

Nationally networked plant collections are a necessity

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Collection: *Concr.* A group of things collected or gathered together (Shorter Oxford Dictionary).

New Zealand has a native flora of more than 1876 angiosperm plant species (with perhaps an additional 10% undescribed) and an even greater number of naturalised exotic species of more than 2250 angiosperm species (Wilton & Breitwieser, 2000; New Zealand Plant Conservation Network, 2005). But the full list of what flowering plants, ferns and gymnosperms grow in New Zealand is far greater overall, and in excess of the 27,000 or so species included in the Ministry of Agriculture and Forestry's (MAF's) national Plants Biosecurity Index (available at <http://www1.maf.govt.nz/cgi-bin/bioindex/bioindex.pl>). This marks New Zealand as a country that has an extraordinary array of plant diversity, both native and exotic. A recent survey found that some of these exotic plants are globally threatened, including at least 15 critically endangered tree species (Brockerhoff et al., 2004).

There is a belief that our exotic flora is derived from that of Europe, including importations from Asia and North America to Europe by well-known plant hunters such as David Douglas (1799–1834), Ernest Wilson (1876–1930), and Frank Kingdon-Ward (1885–1958). This may be true for many imported species but tracking the origins of our exotic flora suggests that there were many direct importations. Fieldwork by David Given in the Hokianga Harbour region during the late 1980s for Volume 4 of the *Flora of New Zealand* showed that people such as Lieutenant

MacDonnell independently imported many Asian plants in connection with the flourishing timber trade around the 1840s. In some instances, such as for the Chinese hill cherry (*Kalanchoe grandiflora*), it was probably in cultivation in New Zealand decades before its introduction into Europe. Another example of direct importation concerns early introductions of Monterey pine (*Pinus radiata*) especially through botanic gardens as well as private individuals (Shepherd and Cook, 1988; Shepherd, 1990a,b). This all means we probably have exotic genotypes absent from collections outside of New Zealand.

Furthermore, many New Zealanders of past generations seem to have a streak of 'collection mania' in their personality. Some of these collections have been regarded as world-class in their completeness and their maintenance. Examples include Douglas Cook's extensive importations for Eastwoodhill Arboretum, Keith Hammett's specialist plant-breeding collections (including *Dahlia*, *Dianthus*, and *Lathyrus*), the national flax (harakeke or *Phormium*) collection at Lincoln (incorporating Rene Orchiston of Gisborne's collection), the rose collection accumulated during a life-time of interest by Trevor Griffiths, the late Mary Evans' collection of *Narcissus* and other bulb genera near Ashburton, and the Koanga Gardens Trust collection of heritage crops in North Auckland.

A recent survey of plant collections for a report to MAF Policy (Brockerhoff et al., 2004) showed just how large and how long they

had been in existence (Figures 1 & 2). Nearly 90% of the collections had been maintained for longer than 10 years and almost half had been there for more than one working generation (i.e., >30 years, Figure 1).

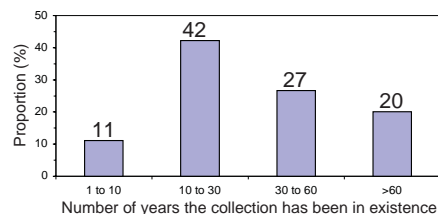


Fig. 1 The length of time a plant collection has been in existence (from Brockerhoff et al., 2004).

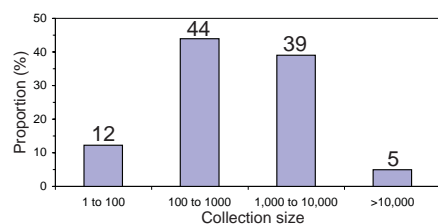


Fig. 2 The size of plant collections (from Brockerhoff et al., 2004).

Also, a substantial number (44%) of collectors held over 1000 types of plants (Figure 2). Yet the story of such collections is often one that ends in tragedy. In the same report to MAF Policy (Brockerhoff et al., 2004) there is a section entitled, "The rise and fall of exotic biodiversity collections – why do collections fail". The introduction to this section states:

"One of the significant observations to emerge from analysis of a wide range of biodiversity collections, especially for conservation, is that the presumption of permanence is a myth. It seems that, independent of tenure, there is a limited life

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on many collections. In effect, collections are started, thrive, mature and senesce. Curiously, there seems to be little if any published documentation of this although it is a concern expressed by a significant number of 'collection keepers'."

The report then goes on to identify six stages through which most collections pass:

1. The birth of a collection usually in answer to a perceived need to do something useful – the concept is seized upon with enthusiasm and with vision, but often with little money and limited human and physical resources.
2. Growth of the collection, often on 'borrowed' resources, often using volunteer time with a need to demonstrate to potential end-users and funders that the collection ought to be progressed.
3. The collection matures and starts to be recognised as having value as a resource and it may achieve some level of national or international recognition – others want to 'come on board', end-users proliferate and there is development of new facets of the collection programme.
4. As the collection matures the reality sets in that parts of the collection may be little used, operational funding starts to decrease, the founders are losing energy, technology may be becoming outmoded, collection gaps are not being filled and may not be coping with new material being 'dumped' on it or with replacement of older parts.
5. Senescence is an increasing risk as the founders retire, die or shift so that there is increasing neglect and lack of curation.
6. Collapse of the collection with (if fortunate) either reorganization or dispersal and incorporation into other related collections, or (if unfortunate) loss and extinction – the collection becomes a morgue or cemetery and fades into history.

Tracking the history of numerous collections suggests that this is indeed a frequent sequence of events. Many collections exist for the life of their enthusiastic and knowledgeable founder. Even within botanical and horticultural institutions, including universities, major commercial nurseries, Crown Research Institutes, and botanic gardens, there is no guarantee of permanence. In botanic gardens too few collections survive the section curator who may have initially set them up or inherited them at an early stage and built up the collection.

Does this really matter? There are several reasons why it does. One of the major reasons is the current difficulty of importing plant materials into New Zealand (e.g., Douglas, 2005) even to replace gaps that have crept into collections through natural attrition and loss. Another is that fashions in horticulture change and the plant that may have been popular two decades ago may now be discarded especially by the public. Yet, move on another decade or two and that same plant will be found to have desirable attributes that mean breeders want it as part of a cultivar breeding programme. A personal example occurred just after David Given moved to the Christchurch Botanic Gardens. Walking through the rose garden, his wife exclaimed, "that is the rose I want for Christmas". Exhaustive enquiries showed that although some wholesalers recognised the name no one now stocked it. The Christchurch Botanic Gardens plants are the only ones we currently know of. The same can happen with native plants such as *Senecio xatkinsonii*, early selections of *Coprosma* and *Leptospermum scoparium*, and several forms of *Phormium* that do not yet appear to be part of the national flax collection. A third reason is that over time it can become difficult to know exactly what plant earlier growers may have been talking about in the absence of definitive material (or images and herbarium specimens).

Can this scenario be avoided?

Certainly, but probably only if we can move to three areas of action. One of these is to recognise the national importance of key collections. A second is to ensure that there are recognised action plans for individual collections that include maintenance and acquisition guidelines along with a commitment to maintain the collection in perpetuity or at least until a deliberate decision is made to dismantle or dispose of the collection (much current dismantling is by default). A third is to recognise national networks of collections at least for larger and more important collections.

Good quality nationally important collections of plants, whether native or exotic, need to be recognised as national treasures just as much as works of art and buildings.

Why national importance and recognition?

Although the public, politicians and funders put value on works of art, built heritage and the antiques, the attitude towards plants that may be of similar value or rarity is often quite off-hand and cavalier. People often assume that plants are just "always there". Comparing contrasting attitudes to birds and plants, especially those that are either rare or declining towards extinction, there is frequently excitement about birds such as kakapo, takahe, whitehead and orange-fronted parakeets, but little said about plants that may be in an equally parlous situation. Do people realise that perhaps the most primitive mistletoe known, *Trilepidea adamsii*, was only found in New Zealand and has not been seen alive since 1954? It is assumed to be extinct (Norton, 1991), yet could have been saved with a little more care, attention and publicity. Good quality nationally important collections of

plants, whether native or exotic, need to be recognised as national treasures just as much as works of art and buildings. Perhaps they should be even more valued as we are far from being able to recreate facsimiles of them once they have gone.

Why suggest action plans?

These do not have to be complex and lengthy documents. They should set out why the collection is considered important (and whether this is for scientific, horticultural, educational, amenity, monetary or cultural reasons). There should be an identification of both desired and missing elements in the collection so that resources are spent wisely and not squandered on relatively unimportant parts of the collection. There needs to be a deliberate policy on accession (once you have a known collection many other people may see you as a "dumping ground" for their spare plants). On a visit to the Royal Botanic Gardens, Melbourne, David Given had been very impressed with their two levels of strategic planning for collection – an overall gardens strategic plan that prioritises collections and sets out general principles and individual plans for each collection.

Why recognise national networks of collections? A primary consideration is the sheer magnitude of species and cultivar or genotype selections that are likely to be included. A good example is the indigenous genus *Hebe* with probably more than 100 species but with many infraspecific taxa and a myriad of cultivars (Metcalfe, 2001). The overall extent of a comprehensive *Hebe* collection would amount to more than a thousand entities. Such a collection can probably only be accommodated nationally by siting sections of the collection in different parts of New Zealand. Moreover, such a dispersal of a collection such as *Hebe* (or roses, camellias, rhododendrons and azaleas, and native grasses) is wise on two grounds. First, that no single site is immune from catastrophe, unseasonable weather events and vandalism, so

that dispersal amounts to being a form of insurance. Second, that the varied array of climates, soils and topography in New Zealand means that it may be quite impractical to grow every member of a collection at a single site, assuming that a site can be found that is large enough to accommodate all the specimens.

This does not rule out having recognised 'national' collections and collection centres at one site, for instance the rose collection at Hamilton Gardens being regarded as the national collection. But what is being advocated here is that there are good reasons for considering dispersed national collections that link holdings in various parts of New Zealand according to agreed criteria and standards and accepting responsibility for them and (where necessary) an ordered disposal of collections.

Such a scheme was attempted by the RNZIH and associated organizations in the early 1990s (Hammett, 1993; also see <http://www.rnzih.org.nz/pages/plantcollectionregister.html>) but did not gain traction at that time. It was envisaged at the time that the New Zealand scheme would be along the lines of the United Kingdom National Council for the Conservation of Plants and Gardens (NCCPG) National Plant Collections scheme, which had been operating for some years. A related resource was Meg Gaddum's Plant Finder, an online database and an annual published list of New Zealand plant species and cultivars, along with the nurseries that stocked them, developed from 1995 and ceased in 2000. This initiative was modelled on the successful United Kingdom RHS Plant Finder.

We can both learn from the relative lack of success of the New Zealand schemes and take advantage of new initiatives and potential partnerships. Initiatives include the realisation that current biosecurity legislation may make it difficult to regain species once they are lost from New Zealand, the greater awareness of the rarity and

threat to a significant part of the New Zealand flora, changes to the patterns of New Zealand gardening that have probably accelerated loss of some 'old favourite' plant groups and increasing needs by research organizations for obscure and rare germplasm to maintain New Zealand's competitive edge in horticulture, forestry and agriculture.

Particularly important are the formation of new networks and especially the New Zealand Plant Conservation Network, and Botanic Gardens Australia and New Zealand. The time is appropriate for these organizations, the Royal New Zealand Institute of Horticulture, and other key stakeholders to sit around the table (or perhaps the garden bed or the national park forest) and set in place a robust system for collections that will ensure security for native and exotic species, cultivars and genotypes, for the good of future generations and the biodiversity and prosperity of New Zealand.

Acknowledgements

We would like to thank the numerous collection holders who provided information for our survey. This paper is based in part on a study funded by the Ministry of Agriculture and Forestry, project code FRM 228.

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The late David Given is profiled in his obituary, also published in this issue.

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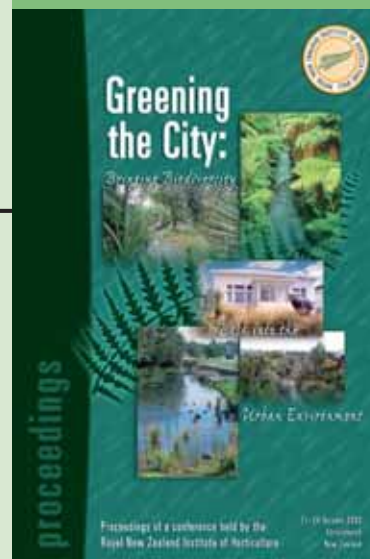
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