

A plant breeder's perspective

Keith Hammett¹

Introduction

Initially, let me state that I believe the preservation of biodiversity is a global responsibility. I do not believe that anyone has ownership of germplasm. At best we have custodianship.

I also reject any notion that we should discriminate between indigenous and exotic flora. New Zealand has in many cases acted as a Noah's Ark for genotypes and even species lost in their country of origin.

It is also important to remember that it is genetic material that is of prime importance. All too often a great deal of effort goes into cataloguing the names of genotypes that are no longer extant.

In order to fulfil our responsibility of custodianship, it is self evident that we must have a full understanding of the plants that are currently in New Zealand. Managing the country without knowing everything in the flora is like managing a supermarket without knowing everything on the shelf.

I suspect that we have a pretty good idea of the plants in our native flora. However, New Zealand has a rich heritage of plant importation. Many of the early importations were undocumented. However, it never fails to amaze me, that after the introduction of biosecurity policies, with all the costs and bureaucracy that has and is associated with this, that there is no comprehensive record of what has been introduced legally. This even applies to recent decades following the introduction of computer technology.

It is important to understand that it is often difficult to get an introduced plant to establish in a new environment and that plant collections are dynamic and easily eroded. Each collection needs careful curation and data records of both additions and losses need to be kept up-to-date.

With regard to plants that did establish sufficiently well to be offered for sale, collections of nursery and seed catalogues are an invaluable source of information, especially when trying to pinpoint the date of introduction.

Managing the country without knowing everything in the flora is like managing a supermarket without knowing everything on the shelf.

Utility

Why do we need to know which plants exist in New Zealand?

For plant breeders, different forms of a plant are analogous to a box of paints for a painter. For both plant breeders and nurserymen, it is only common sense to establish whether a plant or cultivar is already available within New Zealand as this avoids the costs and risks associated with duplicate importation. This is especially true now that biosecurity regulations have become so Draconian and costly.

In the realm of Plant Variety Rights Protection, it is often very difficult if not impossible to locate plants that are designated as comparators.

In terms of regulatory bodies, it is unacceptable that a taxon should be designated as a new organism simply because our knowledge base is too poor.

With regard to worries about the potential of a plant to be a weed threat, there seems to be a greater willingness to consider data from quite different climates than to check whether that plant has been introduced into New Zealand previously. If a plant has been introduced in the past and

has, maybe, even been offered for sale, but we do not know if it is here now, *ipso facto* it may have little if any weed potential.

It is disturbing to learn that little if any work is being carried out to update plant names on the MAF Plants Biosecurity Index (online at www1.maf.govt.nz/cgi-bin/bioindex/bioindex.pl).

Options

Questions surrounding germplasm resources in New Zealand are multifaceted. The essential first step is to identify collections of plants currently existing in New Zealand as well as material offered for sale by nurseries.

An attempt to produce a New Zealand Plant Collection Register was made under the auspices of the Royal New Zealand Institute of Horticulture, from 1989 to 1993. However, this Register only got to the stage of producing an index to recognisable collections. The next step was to be the listing of the plant names in those collections. This would have enabled some assessment of the vulnerability of individual species or cultivars.

In a small way this work was seen to be analogous to the work of the National Council for the Conservation of Plants and Gardens in the UK.

Of course there are many downstream issues such as the correct identification of the plants in the collections and the use of names that conform with the edicts of the International Codes of Botanical Nomenclature and Cultivated Plants.

Similarly, it would be desirable that herbarium specimens should be made of the various plants held in collections to serve as datum points and for future research.

¹ Professional plant breeder, Auckland; www.drkeithhammett.co.nz; khammett@clear.net.nz

Practical implications

Virtually all of New Zealand's plant industry is based on exotic germplasm. With regard to ornamental plants, the New Zealand flora is predominately green and floristically poor, thus offering few opportunities.

The use of indigenous flora is further constrained by the notion of Māori 'ownership'.

For genuine new crops we need to import species and genera that have not been developed previously. There is little point in further stirring a domesticated gene pool that is freely available elsewhere.

To determine the potentiality of developing a new crop, collections consisting of various species from a genus, as well as a number of accessions or genotypes within each species need to be established.

It is often very difficult to introduce species from the wild into cultivation, especially where highly specialised ecotypes are concerned.

Once collections have been established, they need to be actively curated and plants carefully observed to determine any possibility for breeding new crops. This takes a long time.

In my case significant development in the genera *Lathyrus* and *Dahlia* have been based on the use of species not previously used for breeding. Fortunately, as part of my breeding work I had imported a range of species prior to 29th July 1998 (the date on which the HSNO Act came into force for plants and other new

organisms). To do so now, since the implementation of the HSNO Act, would be impossible, certainly without very deep pockets and a great deal of time and patience to meet the regulatory requirements.

With some large genera such as *Cuphea*, which has both ornamental and utilitarian species, it is impossible to prejudge the potential of any of the species not already in cultivation.

For these reasons alone, the best we can hope to do is to locate and record exotic germplasm already in New Zealand. Maybe if we are very lucky indeed, we might just find something comparable to the kiwifruit (*Actinidia*), *Zantedeschia* or *Sandersonia*, but do not hold your breath.

New Zealand's door is now firmly closed.

Further reading

- Brockhoff, E.; Given, D.; Ecroyd, C.; Palmer, J.; Burdon, R.; Stovold, T.; Hargreaves, C.; Hampton, J.; MacKay, M.; Blaschke, P. (2004). Biodiversity: conserving threatened introduced species. Final Report for the Ministry of Agriculture and Forestry Operational Research 2003–2004, Forest Research Report, Output No. 37326. 145 p.
- Cave, P. (2004). New Zealand needs new plants. *New Zealand Garden Journal* 7(2): 2–4. Available at www.rnzih.org.nz/pages/2004_Banks_Lecture.htm.
- Douglas, J.A. (2005). Plant import rules blocking growth. *The New Zealand Herald*, 18 April 2005.

- Douglas, J. (2005). Exotic plants are the lifeblood of New Zealand: less regulation is needed to allow more new species into this country. *New Zealand Garden Journal* 8(1): 2–6. Available at www.rnzih.org.nz/RNZIH_Journal/Pages2-6_from_2005_Vol8_No1.pdf.
- Given, D.R.; Eckerhard, G.; Brockerhoff, E.G.; Palmer, J. (2006). Nationally networked plant collections are a necessity. *New Zealand Garden Journal* 9(1): 15–18. Available at www.rnzih.org.nz/RNZIH_Journal/Pages_15-18_from_2006_Vol9_No1.pdf.
- Hammitt, K.R.W. (1993). New Zealand Plant Collection Register Update No. 3: 1st March 1993. *Horticulture in New Zealand (Journal of the Royal New Zealand Institute of Horticulture)* 4(1): 18–28.
- New Zealand Government (1996). Hazardous substances and new organisms Act, New Zealand Government, Wellington, New Zealand. 252 p.
- New Zealand Government (1998). Biosecurity. Reprinted Act (with amendments incorporated), New Zealand Government, Wellington, New Zealand. 199 p.
- NZ Institute of Economic Research (Inc.) (2003). HSNO Act: Impact on costs and innovation. Report to Ministry of Economic Development. 26 p.
- Oates, M. (1989). Garden plant conservation. *New Zealand Gardener*. June 1989, p. 7. (Letters and plant exchange).

