

THE BOTANIC GARDEN

A Newsletter for the Botanic Gardens of Australia
and New Zealand – www.bganz.org.au



Issue 27 – JULY 2010

ISSN 1446-2044

Editorial Committee

Dr Philip Moors

Director and Chief Executive, Royal Botanic Garden Melbourne and BGANZ President

Dr Tim Entwisle

Executive Director, Botanic Gardens Trust, Sydney and BGANZ Vice-President (Australia)

Mr Mark Fountain

Deputy Director Collections and Research, Royal Tasmanian Botanic Gardens and BGANZ Council Member

Mr Dale Arvidsson

Curator
Mackay Regional Botanic Gardens

Managing Editor: Brigitta Wimmer

Graphic Designer: Siobhan Duffy

Cover photo: Orang utan and uprooted plant at Melbourne Zoo.

CONTENTS

President's View	2
Both Global and Local <i>Philip Moors, BGANZ President</i>	
Membership News	3
Introducing BRON (BGANZ Records Officers Network) <i>Tom Myers, Botanical Services Officer, Dunedin City Council</i>	
Renewal of Memberships <i>Brigitta Wimmer, BGANZ Executive Officer</i>	
News from BGCI	4
<i>Belinda Hawkins, Research and Communications Officer, BGCI</i>	
BGCI - 4th Global Botanic Gardens Congress - 'Addressing global change: a new agenda for botanic gardens'	5
<i>Kate Heffernan, member of BGANZ and BGCI, freelance contractor to the Gold Coast Regional Botanic Gardens</i>	
Living the High Life in New York	7
<i>Anne Duncan, Council Member BGANZ</i>	
Reports on Horticulture and Zoos: Interaction of Plants and Animals.	8
Fauna and Flora at Melbourne Zoo <i>Deb Crosby, Assistant Curator, Horticulture Department, Melbourne Zoo</i>	
Zoos and gardens in Wellington, New Zealand <i>Rewi Elliot, Curator/Manager, Otari Native Botanic Garden and Wilton's Bush Reserve</i>	
Plants clean up Hippo water at the Werribee Open Range Zoo <i>Kellee Reissinger, Horticulturist, Werribee's Open Range Zoo</i>	
A Green Vision for Mount Annan <i>Peter Cuneo, Manager - Natural Heritage, Mount Annan Botanic Garden</i>	
Latham's Snipe avoid the natural Vegetation at Mount Annan Botanic Garden <i>Caz McCallum, Assistant Director, Botanic Gardens Trust, Mount Annan Botanic Garden, Sydney</i>	
Bendigo Botanic Gardens, White Hills, phases out its animal collection <i>Kevin Walsh, Landscape Planner, City of Greater Bendigo</i>	
Item of Interest.	17
Correas - Australian Plants for Waterwise Gardens <i>Maria Hitchcock, Leader of the Correa Study Group 1991 - 2007</i>	
Conferences and Events	18
Launch of Southern Highlands Botanic Gardens, Bowral NSW International Garden Photographer of the Year - Call for Entries	
Calendar of Events	19

Both Global and Local

Philip Moors

In mid-June the National Botanic Gardens in Dublin hosted the 4th Global Botanic Gardens Congress, the three-yearly meeting organised by Botanic Gardens Conservation International for botanic gardeners from around the world to get together, exchange ideas and experiences, and consider how collectively and individually we can improve the stewardship of our environment (and our gardens!).

Almost 400 delegates from 53 countries including Australia and New Zealand attended the Dublin meeting and focussed on the congress's theme of "Addressing global change – a new agenda for botanic gardens". Speakers' presentations considered eight aspects of this theme, ranging from global challenges such as climate change and strategies for plant conservation to local actions such as community involvement and botanic garden horticulture.

Importantly, the Congress provided the opportunity to review progress in implementing the Global Strategy for Plant Conservation (GSPC). Conclusions arising from the GSPC presentations and discussions are summarised on the BGCI website (www.bgci.org), and I mention several of them here. The Congress conclusions make clear the power of the GSPC as a world-wide plan with measurable targets to provide a framework for plant conservation action. All 16 targets are being addressed – and no matter the number of targets individual gardens are working on, all actions, even the most local ones, are making positive contributions to delivering the GSPC as a whole.

Continuing progress and better dissemination of GSPC results will depend on closer collaboration between science, conservation and education practitioners within the botanic gardens community and also through linking with non-traditional partners beyond the garden fence. Within our Australasian community there's a particular need to get even better at sharing information and resources and building capacity within regional and developing gardens.

BGANZ gardens are engaged both locally and globally with these challenges. For example, some gardens have used specific GSPC targets as the framework for their plant conservation programs, such as with Albury Botanic Gardens' conservation of the Crimson Spider Orchid, and these and other approaches are evident in BGCI's recent survey of GSPC progress at 252 gardens around the world (see *BGjournal* July 2010).

In responding to climate change, Australian capital-city gardens have been working to implement the *National Strategy and Action Plan for the Role of Australia's Botanic Gardens in Adapting to Climate Change* prepared in late 2008 by the Council of Heads of Australian Botanic Gardens (CHABG). The plan sets out strategies and actions to promote botanic gardens as facilitators of climate change preparedness and adaptation. It also provides a reporting link to the Natural Resource Management Ministerial Council, which comprises the state and national environment ministers from both sides of the Tasman. CHABG is currently reviewing progress on the plan and will prepare a report for the Ministerial Council and for the next issue of *The Botanic Garden*.

At the local collaborative level, BGANZ is launching a web-based network for plant records officers – BRON, the BGANZ Records Officers Network. This initiative arises from discussions at our Mackay Congress last year and enthusiastically progressed since then by a working group. Tom Myers gives details of BRON elsewhere in this issue. It's an important step forward in developing and promoting professional standards for plant record keeping, data management and exchange, and collection policies.

So by taking local action every botanic garden – whatever its scale and focus – can contribute in its own way to meeting global environmental challenges such as climate change and loss of plant biodiversity. After all, it's the sum of these local actions that mark out the progress and achievements of global initiatives like the GSPC.

The theme of the November 2010 issue of *The Botanic Garden* will be 'Community Gardening – Community in our Gardens'.

The deadline for contributions will be Thursday, 28 October 2010. Please contact the Secretariat if you are intending to submit an article.

Introducing BRON (BGANZ Records Officers Network)

Tom Myers

Anyone who has fielded telephone calls (or emails) at a botanic garden will know the value of good plant records. The day to day effort of keeping information up to date is well rewarded by the ability to respond to queries, and to give meaning to a living collection.

Record-keeping can be solitary work, so a chance to discuss common issues is welcome. A workshop held at the BGANZ congress in Mackay last year found that there was sufficient interest to establish a network for record-keepers. An initial working group was formed with Rob Smith (Mount Tomah), Sarah White (Alice Springs), Andrea Dennis (Boroondara), Tom Myers (Dunedin), John Sandham (Adelaide), Sabine Glissman-Gough (Melbourne), and Yvonne Etherington (Auckland). Gary Fry of Alice Springs Desert Park Gardens volunteered to act as project leader.

Eight months have passed since the congress in Mackay. During this time, Sarah White and Gary Fry have set up a "Wiki style" website and email group using Google Sites and Groups and a charter has been drafted to provide some rules and accountability to BGANZ. The website and charter will continue to need modification, but BRON is now at a stage where it can be opened to the wider BGANZ network to try out. Key features of this website include site announcements, the network charter, results of plant records surveys, minutes of BRON meetings, resources for plant records and a link to the email group.

Membership of BRON is open to members of BGANZ, including staff of member institutions. If you are interested in participating in BRON, please send an email to BRON at bganz.bron@gmail.com. Put "plant records network" in the subject line, and your name and BGANZ membership number or name and address in the body of the message.

If you are willing to assist with running the network, please include the line "can help with BRON" in your message.

BGANZ – Renewal of Memberships

Brigitta Wimmer

I would like to thank all BGANZ members who have already renewed their membership for the coming year and a warm welcome to all new members too.

A new membership list is due to be posted on the BGANZ website within the next month, so if you are not certain about the status of your membership and do not want the unpleasant surprise of having your name dropped off the list, please do contact me at bganz.secretariat@environment.gov.au.

Belinda Hawkins

We're just back from the 4th Global Botanic Gardens Congress: *Addressing global change – a new agenda for botanic gardens*, which was held in Dublin, Ireland from 13–18 June 2010. The Congress was hailed as a great success, full of positive messages for conservation and for the role of botanic gardens in safeguarding plant diversity at this most critical of times.

Over 370 delegates attended representing 53 countries, including 16 delegates from Australia, four from New Zealand and one from Samoa!

Dr Ahmed Djoghlaif, Executive Secretary of the Convention on Biological Diversity (CBD), addressed the Congress on the first day and acknowledged the vital role of botanic gardens in supporting the Global Strategy for Plant Conservation (GSPC) of the CBD and in helping to develop a revised version that addresses new challenges. He called on the botanic garden community to do more! In order to do so botanic gardens need to reach out to wider audiences and engage with new partners – including zoos – a recurring issue for debate throughout the Congress. A panel discussion on redefining the role of botanic gardens – towards a new social purpose – considered how botanic gardens could tackle social exclusion. The educative role of botanic gardens in our increasingly urbanized world was also emphasized throughout the Congress sessions.

In total there were 13 plenary addresses, 27 parallel sessions (of which 12 were organised symposia on special topics) 136 talks and three panel discussions! You can see [a summary of talks and authors here](#). Feedback was provided at the end of every session and was presented at a conclusions session on the last day of the Congress. [You can download the conclusions presentation here](#).

Addressing the need to get more people involved, BGCI has launched a new on-line campaign '[Plants for the Planet](#)' designed to generate broader public support for plant conservation.

Plants for the Planet

The aim is to gather signatures from people around the world in order to ensure that governments adopt the updated Global Strategy for Plant Conservation at the next Conference of the Parties to the CBD. This will be held in Nagoya, Japan, in October 2010. Support for the campaign will help us to send a strong message to the Conference that countries must act now to halt plant extinction. [Please sign up!](#)

On the theme of zoos and botanic gardens, in October 2004 BGCI's education review *Roots* looked at '*Botanic Gardens and zoos: synergies for the future*' (Volume 1, Number 2). Though it seems like an age ago the articles remain relevant, with ideas and considerations on this theme from a variety of institutions around the world. From Australia, there is an article on '*Linking the botanical with the zoological*' from Geelong Botanic Gardens as well as '*Gondwana connection: partnerships for learning*' from the Botanic Gardens Trust, Sydney. [You can download the whole magazine for free here](#).

BGCI - 4TH GLOBAL BOTANIC GARDENS CONGRESS - 'Addressing global change: a new agenda for botanic gardens'

Kate Heffernan

Kate is a member of BGANZ and BGCI and is a freelance contractor to the Gold Coast Regional Botanic Gardens, writes for the horticulture media and is an educator and horticulture consultant.

A grand marquee set amidst towering trees in the National Botanic Gardens, at Glasnevin, Dublin, was the setting for the 4th Global Botanic Gardens Congress - 'Addressing global change : a new agenda for botanic gardens'.

The challenges that confront botanic gardens in addressing both the causes and effects of climate change were articulated in the opening address by Dr. Ahmed Djoghlaif, Executive Secretary of the UN Convention on Biological Diversity. His warning that the world needed to 'wake from the nightmare' was sobering and quickly brought home the gravity of the work ahead. Delegates from gardens across the world had come together to review progress on the International Agenda for Botanic Gardens in Conservation and the targets of the Global Strategy for Plant Conservation, as well as look to the future in dealing with the challenges of implementing these agenda.

I attended the Congress with the objective of broadening my own perspectives, and also saw it as an opportunity to discover

new pathways to assist in the development of the Gold Coast Regional Botanic Gardens. The key questions that I brought to the Congress were how can a regional botanic garden set in a city renowned for its glamour and relaxed lifestyle fit into the botanic gardens model, and what can we do to fulfil our role as a botanic garden?

Each Plenary Session at the Congress was presented by eloquent and motivating speakers, with topics ranging from:

- *Conserving Plant Diversity in China,*
- *Climate change implications for trees, arboreta and botanic gardens,*
- *Effective environmental education, and*
- *Art in botanic gardens, meeting the needs of a diverse audience of visitors.*

The scope of the topics was extensive but the weight of the meaning in their messages was equally significant. Absorbing the detail was at times overwhelming. Breakout sessions were spread across the gardens, and moving between venues was an occasion to take in the plant collections at Glasnevin, albeit hurriedly. Ever present as focal points and direction finders were the Curvilinear Glasshouse and the Great Palm House, also reminders of the historic location.



An Irish welcome reception in a recent addition to the glasshouses at National Botanic Gardens, Glasnevin, Dublin.

Themes in the breakout sessions were varied, and I selected those principally based on education, interpretation and conservation. Facts and figures provided convincing evidence of both positive and negative aspects of botanic gardens and conservation. Each presenter proffered figures supporting the critical role of botanic gardens in plant conservation and species recovery. Figures on visitation, and on educational and social outcomes offered encouragement. Overall the sessions provided tangible, enlightening and often inspiring accounts of projects and initiatives from botanic gardens around the world. Some of these were from well known gardens like Brooklyn Botanic Garden and RBG Edinburgh, with long histories and established traditions, while others were from smaller and sometimes unconventional gardens such as the Dombulla Arboretum in Sri Lanka or the Tooro Botanic Gardens in Uganda.

Meeting like-minded people with interesting stories to share is a bonus that comes with a Congress that attracts an audience from across the globe. Social events lived up to the reputation of our Irish hosts. We were greeted at an informal welcoming reception in both the glass house and nearby gallery by the strains of a chamber orchestra and traditional Irish music. The Gala Dinner was a festive evening of celebration that engaged the delegates in Irish music and dancing, and simply wonderful to experience the Asian and Russian delegates adding their own spin to the jig and the reel....

The status accorded botanic gardens by the Irish Government was evident by the attendance at the Congress by retired Taoiseach (Prime Minister) Bertie Ahern and the Official Congress Opening by An Taoiseach Mr. Brian Cowan TD, Government of Ireland, as well as the official reception at Dublin Castle. Additionally the awarding of Botanic Garden status to the historic Kilmacurragh Estate in County Wicklow, on the eve of the Congress typified their acknowledgement of botanic gardens.

Australia was well represented as both delegates and presenters, and the state and national botanic gardens seemed well known and respected by their international colleagues. The role of our regional botanic gardens appears lesser known though, and addressing this is the responsibility of the regional networks.



Commemorative tree planting by Peter Wyse-Jackson, Director, National Botanic Gardens of Ireland and Peter Acton, descendant of the family who established the gardens at Kilmacurragh Arboretum.

There was much to learn throughout the Congress, and I came away with the confidence that each botanic garden, small or large, old or new, is relevant in the mission for conserving biodiversity and addressing climate change. Whatever the charter of individual gardens, the differences in their collections, the level of their involvement in research or science, or their educational and social programs, they are all partners in transmitting the message of 'awakening from the nightmare' of human contribution to climate change so articulately presented by Dr. Djoghlaif.

Throughout the Congress there were opportunities for delegates to discuss issues and gather critical information from their colleagues. Opportunities to continue this dialogue are possible through the BGCI and BGANZ websites and through email, and I hope that I can continue the connections and friendships that I made. The gravity of the challenges ahead break down any real or perceived hierarchal barriers between gardens and unite us as a real force for change. Continuing the communication channels established at the Congress and sharing the messages through education and interpretation is our ongoing challenge.

LIVING THE HIGH LIFE IN NEW YORK

Anne Duncan

Recently I was lucky to be able to visit a wonderful inspiring new garden project in New York called the “High Line”. The High Line is a new park in New York City (NYC) built on an elevated 1930s freight rail structure on the west side of Manhattan.

It was originally built in the 1930s to remove dangerous freight trains from the streets, which prior to its construction had created a death trap for many pedestrians (10th and 11th Avenues were known as “Death Avenue”). Twenty nine feet above the street the high line delivered milk, meat, produce and raw and manufactured goods into upper-floor loading docks of warehouses and factories for twenty two blocks. The last train ran in 1980 and since then the elevated tracks gradually fell into disrepair and became covered in self-seeded vegetation. Under threat of demolition in the 1990s, a community groundswell to maintain the structure was inspired by the fact that nature was bravely regenerating on the disused structure – a self sown “wilderness” in the city. The community had a vision to re-create it as an extraordinary public open space and in 1999 a not for profit group of community residents called the “Friends of the High Line” formed and worked to save it from demolition.

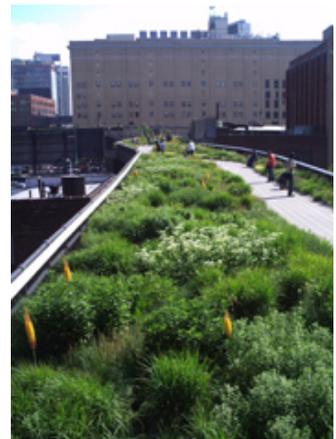
What developed was an innovative public private partnership which should serve as an inspiration to all of us. It harnesses the talents and resources of government, the business community and a non-profit organisation to achieve far more than any could achieve alone. The City of New York contributed \$30 Million for infrastructure improvement costs while the Friends of the Highline ran a successful capital campaign to raise an additional \$50 Million from business and the community. The Friends of the Highline has now been transformed from an advocacy group to a non-profit conservancy, responsible under licence from the City of New York Parks and Recreation Department for stewardship of and public programming in the park, and committing to contribute over 70% of the annual operational budget.



Stage 1 is complete and open, stage 2 is underway and stage 3 is in the planning. The landscape plantings on the highline are inspired by native vegetation communities – bogs, wetlands, meadows, grasslands and woodlands. Both the landscapes and the species they contain are carefully chosen to ensure there is always something of horticultural interest, no matter the time of year. The landscape plantings are interspersed with a variety of public spaces of different sizes and with unique views of the cityscape and the Hudson River. There are already events and low-cost public programs, and it is envisaged that this will increase over time. Not surprisingly it is proving very popular - in the ten months since it has been opened it is estimated that it has been visited by well over a million visitors.

I found the place, the concept and the implementation totally inspiring– it showed me that everyday people can shape their city and can work with government to achieve something unique and visionary; that history, culture and nature can be brought together to re-connect people to nature in unexpected ways, even in the huge metropolis of NYC; and that something ugly and functional can be re-created into an inspiring landscape, which in turn can provide a focus for urban renewal in the surrounds. It is truly amazing what can be achieved by people with vision, passion and dedication, working together.

I thoroughly recommend a visit. My sincere thanks to Patrick Cullina, the Vice President - Horticulture and Operations, who took time out to show me around. More detail can be found at www.thehighline.org.



REPORTS ON HORTICULTURE AND ZOOS: INTERACTION OF PLANTS AND ANIMALS

Fauna and Flora at Melbourne Zoo

Deb Crosby

Working as a horticulturist at Melbourne Zoo can be pretty interesting. Not only do we develop garden beds that are appropriate to strictly themed landscapes, but they must be aesthetically appealing. They need to be able to withstand the rigours of one million inquisitive, admiring and sometimes over-zealous visitors each year. That's 2 million feet, 10 million fingers. The challenge doesn't stop there. Each enclosure and animal present individual and specific needs. Animals are why visitors come to the zoo, with each exhibit constantly under the visitors' gaze.

Vegetation in animal exhibits must fulfil a variety of practical, landscape and aesthetic functions. Consideration must be given to many factors when selecting plant material for an animal display. Will the animal eat the plants, use plants for perching, gather foliage for nesting, use branches to escape, is the plant poisonous, does it have weed potential? The plants need to be tolerant of local environmental conditions and not require regular maintenance, and the enclosure needs to simulate the animals' originating habitat and blend with the adjoining landscape.



Photo: Melbourne Zoo

Positioning the plants is critical. Large plants that can shed limbs, or drop into an enclosure, may create an escape route for the occupants. Plants can compromise 'hot wiring' systems, a key method of protection used by zoos. Most animals don't take long to realise hot wires are not working. Carefully nurtured plantations can be destroyed in minutes when smart animals like Orang utans or Western Lowland Gorillas realise the hot wires are down. It is extremely important that the plants inside each enclosure do not hide the animals on display. As zoo horticulturists, we need to know a little about the habits of each of the animals. Do they climb, are they vegetarians and or browsers, will they dig to forage, etc? When animals show aggression towards each other, we must make sure there are plenty of places to escape to, no dead-ends and plenty of run-through space.



Photo: Melbourne Zoo

These were some of the challenges faced when we were planning our new Orang utan exhibit. Throughout the zoo world it is well known that it is difficult to grow vegetation successfully in an Orang utan exhibit. They are large, 100 kilograms for a mature male, females about 50 kilograms, intelligent and strong, yet incredibly nimble. Orang utans are arboreal and like to climb, they forage and build nests. These are all destructive behaviours for vegetation. And they can utilise woody material such as bamboo to escape.



Photo: Melbourne Zoo

The theme for this exhibit landscape was a rainforest clearing along the edge of a watercourse. This required the use of some large woody plants, riparian species, and some shrubs with the majority of planting comprising ground covers. Many of these were culinary herbs.

The plants themselves had to have many unique characteristics. They needed to be quick to establish. Ideally they would have ornamental qualities with excellent regenerative capabilities that can handle a fair amount of animal and keeper traffic. Their root systems would be strong and restorative, such as rhizomes. Preference would be given to plants that had a level of natural protection, such as raspy leaves, thorns, pungent oils etc. Any large plants needed to be able to sustain damage from the animals or be adequately hot-wired. Their positioning was critical to prevent links with canopies or buildings outside the enclosure and possible avenues of escape. The planting also needed to fit seamlessly with the surrounding area which is themed as a tropical Asian rainforest.

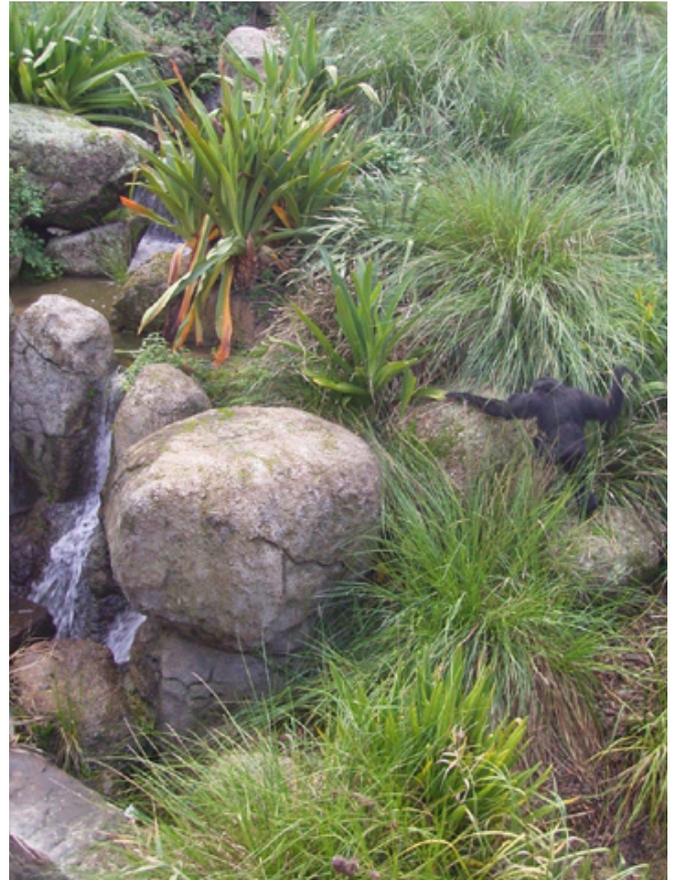


Photo: Melbourne Zoo

A lead time of more than twelve months was given to source and grow plant material. This ensured that we were able to use preferred plant species in the sizes we required. Our experience has shown that advanced plants can withstand damage shortly after they are planted. Typically we do not have the luxury of long establishment times; the exhibit must be ready to open as soon as possible. Some of the large trees had been left over from a previous project and were grown on under contract by an advanced tree grower. Soil compaction and contamination and access to the site for planting and scheduling were some of the usual project considerations that were dealt with, knowing that we only had one chance to get it right.

So far our choices are doing well - please see the list of species planted in the enclosure. Careful maintenance and the co-operation of the keepers have contributed to this success. Regular access to the exhibit for maintenance and follow-up planting has been possible. This must all be done prior to the public entrance time of 9am. The keepers provide the animals with lots of bedding material and browse. Enrichment items are provided at irregular intervals throughout the day to provide stimulation and activity for the animals. There are many climbing opportunities and elevated platforms to encourage arboreal behaviour. This acts as a diversion for the animals and takes the pressure off the plants.

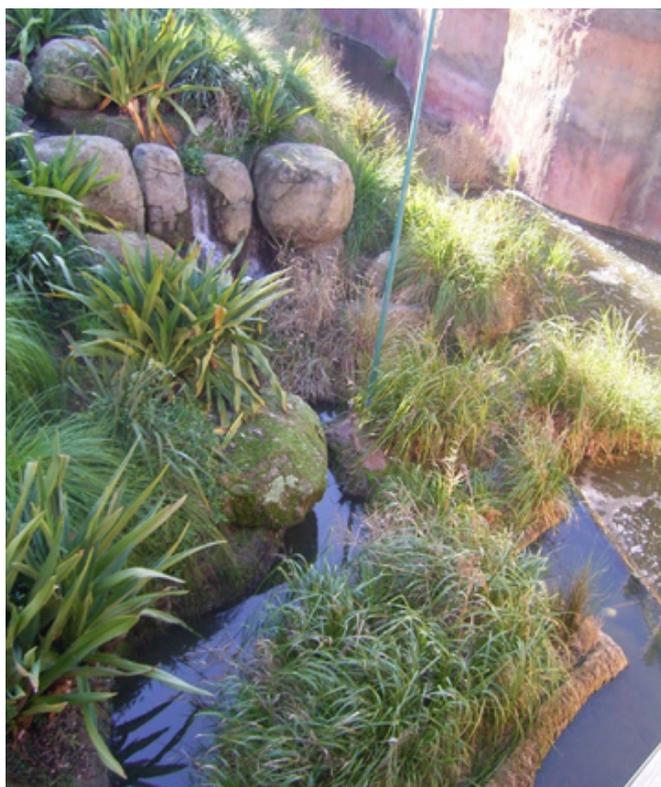


Photo: Melbourne Zoo

Four years on we consider the exhibit to be an enormous success. Not only have we established plants where we were told we could not, we have provided an interesting, interactive and stimulating environment for the Orang utans. We have built an exhibit that looks good and displays the animals well, while the plants continue to thrive with little more maintenance than a seasonal weed and mulch. The Horticulture Department is very proud of the enclosure and we are frequently used as an information resource for other zoos seeking to emulate our success.

Next time you are at the zoo, spare a thought for the amount of time and planning and the unusual considerations that need to go into the successful development of each enclosure.

<i>Aphanopetalum resinosum</i>	Gum Vine
<i>Carex appressa</i>	Tall Sedge
<i>Carex bichenoviana</i>	Creeping Sedge
<i>Carex tereticaulis</i>	Common Sedge
<i>Cladium procerum</i>	Tall Twig Rush
<i>Clematis aristata</i>	Goats Beard
<i>Cordyline stricta</i>	Slender Palm Lily
<i>Crinum pedunculatum</i>	Swamp Crinum
<i>Cyperus gunnii</i>	Umbrella Sedge
<i>Eleocharis sphacelata</i>	Tall Spike Rush
<i>Ficinia nodosa</i>	Knobby Club-rush
<i>Gahnia sieberiana</i>	Red-Fruit Saw-sedge
<i>Juncus amabilis</i>	Rush
<i>Lomandra longifolia</i>	Mat Rush
<i>Lonicera hildebrandiana</i>	Giant Burmese Honeysuckle
<i>Melissa officinalis</i>	Lemon Balm
<i>Mentha</i> sp.	Mint
<i>Mentha spicata</i>	Spearmint
<i>Pandorea jasminoides</i>	Bower of Beauty
<i>Persicaria odorata</i>	Vietnamese Hot Mint
<i>Phormium cookianum</i>	NZ Flax
<i>Phragmites australis</i>	Common Reed
<i>Populus yunnanensis</i>	Yunnan Poplar
<i>Rubus parvifolius</i>	Native Bramble
<i>Viburnum odoratissimum</i>	Sweet Viburnum
<i>Washingtonia robusta</i>	Fan Palm

Zoos and gardens in Wellington, New Zealand

Rewi Elliot

Contemporary public botanic gardens are interpretation centres of the plant world, and this interface between public and plants is much the same as zoos with animals, artefacts in museums, and imagination in art galleries. Interpretation is about telling stories. For entertainment, to get a point across, to change behaviours or start new ones, memorable experiences work best – good stories. Merging the story of animals and plants helps achieve more comprehensive and more memorable stories.

In Wellington three organisations, Otari Native Botanic Garden and Wilton's Bush Reserve (Otari), Wellington Zoo, and Zealandia involve both plants and animals in varying degrees to interpret nature while still having their own discernable points of difference.

Botanic gardens have myriad ways to incorporate the interplay between plants, animals and the rest of the natural world into their stories. We continually exploit the bizarre, the abnormal, the erotic, and the macabre of the plant world to attract audiences. These plant stories are sometimes better told involving animals.



Waharoa entrance to Otari Native Botanic Gardens
Photographer: Rewi Eliot

Where previously we may have been showcasing 'what exists in the world', now increasingly we showcase 'how it exists in the world', using themes such as conservation, sustainability, and cultural relations. How better to ask for behavioural change than to show how dependent life is on one another, how our actions affect other species, and what the repercussions can be for us.

A couple of weeks ago botanic gardens staff from Wellington visited the Wellington Zoo for the day. Zoo CEO Karen Fifield set the scene when we arrived with an inspiring presentation about the current and future development of the Zoo. The exhibits, including their gardens, have been steadily upgraded over the past few years, and Karen aims to provide visitors with 'the best little zoo in the world'.

Ample evidence of this vision was seen on our walk around the Zoo. Gone are the scenes when I was young - no more chimpanzees huddled on the cold concrete floor in winter. Many of the animal's enclosures have had dramatic makeovers. Emphasis has really gone into making 'habitat exhibits' giving the look and feel of the animal's natural environment.

Not surprisingly, these are changes zoos have been undertaking worldwide to replace the depressing 'animals in cages' exhibits with attractive, naturalistic enclosures (read: horticulturists have been here!) - better for story-telling and undoubtedly better for the animals too.

The Zoo's next major project will be an exciting New Zealand native precinct called 'Meet the locals.' This exhibit will showcase New Zealand's diverse natural landscape and ecosystems. Visitors will walk from seaside to scree slope in a few moments. Along with native animals and plants, 'Meet the Locals' will present agriculture and our relationship with domestic animals alongside their conservation impact.

I was impressed, and I think a bit of merging of traditional interpretive centres (zoos, botanic gardens, museums etc) is a great idea. Why? It's more comprehensive, it tells more of a story. Every child will tell you, as far as entertainment value goes, that it's far better when you go to the movies to see 3D than 2D. Concerning interpretation, it may be that zoos need us more than we need them. Effective horticulture in zoos is a 2D to 3D transformation.

I asked my kids (9, 11 and 14 year-olds) 'where would you rather visit in a foreign city, the local botanic garden or the zoo?' Of course the answer was: 'stupid question dad; the zoo'. OK, on the surface of it plants are not incredibly interactive. We just have to dive deeper for our stories. Immediately striking about the entertainment value of animals vs. plants is that animals are instantaneously engaging. They are like watching a movie compared to reading a book. Their movements are apparent, they can interact with you, and they just tend to capture the imagination more easily. Perhaps what we need is a live version of David Attenborough's *Private Life of Plants*, where plants move fast enough to capture the imagination of visitors for longer than a passing glance of aesthetic appreciation.

At Otari our interpretation includes (to varying depths) plants, animals and fungi, and their ecology, conservation, cultural history, taxonomy and horticulture. While we're not a zoo, we certainly make the most of advertising the native animals which live in the 100-hectare forest we manage adjacent to the gardens. Iconic New Zealand birds such as the Tui and Kereru are guaranteed to be seen almost everyday. Weta, geckos and skinks, dragonflies and moths although more elusive, are also often spotted and are always mentioned by our guides. On occasions when we have had Zoo staff bring a Kaka (a large New Zealand parrot) to Otari, our Visitor Centre has been bursting at the seams.

Exotic animals are not so treasured. The price of having these uncaged animals is volunteers scouring the hillsides for rats, mustelids and feral cats (domestic cats are well cared for by feline lovers). Paid contractors poison possums and shoot goats and pigs invading from the back hills. In our nursery traps keep mice at bay from pinching germinating seedlings. The only introduced mammals we don't have a crack at are humans and dogs, and we give the two of them a hard time too if they're not joined together by a lead. Animal pests contributed to the loss of several species from the Wellington city area. Now, birds previously extinct from the region (Korimako, Kaka), have been seen since Zealandia's hard work has paid off.

To combat pests more effectively and work on safeguarding our native animals enter Zealandia, the Karori Wildlife Sanctuary Experience. This is the world's first of its kind - if this is the zoo of the future, then the future is now. A 'mainland island', this 225-hectare reserve has an impressive perimeter fence designed to keep animal predators out and (flightless) native animals in. It does a jolly good job of it too. Passing through the perimeter fence evokes

a feeling of being in Michael Crichton's *Jurassic Park*. Once inside, visitors are treated to an interpretation of what Wellington's hillsides were like prior to animal pests and habitat loss. It's worth taking a look at Zealandia's website to see how this experience has been created.

With a 500-year vision, Zealandia has quite some time to pass before the heavily modified forest is back to a state congruent with 'the day before humans arrived'. They have an emphasis on New Zealand animals, particularly birds, and certainly this is a far more appealing way to interpret animals than the historical 'animal in a cage' zoo; it's more like the New Zealand version of a safari. It has animals from all over New Zealand, and Zealandia's managers are now looking at some representative plantings congruent with those animals' habitats.

When designing landscapes for animal exhibitions, who better to lend a hand than a botanic garden and what better way to develop a relationship than to share expertise?



Visitors viewing forest from the gardens at Otari Native Botanic Gardens
Photographer: Rewi Eliot

Plants clean up Hippo water at the Werribee Open Range Zoo

Kellee Reissinger

Back in 2005 the Werribee Open Range Zoo's (WORZ) Hippopotamus herd were in need of a new home. Our three adults and one teenager were living in what looked like a farm dam, with little fresh water, no running water and certainly not the best example of a water-wise exhibit.

Amongst the 200+ hectares at WORZ there was a huge potential to create an exhibit that would not only give our hippos a new home, but would be a world-first in natural plant filtration of water in a zoo animal enclosure.

So we looked at the needs of our current hippos and possibly young calves in the future, remembering that Hippopotamus do everything in the water: breed in the water, give birth in the water, and also defecate in the water. An adult hippo can produce 35–40kg of dung per day!

What to do with all that poo?

The design process for the new and improved Hippopotamus exhibit started in 2005, encompassing all elements of the animals' needs, access for vehicles, visitor enhancement, practicality, creating the feeling of being immersed in the Okavango Delta in Botswana, and last but not least, cleaning up the water recirculating back into our hippo pools.

Then it was down to the water treatment business. How do you filter 3 megalitres of water per day carrying loads of hippo dung? Plants of course, nature's very own environmental cleaners.

A hippo marsh treatment wetland was incorporated into the design of the new and improved hippo pools. Nearly twice the size, but less than half the depth, of the hippo pools, the marsh treatment wetland gives the exhibit more depth visually, creates a microclimate for a number of wild animals, and suits our priority need of filtering the water.

The system provides improvement of water quality via nutrient reduction, algal growth control, turbidity reduction and pathogen removal. The adoption of such a system also provides for interpretive and education opportunities, energy efficiency and minimal operating complexity.

Indigenous plants fitted our needs perfectly. Wetland filtration of the hippo exhibit needed to be more than just a lake with a few plants around the edge. Having three oblong cells of approximately 150m x 15m and varying depths called for an array of local plant species to do the job.

Plants used were in categories depending on their ability to work best in a filtration setting:

Submerged marsh	<i>Potamogeton ochreatus</i> , <i>Triglochin procera</i> , <i>Eleocharis sphacelata</i> , <i>Phragmites australis</i> and <i>Schoenoplectus tabernaemontani</i> .
Shallow marsh	<i>Cyperus gunni</i> , <i>Cyperus tereticaulis</i> , <i>Isolepis nodosa</i> , <i>Juncus smisolicus</i> and <i>Schoenoplectus tabernaemontani</i>
Littoral marsh	<i>Carex appressa</i> , <i>Carex guadichaudiana</i> , <i>Carex bichenovia</i> , and <i>Cladium procerum</i>
Terrestrial	<i>Acacia mearnsii</i> , <i>Bursaria spinosa</i> , and <i>Poa labillardieri</i>

(Also included in the plantings were *Cyperus papyrus* to coincide with the natural setting in Africa!)



The wetland treatment system doing its job. Photo Peter Sullivan

After building such an extensive system to accommodate our needs with water filtration, we needed to sit back and determine whether the system would be successful, mildly successful or just a beautiful landscape.

The key factor in determining the success basically came down to animal health, though there were other maintenance and management issues, some good, some not so good.

Algal growth was deemed to be the most significant risk. Cyanobacterial algae (blue-green algae), with their toxins to both humans and animals, is the number one indicator of the system being loaded beyond the wetland's capability.

Due to the potential health risk associated with some cyanobacterial species, management of cyanobacteria includes a need for regular monitoring, particularly during risk periods. Toxic cyanobacteria can reproduce rapidly and therefore daily observation can assist in identifying any potential blooms.

In 2009 a sample of algae was tested and identified as a *Phormidium* sp., a toxic blue-green alga, but only in small numbers and in an isolated area. Days later the alga was no longer visible, and

no animal or human had any signs of ill-health - plants to the rescue again!

Non-algal turbidity and suspended solid concentrations in the ponds are likely to vary depending on the sources and types present. Design of the wetland flow rate is intended to result in a turnover rate within the ponds of approx 1-1.5 days, and the sediment pond and wetland are expected to provide removal of a large portion of the daily suspended solid load.

Introduced pests, mainly fish, are likely to be an issue in the filtration wetland, the most significant being Carp (*Cyprinus carpis*). Other less concerning species includes Mosquitofish (*Gambusia holbrooki*) and Redfin (*Perca fluviatilis*). There are many options for treating these animals - sand filters, carp traps or exclusion screens can be used, though we have found none of these fish to be of great concern.

For the past five years we have carried out tests monthly, and more recently quarterly, to determine whether the wetland marsh is effectively filtering the water to hippo standards. To date there has been no outstanding increase in the levels of algal blooms, pathogens, *E. coli*, nutrients (nitrogen and phosphorus), ammonia, suspended solids, turbidity, chlorophyll or temperature.

In general the water quality in the pools and wetland is good. The current water quality monitoring is allowing us to assess the system's function as it becomes more and more established and to provide detection of any anomalies.

Plants win again!



Primrose and Lotus enjoying a mud bath. Photo. Werribee Open Range Zoo

Not only do we have happy hippos, especially with our new calf born in 2008, we have happy visitors, staff, Growling Grass Frogs, Japanese Snipe, and Fairy Martins. There's an endless list of all the benefits the Wetland Treatment Marsh has provided.

All thanks to plants!

A Green vision for Mount Annan

Peter Cuneo

The essential purpose of a botanic garden is to inspire visitor appreciation of the natural world. Increasingly, botanic gardens incorporate and cherish examples of native vegetation, which provide an important visitor 'window' into ecosystems and landscapes.

Mount Annan Botanic Garden is the Australian plant garden of the Botanic Gardens Trust, Sydney located 60km south-west of Sydney. This unique 416-hectare garden is a mosaic of horticultural theme gardens, natural woodlands, grasslands and lakes which now provides important habitat for over 170 bird species. As well as a botanic garden, Mount Annan has also become a regionally significant conservation reserve that includes some excellent examples of endangered ecological communities such as Cumberland Plain Woodland (recently listed as critically endangered).



Mount Annan Botanic Garden, a unique landscape mosaic on Sydney's urban fringe. (Photo: Aerial Impressions)



The endangered Cumberland Land Snail is used as a sculptural feature near the woodland. (Photo: Debra Little)

The presence of native woodlands and fauna is very much part of the visitor experience at Mount Annan, where it is now common to see families of Wallaroos (Hill Kangaroos or Euros) and Swamp Wallabies at a number of locations across the Garden. Woodland ecology is well interpreted to visitors via signage as they enjoy a walk through the woodlands to experience the 'real thing'. Local fauna also features in a series of highly visible sculptures located throughout the Garden, which include the endangered Cumberland Land Snail and Wallaroos.

Master-planning for the Garden in 2000 identified the importance of conserving native vegetation and also outlined a process of consolidation, restoration and expansion. Large scale management of woody weeds such as African Olive are a high priority as well as the linking of vegetation remnants to form ecologically healthy "green corridors" across the Garden, enhancing the possibilities for the movement of the native fauna now increasingly attracted to the site.



Fauna sculptures highlight the fauna conservation values of the Garden. (Photo: Peter Cuneo)

South-west Sydney is one of the fastest growing urban areas in Australia, and continually presents both management and conservation planning challenges for Mount Annan Botanic Garden. It has become important to look strategically beyond the boundaries of the Garden to ensure that native vegetation and fauna corridors are maintained to the Nepean River and other local reserves as part of a regional conservation network.

As a developing, contemporary botanic garden, Mount Annan will continue to be dynamic, presenting a unique balance between horticultural and natural landscapes, with native fauna providing an important dimension to the visitor experience.

Latham's Snipe avoid the natural Vegetation at Mount Annan Botanic Garden

Caz McCallum

Every year after their breeding season, groups of a medium-sized wader called Latham's Snipe, *Gallinago hardwickii*, depart from their breeding grounds between July and November to fly all the way from Japan and far eastern Russia to Papua New Guinea and northern Australia. In fact, the entire global population of 25,000 to 100,000 birds is believed to migrate to Australia during the northern hemisphere winter. They slowly make their way southward from Cape York, spread no further west than the ranges in New South Wales, and south through Victoria, Tasmania and South Australia, arriving at their south-eastern Australian destinations between August and January. On the way some annually decide to stay at Mount Annan Botanic Garden from late September/October to March.

Departing late February or early March, they again travel along the New South Wales and Queensland coastlines, reaching Japan in April and Russia in April/May ready for the next breeding season.



Gallinago hardwickii Latham's Snipe. Photo by A. Leishman.

Not easily detected, the Latham's Snipe adult plumage (cream, brown and blackish-brown) provides a natural camouflage for their preferred habitat of muddy wetlands with low, dense vegetation. This may comprise long pasture grass or tussock grasslands with rushes, reeds and sedges. Water bodies are habitat favourites as the birds are omnivorous, feeding on seeds and other plant material (mainly from the *Cyperaceae*, *Poaceae*, *Juncaceae*, *Polygonaceae*, *Ranunculaceae* and *Fabaceae* families) plus flies and beetles, earthworms, spiders, molluscs, isopods and centipedes.

Extremely shy and wary, they crouch down or remain motionless in low, dense vegetation when approached by an observer. At night they are also active. However, when flushed from cover, I

have watched their swift speed and 'zig-zagging' motion in the air. This challenging action is why they were once a favourite hunting target worldwide.

The Latham's Snipe come back in very small numbers to Mount Annan Botanic Garden each year to seek out the small permanent dams and rank Kikuyu (*Pennisetum clandestinum*) which provides excellent foraging. Not frequented by people, one preferred location adjoins a major six-lane arterial road and is thick with this rampant East African pasture grass. Noise and traffic movement do not appear to concern this species. As long as the dam's surround is maintained and Kikuyu continues to grow, the birds continue to return to this protected, healthy and plentiful ecosystem.

Selective in its preference for the long exotic pasture grass paddocks, Latham's Snipe actually appears actively to avoid nearby remnant, critically endangered Cumberland Plain Woodland and especially contact with its Sweet Bursaria (*Bursaria spinosa*) shrub understorey. From the *Pittosporaceae* family, other common names for this shrub include Blackthorn, Boxthorn or Kurwan (D'harawal) – an indication of the bird's intelligence.

A new road and a new entrance are to be built at the Garden by June 2011. Due to the snipe's migratory habit, clearing and fencing of work areas will take place while the bird is not on-site. And offset areas, larger than the total of impacted areas, have been mapped and slashed in early winter – to discourage the *Bursaria spinosa* and selectively encourage taller grasses, including local species and sedge growth. The new road level will be set above the surrounding land and the detailed design incorporates large cell culverts to facilitate uninterrupted foraging and movement, as usual, by our summer visitors.

References

- Frith, H.J., Crome F.H.J. and Brown B.K. (1977). Aspects of the Biology of the Japanese Snipe *Gallinago hardwickii*. *Australian Journal of Ecology* 2:341-368.
- Higgins, P.J. and Davies S.J.J.F., eds (1996). *Handbook of Australian, New Zealand and Antarctic Birds, Volume 3 – Snipe to Pigeons*. Oxford University Press, Melbourne.
- Todd, M.K. (2000). Feeding ecology of Latham's Snipe *Gallinago hardwickii* in the Lower Hunter Valley. *Emu* 100:133-138.

Bendigo Botanic Gardens, White Hills, phases out its animal collection

Kevin Walsh

Zoological collections were historically a feature of many Victorian regional botanic gardens. In the case of the Bendigo Botanic Gardens, White Hills, an animal collection has been held continuously on-site since 1862. This makes it Victoria's oldest continuously maintained animal collection in a botanic garden.

Originally it featured native animals and birds, but it was reported in 1865 that there were also monkeys. These animals were also a feature in the mid-20th century.



Monkeys in the Bendigo Botanic Gardens, circa mid-20th century

Bendigo's current animal collection includes wallabies and kangaroos kept in cyclone-wire enclosures, a walk-through bird aviary, and Sulphur-crested Cockatoos housed in a former monkey cage. With a staff of just two horticulturists, it should be noted that animal care takes a considerable amount of staff time.



Current wallaby and kangaroo enclosure

In 2008 a process was put in place to create a new Master Plan for the rejuvenation and extension of the Bendigo Botanic Gardens – see the article in *The Botanic Garden*, Issue 26 – March 2010, <http://www.bganzt.org.au/newsletter.html>. It was decided to approach the local community early in the process to get resolution on three controversial issues. This was to allow us to understand what

the community thought on these things and also because a resolved position would help formulate the brief for the Master Plan.

The issues, now resolved, were a name change from White Hills Botanic Gardens to Bendigo Botanic Gardens, White Hills; the removal of a fifty-year-old swimming pool from within the Gardens once an alternative aquatic facility was provided in the local area; and to phase out the animal collection over time.

The City of Greater Bendigo received much correspondence on the issues, with the phase-out of the animal collection receiving the lion's share. In analysis it was clear that the majority of people were in favour of phasing out the animal collection. Much of this revolved around the contemporary understanding that it is far better to see native animals in their natural habitat than in enclosures. Contemporary expectations of style and quality of enclosures were also a factor, together with the desire for the Gardens to return to its role as a true botanic garden, rather than the arboretum and 'fauna park' it had become.

Bendigo City Council adopted the phase-out, but not without controversy. A petition was immediately circulated to stop the phase-out. While many claims were made about the benefits of retaining the animals, there seemed to be three core issues. One was the purely emotional response from the sentimental attachment to the animals. Generations of Bendigonians and visitors recall childhood visits to the Gardens and the animals loom large in their recollections. The second was about giving local children free access to animals.

Thirdly, there was the claim that without the animals there would be nothing to see in the Gardens. While acknowledging that there are many shortcomings in the current Gardens, the intention is to 'phase in' botanic garden elements such as greater plant diversity, interpretation, labelling, heritage garden restoration, rare and threatened species collection, etc at the same time as we 'phase out' the animal collections.

Council stuck to its original resolution and the animal phase-out will continue. One group of wallabies and female kangaroos has already been relocated to The Briars on Victoria's Mornington Peninsula where they can range free in 96 hectares of indigenous bush. More wallabies will be relocated there during 2010, leaving the Gardens with two male Eastern Grey Kangaroos and an older wallaby. As no one is interested in taking these animals it seems they will be kept until they die of natural causes.

Next to be re-housed will be the Sulphur-crested Cockatoos. It is unlikely that they will be allowed to be released into the wild, so sympathetic owners will need to be found. If new owners cannot be

found they will remain until all are gone through natural attrition. In the meantime the horticultural staff have the unpleasant duty of controlling the rat population that lives under the cage. You don't want to know how!

The walk-through aviary, which houses a range of birds including Long-tailed Parrots, will be retained for the foreseeable future. This enclosure most nearly meets people's modern expectations of how animals should be housed and displayed. There are no plans to restock

this enclosure so natural attrition will also be the process here. There is no intention to euthanase any of the current animals or birds.

The process of community consultation on the future of the animal collection at the Bendigo Botanic Gardens, White Hills, has been thorough. Now the decision has been taken and supported by Council it will take many years, possibly decades, for the phase-out to be completed. In the meantime it is intended to continue to return the Gardens to its principal role as a true botanic garden.

ITEM OF INTEREST

Correas - Australian Plants for Waterwise Gardens

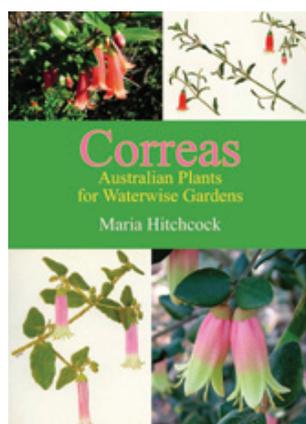
Book to be released by Rosenberg Publishing in late August 2010

Maria Hitchcock

This book is the result of over 20 years of research, documentation, propagation and wild collections of the genus *Correa*. After moving to Armidale from Sydney in 1974, my husband Don and I built a house on a hobby farm just west of the Armidale city boundary. The winters were harsh and we had many failures in our first attempts to establish a native garden. In 1977 we became foundation members of the New England Group of the Society for Growing Australian Plants, and over the next few years through trial and error established a large garden which included a few *Correas*.

Correas are ideal plants for temperate-zone gardens. Most varieties are frost-hardy and nearly all are drought-hardy. They were ideal for my small acreage and easy to propagate so I was able to start a collection and increase the numbers of *Correas* in my garden. The *Correas* soon brought many small birds to the garden, especially in autumn and winter.

I joined the Association of Societies for Growing Australian Plants – ASGAP - *Correa* Study Group in 1990 and was asked to take on the leadership in 1991. This introduced me to the other members, many of whom live in Victoria. They were growing a huge range of varieties I had never heard of, so I set myself the task of recording and collecting every *Correa* in the wild and amassing a big collection of cultivars. My husband Don and I made many collecting trips and one of the first was to Naracoorte to meet Marian Beek who had an important collection of *Correas* and had the foresight to have her collection painted by her good friend Kath Alcock. We documented, photographed and took GPS readings on these trips, sending parcels of cuttings to the Australian National Botanic



Gardens and Mount Annan Botanic Gardens, as well as adding to the Study Group Collection.

I soon realised that there were no books on *Correas* available apart from small sections in general guides, and it became very frustrating to sort out the many cultivars that were emerging all the time. I would have to write one myself. The book progressed slowly in between working as a high school teacher and raising three children, not to mention maintaining the collection and garden. There were always more and more discoveries. New forms kept appearing on the scene, and

because I wanted to include as many of the known cultivars as possible the list kept growing. Unfortunately the naming of plants is currently unregulated in the nursery trade and there are many cultivars sold under a variety of names. Registering plant names with the Australian Cultivar Registration Authority is a help but no guarantee. I spent many hours trying to sort out this confusion and I hope this book will become an important reference for nursery staff as well as gardeners and collectors.

My *Correa* collection, which is registered with the Garden Plant Conservation Association of Australia, is now very extensive and is being added to all the time through a collaboration with botanists and other collectors. *Correas* are becoming more and more popular in the nursery trade as well because of their drought resistance and bird attraction. They feature in major gardening programs and magazines regularly and are being used as emblems. *Correa* 'Federation Belle' was used to commemorate the endeavour of our Federation in Tenterfield, and *Correa* 'Canberra Bells' has been selected as the floral symbol for Canberra's Centenary celebrations in 2013.

CALENDAR OF EVENTS

BGANZQ 2010 Conference **'Community Linkages & Partnerships'**

13-15 August 2010
Tondoon Botanic Gardens, Gladstone
Email: Merilyn@gcc.qld.gov.au
Ph: 07-4971 4443

BGANZ NSW 2010 Conference **'Where to now?'**

27-29 August 2010
Hunter Region Botanic Gardens
Email: info@portstephens.org.au

BGANZ Vic 2010 Plants Forum

Sale Botanic Gardens
10- 12 November 2010

Ongoing updates are being posted on the BGANZ website.

Southern Highlands Botanic Gardens - Launch

7 August 2010, Bowral NSW
<http://www.cwebb.com.au/shbg.htm>

8th International Flora Malesiana Symposium

23-27 August 2010, Singapore Botanic Gardens
<http://www.sbg.org/fm8>

4th International Biennial Parks Leadership Conference: Common Ground - Urban parks, urban growth, and the sustainable health of communities.

24 - 26 August 2010 Luna Park, Sydney, Australia
<http://www.parksforum2010.org> or
email parksforum2010@icms.com.au

Australian Network for Plant Conservation Inc (ANPC)

8th National Conference - Planning conservation to achieving restoration

28 September - 1 October 2010, Perth WA
<http://www.anpc.asn.au/conferences/2010/>
or contact the ANPC office 02 6250 950

2010 Global Eco Asia-Pacific Tourism Conference

25-27 October 2010, Noosa
<http://www.globaleco.com.au/>

Seventh International Conference on Environmental, Cultural, Economic and Social Sustainability

5 to 7 January 2011
University of Waikato, Hamilton, New Zealand
<http://onsustainability.com/conference-2011/>

XVIII International Botanical Congress

23-30 July 2011, Melbourne VIC
<http://www.abc2011.com>



www.bganz.org.au