diversity. To the extent practicable, BGCI works in China with botanic garden staff and other conservation practitioners to promote the latest plant conservation knowledge and techniques. Through the BGCI-KFBG Travel Scholarship Program for example, mid-level botanic garden staff have been trained in concepts and techniques for native plant conservation, ecological restoration, in vitro conservation, ethnobotany and botanic garden management. KFBG helps to develop professional relationships between the staff of botanic gardens and exchanges of information on practical techniques. So far, 50 staff from around 34 Chinese botanical gardens or conservation organizations have been trained via this programme. More broadly BGCI connects Chinese experts with botanic gardens worldwide through its global network to facilitate continued capacity building in plant conservation-related disciplines.

BGCI has also been involved in training protected area staff. Working with Fauna & Flora International (FFI), BGCI provided a six day training course in Huaping National Nature Reserve in Guangxi province in December 2010, mainly focusing on threatened plant conservation and monitoring skills for protected area technicians. The course provided training for 30 individuals from 21 nature reserves in Chongqing, Hubei, Yunnan, Guangdong and Guangxi Provinces.

Advances in environmental education and new approaches to public outreach are also promoted and are so important at a time of rapid global change. BGCI works with its members and partners to enhance environmental awareness through a variety of public outreach activities. These include the incorporation of conservation messages into signs and printed materials, facilitation of web-based information platforms, or support for the organization of exhibitions, lectures and special events at botanic gardens and other venues of public interest. Strong public environmental awareness is key to a continually evolving conservation rationale, and to gaining political support for its implementation.

Influencing global policy

China's Strategy for Plant Conservation (CSPC) is the national response to the *Global Strategy for Plant Conservation* (GSPC) developed under the *Convention on Biological Diversity* (CBD). BGCI significantly contributed to the development of GSPC and its revision that was adopted at the CBD Conference of the Parties in Nagoya, Japan in October 2010. BGCI continues to assists in the promotion and further advancement of this globally important strategy through various means. Case studies and examples of best practice from China can be of great value internationally. This is of particular importance as BGCI is developing an online global toolkit for the implementation of the GSPC with its new 2020 targets.

Table 3 Distribution of Conservation Promotional Materials during the local stakeholder workshops (2008–2010)

Target Plants	Type of Materials	No. of Prints	No. of Public Distribution
Bretschneidera sinensis	Conservation Promotional Materials	800	630
Arboretum Transfomation Lushan Bot. Garden	Public Education	640	420
Euryodendron excelsum	Conservation Education	1 000	650
Dipteronia dyeriana & *M. odoratissima*, *M. aromatica*	Conservation Demonstration Materials	900	700
4 *Magnolia* spp: *M. hebecarpa*; *M. longipedunculata*; *M. angustifolia*; *M. ingrate*	Conservation Materials	400	400
Davidia involucrata	Conservation Materials	400	400
Zhi-Ben-Shan Mt. Woody Flora	Conservation Woody Flora	1 500	500
BGCI-China Programmeme Brochure	Programmeme Briefing Materials	4 000	2 500

Looking to the future - BGCI′s China Programme 2011–2013

Rapid global change presents a major challenge in devising future biodiversity management responses. It calls into question established conservation rationales and demands innovative thinking for sustainable solutions to environmental problems. Coupled with a still fast-growing population which legitimately seeks to participate in the global economic welfare, the pressure on biological resources in China as elsewhere in the world is expected to persist and with this our conservation conundrum. With modest resources, BGCI continues to address this challenge by working with botanic gardens and other conservation institutions in China and abroad that share a common concern for biodiversity and human well-being. BGCI′s programme in China has recently been subject to review. Based on this, BGCI′s actions and strategies for the future are designed to explore new models of facilitating and implementing adaptive changes in practice and policy that will guide informed, cost-effective conservation action and human development. Membership of BGCI′s global network is open to all botanic gardens, the business community and individuals who value plants and the services they provide.

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