

# From Collection to Cultivation

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Growing a collection of plants within a Botanic Garden is a challenge to any gardener. Otari's challenge is to grow as large a range of New Zealand's native flora within one garden as is possible. If you consider the range of habitats required from the Sub Antarctic Islands to the top of the North Island and offshore islands, from extreme cold to almost tropical. How is this achieved?. I will attempt to describe to you a few of our techniques that allow us to grow one of the largest collections of NZ natives.

To complicate matters, we also aim on having a large proportion of this collection from a sourced location. The collection can then be used for scientific, conservation or educational purposes.

This generally means collecting plant material from the wild.

A true example of a species is at its best when growing in the wild. Once brought into cultivation it generally becomes easier to cultivate after the first or second progeny. Whilst this is good for horticulture, it doesn't truly represent the species. An example of this could be an alpine whipcord Hebe. Brought down to sea level, the plants will often open out from flattened or appressed leaves to tiny open leaves all down the stems. This is not characteristic of the species. If you then propagate from this material it will end up somewhat removed from the original. The plants often end up growing too fast as well, often flowering themselves into an early death.

Sometimes you also get the plants adapting to the local climate, and changing form over time.

By careful selection of plants and understanding their requirements you can grow them successfully. Anyone can go and dig plants up but it takes more time to study them and keep these plants alive in cultivation, and propagate from them.

When we are renovating an area or looking to start a new collection we will research the plants from an area and organise a collecting trip. An example of this would be collecting plants endemic to Marlborough in 1995 for the new Marlborough collection.

We looked at regional plant lists and worked out where would have the best representative plants of that area and obtained the necessary DoC permits.

We restrict our collecting to seed and small quantities of cuttings. We have found that by collecting cuttings and wrapping them up in sphagnum moss then sealing into plastic bags we are able to keep these

cuttings fresh for up to two weeks. We store the cuttings in a cool place, either in chilly bins or in the shade until we can get them home. The seed are dried out at night and packaged into small plastic bags and also kept cool.

By far the most important part of these expeditions is studying the environment that these plants grow in and learning about the conditions that would be best suited for planting them, if we are successful in growing them on. Notes are taken on the altitude, aspect and fellow companions that the plants associate with. This, I think is the most important part of being successful when placing plants back at Otari. If you don't know much about the plant then you have to rely on books or information from other successful growers. This is all very well for popular growing plants but when growing some of the more obscure parts of the flora there is little information available.

Once arriving back with the collected material, the cuttings are quickly processed, with most being placed into a pumice-growing medium in our shadehouse. I believe that with slight modifications of the media and the use of plastic bags for higher humidity most of the flora can be successfully propagated. Bottom heat and glasshouses would certainly speed the production time of some plants but there is usually a good strike rate without this. Again there is often little information about some of these species so I work on the principle that most plants will grow from semi hardwood cuttings. There are some exceptions eg deciduous olearias, such as *Olearia hectori*, respond better when propagated as hardwood cuttings.

Seeds are chilled for a few months in the fridge, then sown in a 50% peat/sand mix with grit placed over the top of the seed. This is to retain the moisture and slow the growth of liverwort. I think it also simulates the alpine environment. I usually relate where the plant has come from and ponder how the seed would naturally have been dispersed and what would cause it to germinate. If it is an alpine wind blown seed then perhaps it would land on a shingle bed and be worked into the gravel by rain, wind or frost where it is then sheltered and can proceed to grow in the spring.

Once the plants have grown to a reasonable size and have survived the nursery treatment they are ready for the harsh reality of public life.

My philosophy here is quite simple for some plants. If it comes from a warm northern area, it is placed with a northern aspect of a nice warm frost-free slope. If it is a

southern, cool loving plant then a south side of a border is sought. This of course has its limits as when growing all the Pittosporums in one garden bed, you only have so many northern or southern positions, and what about the epiphytic Pittosporums?. *Pittosporum cornifolium* was first planted in rock crevices, and grew well but tended to get too much sun, next they were put underneath some larger trees that were representing their host tree. They now have a fairly dry position, dappled light and are growing well. This is through thinking about their natural environment.

Now lets turn to a tricky plant, *Cordyline indivisa* or mountain cabbage tree. You will find that some gardens will have no problem at all, For example in Wakehurst Place in England I saw them growing very happily in a garden bed, probably because they got quite cool air for most of the year and were fairly shaded at times. We have struggled constantly to get beyond about 1 metre with ours. We have tried open positions, failed; in the wild garden grew well until it was stolen; tried in a free draining soil in a shady position, got phytophthora, a root wilt disease. I went back to the basics and thought about where I have seen them growing in the wild, sometimes on the side of cliffs, exposed to wind, usually in very free draining, but moist cool positions.

This time we are trying on the side of a hill, with cool, winds coming up the slope out of the bush, semi shade and very free draining with irrigation at hand. I hope they succeed this time.

Another plant some have difficulty with is *Pachystegia insignis*, or Marlborough rock daisy. If you find the right position, then there is no problem, they thrive in the rock garden, clinging to rocks often self seeded, or planted in rock crevices. If you observe where they are growing on the Kaikoura coastline they are mostly confined to extremely rocky positions, full sun, very windy with lots of sea air. We have found that giving them a side dressing of dolomite lime every second year seems to keep them happy.

Many of the daisy family plants can present problems. We have found that they are all very susceptible to phytophthora. If the plants get stressed at any time during the summer and autumn then we will lose them. It seems to be important to keep them well watered so the plants don't go through a spell of being dry- wet-dry again. The root systems die back and are very prone to fungal attack. In the case of some, it is not worth trying. Despite *Olearia colensoi*, leatherwood being a major curse when tramping, it has to be one of the hardest plants to keep alive in Wellington. I've trampled over and under my fair share of this plant and I am always amazed at how tough it is in the subalpine belt. Always seems to be constantly wet under foot and puts up with a range of conditions. We are now trying some plants in the subalpine area of the new alpine garden, we have placed them in the shade, in cool rock crevices. It will be a good test of the soil

type we have given them.

The new alpine garden has four different types of soil. We have stayed away from any bark component and grown all the plants for the garden in a 70% grit, 30% loam ( clay and peat). We have gone for this type of mix to keep the growth of the plants slow, with good drainage whilst having a good moisture content. If you read in the books about alpines, they often mention, "enjoys a cool soil, ample water but good drainage". The challenge is to keep the plants moist but not wet. The main requirement for our garden was to face south with good light levels and plenty of rocks to place plants against. Looking at the plants in the wild they are often on the cool shady slopes, or if they are in the sun then their roots will be in under rocks keeping cool, under rock overhangs or nestled at the base of tussocks. This is what we have tried to achieve.

Another point to be observed in the wild, is they don't have the "tidy gardener" coming along and pulling off leaves. Cockayne many years ago pointed out that "...wild plants will sit in a decaying mass of leaves". What happens when you do pull off the untidy dead leaves at the base of aciphyllas, celmisias, anisotomes, astelias, just to mention a few is you expose the stem or base of these plants to drying winds and sunlight. It is just about instant death to some celmisias and aciphyllas if this happens.

At Otari we tend to use chipped mulch in all our borders. We have found that most of the plants respond well to the extra food and moisture retention. It also reduces our weeding time considerably. But that aside, the hebes benefit well with the mulch layer except for the whipcords. We have tried a grouping of whipcords with bark mulch around them and the soil has been too rich, plus the base of the stems are being buried. The end result has been them browning off. We are next going to try our alpine soil, and use rock mulch around their bases. Hebes in general though will benefit from being placed in a windy position, and mulched around. By doing this with the Hebe cultivar border we have reduced the downy mildew and leaf spotting considerably.

Last year we moved all the flax cultivar's to a warmer border and transferred all the new Marlborough plants to a hot dry bank. Many people were a little concerned when they saw the flax's shift as we moved them in November in the warmth. We had found that shifting flax's in the more traditional time of autumn made them sulk for months. It was also suggested that we give the flaxes a weak solution of nitrogen fertiliser weekly and keep them well watered. This has been extremely successful, Rose Walker, the collection supervisor for the collection may say too successful as she is back to trimming them regularly.

The Marlborough plants will do better than their previous home, as they are now on a very hot, dry north-facing bank. Some of the transplants such as

*Carmichaelia* spp. and olearias that I thought might not take have grown very well.

Our next challenge is to see the new alpine garden growing well and to get some of the Sub Antarctic plants going from this years collecting trip, I can already see *Bulbinella rossii* and some stilbocarpas....., but how will we replicate constant mist and cold

windy conditions. Perhaps the wind won't be a problem in Wellington's climate.

But for all the challenges of growing native plants, it is hard to beat viewing them in the wild in their natural associations, be it the giant kauri's in Waipoua Forest or an alpine herbfield with mountain daisies in full bloom.