

## Breeding of New Zealand Native Plants at the Auckland Regional Botanic Gardens—Commercial Potential of our Native Flora

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Hebes possess many characteristics which make them desirable garden subjects, including abundant flowering, attractive foliage, and ease of propagation. Despite the horticultural merit of *Hebe*, and a vast gene pool with which to work, little breeding work has been undertaken to produce improved hybrids.

A *Hebe* breeding programme commenced at the Auckland Regional Botanic Gardens in 1982 with the objective of producing outstanding cultivars of superior appearance and improved garden performance. The susceptibility of hebes to disease, particularly in nursery conditions, has restricted their commercial potential. Initially our main aim was to produce hybrids with reduced susceptibility to septoria leaf spot (*Septoria exotica*) and downy mildew (*Peronospora grisea*). *Hebe speciosa*, one of our most important parents as the source of bright floral colours, is susceptible to both of these diseases. Species which generally remain free from such disease problems (e.g., *H. diosmifolia*) were introduced into the programme with the intention of imparting some degree of disease resistance to their offspring. Generally this strategy proved to be reasonably successful, although complete freedom from diseases under nursery conditions has proven to be difficult to achieve.

Other objectives for the breeding programme included:

- Increased flowering periods.
- Repeat flowering (several flushes per year).
- Increased flower quality.
- Greater flower colour range, with particular emphasis on blue, pink, purple, and magenta shades.
- A range of flowering times.
- Attractive foliage.
- Compact symmetrical plant habit.
- Reliable garden performance.
- Acceptable nursery performance.

In 1990 and again in 1993, I visited Denmark to look at the production of *Hebe* on the island of Funen. Subsequently, and as a result of having consulted with growers in this country, the objectives of our breeding programme were expanded. New considerations include:

- The commercial requirement that flower colour should be appropriate for the particular season.
- The requirement for new variegated cultivars in Europe.
- The importance of cultivars in which flowering time can be predicted and controlled. This is a problem for those cultivars in which flowering is triggered by exposure to cold, as it is not possible to always predict how low mean temperatures will be in a particular winter.

Therefore, it is preferable that flowering should be initiated by exposure to a period of warmth as, although relatively expensive, this can be controlled. Danish hebes are despatched when in flower to the markets by lorry, and they often spend up to three days without light. It is necessary that their flower colour does not fade in these conditions.

Selection of elite material from the wild for introduction into the breeding programme has been fundamental to its success. Often great variation occurs within a wild population. Selected plants are asexually propagated, then grown and evaluated. Those which exhibit desirable characteristics may then be used as parents. With few exceptions F1 hybrid seedlings have exhibited characteristics which are intermediate between those of their parents. This is not, however, true of complex hybrids, which can in fact be extremely variable. This presents opportunities for breeders to extend further the previous limits of this genus.

Attempts to produce new variegated clones have been made both genetically and by using irradiation techniques. Only genetic methods have proven to be successful so far, although we have yet to produce a commercially viable variegated cultivar. Seed has been irradiated at various levels in an attempt to induce variegation. At 10 kilorads, albinism has been induced in seedlings, but these lacked vigour and died. Currently a level of 2.5 kilorads is being tested.

Each year several million hebes are produced in Denmark for the European market. About 2.5 million *Hebe xfranciscana* 'Variegata' plants are grown in 10-cm pots. Most of these are sold during July and August. They are used mainly as outdoor pot plants, in window boxes, as house plants, bedding plants, and particularly in Germany for decorating graves. Generally they are discarded once they cease to be attractive.

Several other native genera present great potential to breeders. Graeme Platt, Terry Hatch, and others have now collected several outstanding forms of *Metrosideros excelsus*. The opportunity exists to use this material to produce hybrids with different characteristics.

Our kowhai (*Sophora tetraptera* and *S. microphylla*) have been largely neglected, with few worthwhile selections from the wild available and no breeding programme.

*Arthropodium cirratum* (rengarenga) is another species with great horticultural merit. We have now selected and assembled elite material in association with Graeme Platt. This material includes superb horticultural forms with large wide-arching foliage and dense candelabra-like inflorescences. These have the potential with breeding and selection to produce a strain with outstanding foliage and flowers. They could even eventually rival hostas in appearance, and they would undoubtedly exceed them in performance.

Divaricating shrubs are predominantly native to New Zealand, but it is overseas where they are now becoming hugely popular. *Muehlenbeckia complexa*, in particular, has been accepted in Europe where it is being produced in vast numbers. A hybrid *Muehlenbeckia* has recently been introduced there, and the European market would welcome more hybrid divaricating plants.

The above are just a few examples from our abundantly rich native flora which could be made more commercially viable by breeding and selection.