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# PLAYING TO OUR STRENGTHS: APPLYING HORTICULTURE AND ADVOCACY TO THREATENED PLANT CONSERVATION

*Overlooking the water to the Euphorbia glauca beach habitat*

For conservation purposes, the primary strengths of Auckland Botanic Gardens (ABG) are our horticultural expertise and high visitor numbers (~1 million annually). Applying these strengths in partnerships with other agencies has underpinned our conservation efforts for the past 25 years.

## Introduction

**A** BG 'Plant Collections Guidelines' states that our primary conservation goal is to "conserve plant species with a particular emphasis on regionally and nationally threatened NZ native plants through using our resources and horticultural expertise in

relevant partnerships'. This primarily involves growing nationally and regionally threatened plants in cultivated collections for advocacy, education, research and for restoration of wild populations. It includes establishing seed orchards to provide plants for return to the wild, and to produce seeds for long term storage.

Our conservation goals are achieved mainly through *ex situ* collections of threatened NZ native plants. We also hold collections of threatened cultivars, both exotic and native. These collections also underpin our programmes to engage the broader community with the plight of threatened native plant species and generate widespread support for their protection.

Our plant conservation strategy requires the integration of many disciplines. Our expertise in horticulture underpins much of what we do, but environmental education programmes, garden design, marketing and interpretation are important contributors. To raise their profile and promote their use, we use threatened plants with ornamental qualities, such as *Tecomanthe speciosa* and *Muehlenbeckia astonii* extensively in



Threatened Native Plant Garden

amenity situations. We have long understood that to harness the resources necessary to meet the challenges faced by threatened plants we must capture the hearts and minds of our community as well as community and political leaders. This is challenging when many NZ threatened native plants lack the beauty of similarly threatened native birds and therefore struggle for equivalent attention and resourcing.

## Background

Over the past 25 years ABG has applied horticultural and propagation skills towards many threatened native plants species recovery projects, mainly in partnership with the Department of Conservation (DOC).



In these partnership projects ABG has traditionally undertaken the *ex situ* conservation component, but we also support some habitat-based threatened species recovery projects although this is primarily the responsibility of DOC. Our *ex situ* work involves both cultivating collections and seed banking, and we propagate threatened plant species for *in situ* restoration projects.

ABG is a member of Botanic Gardens Australia NZ (BGANZ), an umbrella group for Australasian botanic gardens. In April 2017 BGANZ signed a memorandum of understanding with DOC that will provide a framework for future cooperation and enable a more strategic approach to threatened plant conservation.

## Threatened Native Plant Garden

Our Threatened Native Plant Garden (TNPG) is central to our endeavours to engage visitors with the plight of threatened plants in NZ as it affords visitors an easily accessible opportunity to view threatened plants and understand their stories.

The TNPG contains 17 replica habitats, each of which showcases one threatened plant species. Most New Zealanders are familiar with the chosen habitats that include a beach, wetland, rocky bluffs and a sand dune. The fact that most visitors recognise and have a strong emotional connection to such environments helps overcome the

*Emma Bodley collecting Euphorbia glauca seed from the seed orchard*

nondescript appearance of many of our threatened plants. Our aim is to transfer the community interest in these special places to the plant species now struggling to survive in them.

Examples include the 'Saltmarsh' habitat where we have highlighted *Tetragonia tetragonioides*, the edible NZ spinach that now rarely grows wild on shell banks and rocky foreshores. The 'Coastal rocky bluff' habitat is home to napuka (*Hebe speciosa*), a popular garden subject that is nationally threatened with very few remaining natural populations. Our 'Offshore island' features *Tecomanthe speciosa* which is common in cultivation but almost extinct in the wild on Three Kings Island. *Euphorbia glauca* can be found in the 'Pebble beach' habitat with other common associates. Once it would have been found on beaches all over Auckland but disappeared long ago.



Flowers of *Clianthus puniceus*

The story of each of the threatened plant species we showcase is told through interpretation that focusses on their plight, their relationships with other organisms such as birds and insects and their importance to plant diversity. We also highlight any medicinal properties or traditional indigenous uses.

To further engage visitor interest, the TNPG contains artworks by leading NZ artists that relate to the stories in this garden. 'Caught in the act of losing you' is a striking representation of the threatened rush *Sporadanthus ferrugineus* that sits within our 'Coastal wetland' habitat. 'Tuna' (a bronze representation of the threatened long finned eel) is located near the 'Wetland' and 'Stream' habitats.

### Seed banking

In April 2012 NZ botanic gardens signed a seed banking agreement with The Millennium Seed Bank, and they also have a formal arrangement to supply seed to the New Zealand Indigenous Flora Seed Bank (NZIFSB) in Palmerston North. ABG also has established a long-term seed storage unit as required under the Millennium Seed Bank partnership.

In our experience seed production and collecting seed is much easier in cultivation than in the wild where plants are often difficult to access, particularly on a regular basis. Our agreement with the Millennium Seed Bank requires a



Edible leaves of *Tetragonia tetragonioides* can be added to a salad just like spinach

minimum of 10,000 seeds per collection so there is significant advantage in using botanic gardens for seed production.

Seed sent by ABG to the NZIFSB to date includes *Clianthus puniceus*, *Epilobium hirtigerum*, *E. glauca* and *Pomaderris hamiltonii*.

### *Clianthus puniceus*

The beautiful kakabeak (*C. puniceus*) is widely cultivated in many countries, but only one population remains in the wild. Since 1995 ABG and DOC have collaborated on the recovery of this last known wild population on Moturemu Island in the Kaipara Harbour. Seed was collected in 1995 and the first translocation back to the island took place in 1997. All relevant information from the original collections of kakabeak is held at ABG.

To protect the genetic purity of this nationally critical species, ABG established a seed orchard of *C. puniceus* that continues today. No other forms of *Clianthus puniceus* are cultivated at ABG, and we also avoid the popular *C. maximus*.

With only one plant of *C. puniceus* known in the wild this species has minimal genetic diversity so our seed orchard is suitable for collection. Approximately 17,300 seeds of *C. puniceus* have been supplied by ABG to the NZIFSB to ensure sufficient viable seeds are available for germination testing during their long storage period.

### *Euphorbia glauca*

In the mid 1990's a single plant of the shore splurge (*E. glauca*) was discovered growing on a sheer cliff on Motukorea (also known as Browns Island), just a short boat ride from central Auckland. It is considered extinct on the Auckland mainland, the only other known location being Hauturu, or Little Barrier Island.

The solitary wild *E. glauca* plant on Motukorea did not produce flowers or seeds, but fortunately plants cultivated in our seed orchard produce copious seed that has been used in many restoration projects. The seed orchard is located in the main ABG public carpark so it also connects visitors with the threatened shore splurge when they arrive.

Experimentation has resulted in an effective harvesting practice of picking whole seed heads and placing them string mesh bags to capture seeds when the capsules explode. It has proved



*Euphorbia glauca* seed orchard in the ABG carpark



Interpretative signage for *Tecomanthe speciosa* highlighting the threats to this plant



Children playing among the *Euphorbia glauca* habitat

much simpler to collect seed from cultivated plants than in the wild as the capsules distribute seeds widely when they explode.

### Green mistletoe

Green mistletoe (*Ileostylus micranthus*) is regionally threatened in the Auckland area. A recovery partnership with DOC commenced in 1997 when seed was collected at Miranda in east Auckland. The initial ABG role was producing *Coprosma propinqua* plants for establishment at Miranda as mistletoe host plants. The first of these were planted in 1998. Over several years ABG and DOC successfully established a thriving mistletoe population in the original roadside habitat at Miranda, and

also in a nearby regional park. ABG has undertaken seed dispersal training and supplied mistletoe seed to the University of Auckland for research projects. Mistletoe plants have also been established at ABG, originally on *C. propinqua* hosts but they have since spread to other *Coprosma* species and *Plagianthus divaricatus*. In May 2017 material of *I. micranthus* was collected from a roadside population at Whakatiwai Regional Park in Auckland to re-establish a new population of mistletoe at ABG.

### Experimental propagation of annual fern

The *Anogramma leptophylla* recovery project is another example of ABG applying horticultural and propagation skills to cultivate a nationally vulnerable plant species. We are researching the association this small annual fern has with a liverwort that grows with it and exploring techniques for spore containment and capture. In future we aim to restore this species into wild sites.

ABG collected spores in July 2014 from plants growing on the bare vertical south side of an ancient kumara pit on Maungarei (Mt Wellington) in Auckland. Material was collected and cultivated in a tray of sand with two scoria rocks collected from the translocation site set in the sand. We have successfully grown plants to produce spores and population numbers have multiplied.



Tuna sculpture in TNPG

### Conclusion

ABG continues to play an important role in plant conservation through utilising our horticultural skills and the opportunity to advocate for threatened plants to a large audience. Our success to date has resulted from carefully prioritising which projects we become involved with, and working collaboratively to optimise threatened plant conservation outcomes.

### References

- Auckland Botanic Gardens (2017). Managing our plants and gardens: Plant collections guidelines.
- New Zealand Plant Conservation Network (2017). New Zealand Plant Conservation Network Search Flora. Retrieved from <http://www.nzpcn.org.nz/page.aspx?nzpcn>

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When leaving the visitors centre to the gardens are topiary *Muehlenbeckia astonii*, a threatened plant, which is utilised in amenity horticulture