

GREENING THE GARDENS

Botanic gardens and Conservation

by Dr David Given,
Botany Division, DSIR.



Our usual perception of botanic gardens is of a place to visit at the weekend to admire the plants. In fact they have a very important conservation role as well. Kew Gardens pictured here has 85,000 living plants and a herbarium of six million species.

It has long been realised that preservation of species under threat should primarily be sought in areas of natural habitat. But conservation in botanic gardens as specimens and plantations, in seed banks, and in experimental gardens is increasingly seen not just as a back-up but as necessary in its own right. Each has its own unique contribution to conservation.

To many people the botanic garden is an enigma – part pleasure garden and part recreation park – or perhaps somewhere to take chattering children on a Sunday afternoon. The problem of how people perceive botanic gardens was addressed by Winifred Blunt. In writing of the Royal Botanic Gardens at Kew, England, she observed that, “... to the botanists, Kew is a scientific institution, but one whose work is sometimes hindered and whose funds are excessively squandered to provide ignorant Londoners with a day in the fresh air among flowers whose names they neither know or greatly wish to know”.

Many varied roles

Botanic gardens have many varied roles. It is hard to find a simple definition, or single characteristic by which to define them. In general it may be said that plant collections in botanic gardens are managed in a scientific way and have a particular purpose other than simple pleasure and amenity. Their purpose can be educational, economic, taxonomic, medicinal, to encourage introduction of new exotic species, or to advance the conservation of rare and endangered species.

Botanic gardens have been in existence for a long time. The earliest medicinal gardens were established in the 16th century in Europe, and today there are probably about 1400 of them worldwide. Most are in the northern temperate regions, especially Europe, North America and the USSR. The number of botanic gardens in the tropics is far fewer. However, during the last decade over 100 new gardens have been established, many in tropical or subtropical regions. Some are very small, perhaps only a few hectares in area. In contrast others cover many tens of hectares, employing not only scores of gardening staff but also supporting large scientific laboratories. In North America, for example, the Missouri Botanical Garden, has probably the largest concentration of scientists working on the immense flora of the tropical Americas. The largest herbaria in North America are mostly maintained by botanic gardens. Similarly, the Royal Botanic Gardens at Kew has not only 85,000 living accessions, but also a herbarium of over six million plant specimens.

New Zealand botanic gardens are rather more modest in size and range of activities. Although most cities and some smaller centres have public gardens, only two (Dunedin and Christchurch Botanic Gardens) have a full-time botanist, and few would claim to put priority on the systematic and scientific collection of plants. Our New Zealand gardens have developed rather different traditions from those of many countries. Almost all are funded by municipal authorities rather than central government. Despite periodic calls for a national botanic garden

or a national network of gardens, this has not eventuated. Perhaps the period of provincial government early in colonial history stifled the development of a national botanic garden. Certainly, the development of gardens separate from museums and universities has persisted up to the present. Consequently a defined research function or long-term association with research, educational and conservation agencies has rarely been developed.

It is therefore not surprising that some of the chief aims of many overseas botanic gardens are passed over or ignored in New Zealand. Sometimes they tend to be seen as options which are good to consider when times are prosperous but are not to be seen as basic functions. This may well apply to the role of gardens in biological conservation.

Five main reasons

There are five main reasons for growing plants in botanic gardens for conservation: to have as many species as possible in cultivation as an insurance against their loss in the wild, to ensure the preservation of a wide range of diversity of plant species as well as diversity within species, to have plants available for study without having to take scarce specimens from the wild, to educate people to the needs of the plant world, and to propagate and maintain species for exchange and for reintroduction into the wild. Implementing these functions might not appear to be a problem until one realises that there are currently about 240 plant species at risk in New Zealand. Of these, just over 20 are critically endangered and may be at risk of becoming extinct in the wild. To rescue such species demands not just the cultivation of a few specimens but – if possible – the capture of a sizeable proportion of the remaining genetic variation in the species. Most species are highly variable, and maintenance of variation is often the key to long-term survival.

The occurrence of variation in the species is well demonstrated by the endangered kaka beak (*Clianthus puniceus*). This is currently being studied by Forest Research Institute and Botany Division, DSIR. Although the species is now very rare in the wild, with perhaps fewer than 200 wild plants known, the species shows considerable variation. Flower colour varies from white through pink to deep red. Plants can be erect to spreading and from two to perhaps as much as six metres high. Stems can be green or purplish. There is also variation in flower and leaflet size.

Several other endangered plants found in New Zealand are now known in the wild only from single plants. The Three Kings Islands endemics, *Tecomanthe speciosa* and *Pennantia baylisiana* are examples of single-plant species, and the recently rediscovered Kermadec Islands koromiko (*Hebe breviracemosa*) is another. The last of these species was believed to be extinct for several decades until, following removal of goats from Raoul Island, a single plant was found. Cuttings from this have now been propagated and are growing in a number of experimental and botanic gardens throughout New Zealand. If it were not for horticultural techniques and garden-based plant