

## Visit to Adelaide Botanic Garden Adelaide, South Australia

23-24<sup>th</sup> September 2006

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(Crop & Food Research)

### Background

A visit was made to Adelaide Botanic Garden as part of the B3 IO3.5 Expatriate Plant Communities project. John Sandham, Collections Development Officer (see site visit report 28 Sept 06\_Barratt) organised a garden duty officer, Enzo Vidoni, to guide the visit by Laura Fagan.



Figure 1. Main entrance to Adelaide Botanic Garden off Botanic Road.



Figure 2. *Wollemia nobilis*

The Adelaide Botanic Garden is an historic garden on the Adelaide Plains with a dry Mediterranean climate and alkaline soils. The original 16 hectare (41 acre) garden was first opened to the public in 1857. Acquired by the Adelaide Botanic Garden in 1866, the adjacent Botanic Park is a glorious 34 hectare green oasis within easy walking distance of the Adelaide CBD. It is flanked on the Botanic Garden side by a stately avenue of Plane trees which were planted in 1874, and on the northern side by the River Torrens and the Adelaide Zoo. Century old Moreton Bay Fig trees from Queensland with their huge trunks and gnarled buttress roots add to the special quality of Botanic Park. The garden contains the oldest Australian forest tree species in the country including a single specimen of *Wollemia nobilis* and the largest Plain tree. Native and exotic plant collections are displayed including palms, cycads, bromeliads and many spectacular mature trees and shrubs.

Rainforest species are grown in the temperate Australian forest and the Bicentennial Conservatory for tropical plants. An exquisite restored Victorian glasshouse imported from Bremen in Germany in 1875 and thought to be the only one of its kind extant in the world features a unique display of arid Madagascan plants.



Figure 3. Bremen glasshouse.



Figure 4. Conservatory.

Problems observed by the botanic duty manager within the gardens are: 1) wilting from water stress, 2) increased bark borers when plants are stressed, 3) a case of *Phytophthora* near the wine shed where someone likely left apricot kernels on the ground plus over watering 10-15 years ago, and 4) graffiti on succulent plants. Aphid biocontrol consists of releasing a species of wasp, unknown to the duty manager, in the garden on a regular basis plus another wasp species for the control of Palm dart inside the Bicentennial Conservatory.

New Zealand plants are located near the main gate off North Terrace's Botanic Road (see map below) in a small area (Fig. ) nearby the palm collection (#3 on the map) and the Nelumbo pond (#10 on the map). Most of the collection is composed of spaced, individual plants each with their own accession number and name plate staked in the ground.



Figure 5. New Zealand plant collection area.

The trees and shrubs are well established, being up to 10m tall, and were generally in good to excellent condition, with the exception of some showing symptoms of water stress.



Figure 6. New Zealand plant collection area continued.



Figure 7. New Zealand plants near palm collection area.

A collection of about 251 individuals of 113 species is estimated and details can be found in the expat plants location database. Further plant holding details can also be found in the gardens Living Collections Information System.

There are Mexican plants (e.g. *Podochaenium eminens* and *Montanoa bipuniatifida*) as well as South African plants (e.g. *Dietis bicolour*).

## Methods

### Site map:

Red circles denote New Zealand plant areas where the majority of plants were held. A number of cabbage trees were also located randomly throughout the garden.

## Adelaide Botanic Garden



Figure 8. Map of Adelaide Botanic Garden showing NZ plant locations.

### Contact details and site location:

Adelaide Botanic Garden  
North Terrace  
Adelaide, SA 5000  
Australia

Phone: (61 8) 8222 9311  
Fax: (61 8) 8222 9399

<http://www.environment.sa.gov.au/botanicgardens/adelaide.html>

## Species list:

<b>Species name</b>	<b>Species name</b>	<b>Species name</b>
Aciphylla squarrosa	Hebe pimeleoides	Stipa arundinacea
Adiantum cunninghamii	Hebe pimeleoides var. glauco-caerulea	Tecomanthe speciosa
Adiantum diaphanum	Hebe pimeleoides var. pimeleoides	Tetragonia tetragonioides
Alectryon excelsus	Hebe speciosa	Todea barbara
Anemanthele lessoniana	Hebe stricta var. atkinsonii	Uncinia rubra
Arthropodium candidum	Hymenantha obovata	Vitex lucens
Asplenium oblongifolium	Hypolepis dicksonioides	Xeronema callistemon
Astelia fragrans	Leptopteris hymenophylloides	
Astelia nervosa	Leptopteris superba	
Beilschmiedia tarairi	Leucopogon parviflorus	
Blechnum minus	Libertia ixioides	
Carex breviculmis	Libertia peregrinans	
Carex flagellifera	Lophomyrtus obcordata	
Carex petriei	Macropiper excelsum	
Carex secta	Mazus pumilio	
Carex testacea	Melicope ternata	
Carpodetus serratus	Melicytus ramiflorus	
Cassinia leptophylla	Metrosideros carminea	
Clematis afoliata	Metrosideros excelsa	
Coprosma arborea	Microlaena stipoides	
Coprosma australis	Microtis unifolia	
Coprosma macrocarpa nova	Muehlenbeckia complexa	
Coprosma propinqua	Myrsine australis	
Coprosma rhamnoides	Nephrolepis exaltata	
Coprosma virescens	Olearia albida	
Cordyline australis	Pachystegia insignis	
Cordyline indivisa	Paesia scaberula	
Cordyline pumilio	Pellaea rotundifolia	
Corokia macrocarpa	Phormium cookianum	
Corynocarpus laevigatus	Phormium tenax	
Craspedia uniflora	Phyllocladus trichomanoides	
Cyathea medullaris	Pisonia umbellifera	
Davallia tasmanii	Pittosporum buchananii	
Dianella nigra	Pittosporum crassifolium	
Dicksonia lanata	Pittosporum fasciculatum	
Dicksonia squarrosa	Pittosporum kirkii	
Dodonaea viscosa	Pittosporum ralphii	
Doodia media	Pittosporum tenuifolium	
Drosera binata	Plagianthus divaricatus	
Drosera pygmaea	Podocarpus cunninghamii	
Drosera spathulata	Pomaderris apetala	
Entelea arborescens	Pratia angulata	
Festuca novae-zealandiae	Pseudopanax lessonii	
Geranium microphyllum	Psilotum nudum	
Glossostigma cleistanthum	Pteris tremula	
Glossostigma elatinoides	Rhopalostylis sapida	
Hebe acutiflora	Scleranthus biflorus	
Hebe albicans	Senecio greyii	
Hebe brachysiphon	Solanum aviculare	
Hebe elliptica	Solanum cheesemanii	
Hebe gracillima	Solanum laciniatum	
Hebe parviflora	Sophora microphylla	
Hebe parviflora angustifolia	Sophora tetraptera	

### Sampling protocol:

A number of plant leaves showing signs of disease were collected and stored in propylene glycol or squashed onto Whatman FTA cards for plant future DNA extraction. Photographs of diseased plants were taken and accession numbers for each recorded onto the project worksheet (see below).



Figure 9. Melanie Walker, Corina Till and Brad Howlett from Crop & Food Research helping collect plant samples. Squashing leaf samples onto FTA cards.

### **Results**

A grower's questionnaire was filled in and details are available in the expat plants location database.

Very few arthropods were observed and none appeared to be causing damage to the NZ plant species. Whiteflies (which could transmit viruses) were present as were jumping spiders commonly located on the underside of *Astelia* spp. leaves. Caterpillar damage on the edges of leaves and cockroaches inside flax leaf/bases were also observed in low numbers. Unwinged aphids on skeletonised *Senecio greyii* leaves were observed being predated on by syrphid larvae.

Leaf spotting and leaf yellowing was present on a number of plants. Many symptoms may have been secondarily caused by water stress since canopy leaves appeared burnt or discoloured. No major pests or outbreak have occurred at Adelaide Botanic Garden in the past. None are known to occur on NZ native plants.



Figure 10. Flax cultivars growing near rose garden.

# Worksheet

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**Garden location:** Adelaide Botanic Garden

**Collectors name:** Laura Fagan, Brad Howlett, Corina Till, Melanie Walker

**Date collected:** 23 September 2006

**Visitors Contact Details:** John Sandham and Enzo Vidoni

**General Notes:** Garden under water restrictions (approx. 2 hours watering per day allowed). Plants showing signs of water stress (e.g. yellowing, leaf drop, wilt). High numbers of whiteflies nearby due to agapanthus bloom.

Plant species (Latin or common name)	Location (aspect & accession #)	Damage symptoms (fungal, bacteria, viral, galls, leaf mines, chewing etc.) or insect	Photo	Sample taken (soil, leaf, insect, plant sap etc.)	Sample result	Data Entered
<i>Astelia fragrans</i>	NZ area G900014	Caterpillar chewing Necrotic spots Ends burnt off Jumping spider underneath	Yes x4 (3)	Yes - Leaf in PG		
<i>Cordyline australis</i>	G990208 Palm collection	Diseased?	Yes x2 (11)	No		
<i>Cordyline pumilio</i>	G990560	Caterpillar damage Yellowing of leaves	Yes x3 (5)	No		
<i>Corokia cheesemanii</i>	G874155	Scale insect damage	Yes x3 (6)	Yes - Leaf in PG		Note: label needs correcting!
<i>Hebe elliptica</i>	G843146	Leaf yellowing Leaf spotting (white circles with dark margins)	Yes x3 (7)	Yes - Leaf squash onto FTA card		
<i>Hebe speciosa</i>	G874155	Leaf spotting (white circles margins)	Yes x5 (8)	Yes - Leaf squash onto FTA card		
<i>Metrosideros kermadecensis</i>	881422 'Variegato' cultivar	Losing variegation pattern	Yes x3 (9)	No		Not found on species list but in NZ garden area.
<i>Metrosideros thomasi</i> cultivar	G881423		No	No		Not found on species list but in NZ garden area.
<i>Pittosporum fasciculatum</i>	G862650	Leaf spotting	Yes x2 (10)	No		
<i>Pseudopanax lessonii</i>	G873529	Canopy leaf burn	Yes x2 (2)	Yes - Leaf squash onto FTA card		
<i>Senecio greyii</i>	G882058	Unwinged aphids (6) on skeletonised leaf being eaten by syrphid larvae (1)	Yes x2 (1)	No		
<i>Hymenathera obovata</i>	874178	Chloritic tissue green around veins Some necrotic spots	Yes x3 (4)	No		
<i>Cordyline australis</i>	NZ area	Yellowing spots	Yes x2 (10)	No		

Photos



Figure 11. *Senicio greyii* skeletonised leaf and caterpillar damage.



Figure 12. *Pseudopanax lessonii* showing canopy leaf burn.



Figure 13. *Hebe elliptica* leaf spotting.



Figure 14. *Pittosporum fasciculatum* showing leaf spotting.



Figure 15a & 15b. *Hebe speciosa* showing Dipteran and leaf spotting.





Figure 16a, 16b & 16c. *Astelia fragrans* showing caterpillar damage, necrotic spots and burnt leaf ends.



Figure 17a, 17b & 17c. *Hymenathera obovata* showing chlorotic tissue and some necrotic spots.



Figure 18a & 18b. *Cordyline pumilio* showing yellowing of leaves and usual caterpillar damage.



Figure 19. *Corokia cheesemanii* showing a bad scale infestation.



Figure 20a & 20b. *Cordyline australis* showing yellowing leaves, possibly diseased. Cockroach shown near base of leaf.



Figure 21a, 21b & 21c. *Metrosideros kermadecensis* showing both variegated and non-variegated patterns on the same tree.

### Recommendations

This is a useful site to study NZ native plants because:

- it is easily accessible
- specimens are well identified
- garden contacts are very willing to support the project
- a relatively large number of well established plant specimens
- the site soils and climate is similar to areas in NZ to compare

Negatives for the site include:

- Climate more Mediterranean than NZ
- Not a very-long-established site
- Few understorey plants
- Prone to drought
- Mostly individual specimens (e.g. no mass plantings of single species)

### Contact details

Enzo Vidoni (Duty Manager)  
Email: [vidoni.enzo@saugoc.sa.gov.au](mailto:vidoni.enzo@saugoc.sa.gov.au)  
Cell: 0401120913

John Sandham (Collection Development Officer)  
Email: [sandham.john@sagov.sa.gov.au](mailto:sandham.john@sagov.sa.gov.au)

### References

<http://www.environment.sa.gov.au/botanicgardens/adelaide.html>

### To do:

- Submit visit report to project leader.
- Load photos onto B3 plant locations database (via John Kean); e.g. DSC0203Coprosmia robusta\_fungi\_Adelaide2006.

- Send worksheet info to John Fletcher to compile and load onto B3 plant locations database.
- Send samples to appropriate people for ID (see protocol for viruses, nematodes, insects etc.).
  - samples sent to John for disease verification
  - scale insects forwarded to Nick Martin, Auckland who forwarded to Landcare Research.
- Check samples are identified and update report, database and photos.