

## Propagation Down Under - Back to Basics New Zealand Style, Nothing Too Fancy - It's Just the Way We Do It

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### INTRODUCTION

Over the years I have seen many methods of propagation from the high tech to the simplest low tech you could have and interestingly enough some of the least thought-out have been the best methods that have the best results; maybe not the most productive but certainly some of the best return for money spent (Figure 1). The following are some of the methods used by our nursery and what we achieve.



Figure 1. Tools of the trade.

Before I get too much into depth about propagation methods, I should give a rundown of New Zealand's climate and zones. New Zealand has two main islands with many small islands surrounding its coastlines. The South Island is a temperate climate zone and holds the records for largest land mass, wettest and driest parts of the country, and also coldest and hottest with an average of 4,000–10,000 ml of rain on the west coast and as little as 0–250 ml in the south east. One town, Alexandra in central Otago, holds most of the records. In an average year it can have a low of -10 °C (14 °F) and as high as 35 °C (95 °F) with 0–250 ml of rain. It also has a mountain range that goes pretty much the length of the Island.

The North Island has a subtropical climate zone with less extremes, more people and productive horticultural land. The North Island average temperatures being 11 °C (52 °F) in winter and 20 °C (68 °F) in summer. Rainfall can be less predictable depending on

what coast you are on or how close you may be to hills, rangers and the couple of mountains as these all create their own little microclimates; rainfall average can vary from 600–1600 ml in any given year. Our own little slice of paradise is in the upper North Island in one of New Zealand’s most productive soils. Pukekohe grows a high percentage of the country’s onions, potatoes and brassica for local and export consumption. Our average rain fall is 1100 ml over approximately 125 days with 2000 sunshine hr. Typical summers are warm and humid with a couple of dryer months and winters cooler and wet with a few frosts in colder years.

Now about us. **Joy Plants** founded in 1960s by Terry and Pam Hatch is a family business currently employing only family. Over the years we have had as many as three workers but at present it is Terry, Pam, Lindsey, and Sarah a granddaughter. We have a 24-acre property (9 hectares), of which about 3 acres is nursery (Figure 2), the rest is bush, gardens, and pasture—yes you can make a living of this amount of nursery. We grow mainly New Zealand natives, perennials, and anything else we think we would like to try. Most product is grown on speck and sold to landscapers and general public. Ninety percent of plants grown are propagated on site and sold in the North Island.



Figure 2. Joy Plants general nursery shot.

## PROPAGATION METHODS

At our nursery, leaf cuttings, rhizome cuttings, root cuttings, stem cuttings, division, tissue culture, fern pups, spores, and seeds are used. Why’s, what’s, and when’s of the propagation methods are outlined below.

### Leaf cuttings

Why? These are normally done when we propagate more plants from small amounts of material. This is not necessarily the fastest method to produce a plant, but it may be a quicker way to bulk up your initial parent stock which may be used to produce other types of propagation material (Figure 3).

When? Leaf cuttings are taken when leaves are at their best and will depend on plants being produced. Many species may be able to have material taken all year while others in the case of bulb species may only have a 3- to 4-week window.

What plants? *Begonia*, *Peperomia*, *Eucomis*, and *Haemanthus*.



Figure 3. Leaf cuttings of *Peperomia*.

## Rhizome cuttings

Why? These are normally made when we have excess rhizome left over from doing division work and pieces of rhizome that are large enough to cut into 2- to 3-cm slices. They are placed on potting medium and covered with pumice sand (Figure 4).

When? These can be taken any time, but most commonly done in spring when most division work is done, and the excess material can be put aside and worked on.

The rhizomes are then put in trays and placed in a cool shady part of the nursery and left till small plantlets start growing. These can be removed once roots form. In some cases, the rhizome can be replaced and in many cases more plantlets are produced until the rhizome rots away.

What plants? *Agapanthus*, *Iris*, *Bergenia*, *Cordyline*, and *Farfugium*.



Figure 4. Rhizome cuttings of *Farfugium japonicum* 'Aureomaculatum'.

## Root cuttings

Why? These are made when there are good roots from many perennials and some tree and shrub species that are easy to produce plants from. This method can produce good plants that may be ready in the following growing season. Because many species are able to be produced in this way it is a good method to bulk up numbers (Figure 5).

When? These are taken when trees and shrubs are lifted in winter and perennials in winter and spring. For best results roots should be the best and normally the largest of the plants roots that can be taken without reducing roots to much which will affect stock plant growth for the growing season.

What plants? *Ajuga*, *Acanthus*, *Pulmonaria*, and *Stokesia*.





Figure 5. Root cuttings of *Stokesia laevis*.

### **Stem cuttings**

Why? This method for many plants is the easiest method for many to produce cultivars of trees shrubs and perennials. The downfall of this method is that a reasonable number of stock plants are required to get large amounts of cutting material to produce larger numbers of cuttings

When? These will be taken all year round and will depend on species and even cultivar and type, e.g., softwoods normally in summer months, semi hardwood in late summer or early autumn, and hardwood in winter and early spring.

What plants? *Coprosma*, *Corokia*, *Dianthus*, *Salvia*, *Hebe*, *Melicytus*, and *Vinca* just to name a few.

### **Tissue culture**

Why? This method is the most hi-tech method of propagation and changed propagation more than any other of the modern-day methods in my view. The issue is, in many cases, this is the most expensive method to bulk up plants, however the good points are that it has cleaned up many plants that had been very difficult to produce by other methods due to viruses or when very little plant material was available. It also has made shifting plant material to and from countries where issues of importation can restrict what can be brought in, e.g., soil material and plant pests (Figure 6).

When? These can be taken out at any time cultures are ready, but we tend to prefer our cultures to be done in early summer and autumn when temperatures are warming up and cooling down.

What plants? *Bergenia*, *Farfugium*, orchids, *Lobelia*, and almost anything you can think of has or is being propagated by this method including tree, food, and flower crops.



Figure 6. Tissue culture plantlets of *Lobelia aberdarica*.

### Division

Why? This method is most common for named perennials and grass cultivars. An easy method of propagating large clumps of plant material into multiple plants with the use of knives, forks, and spades (Figure 7).

When? This is done best as plants just start moving mainly early spring to early summer, but it is possible with some groundcover species to be divided all year round. This is particularly true when it comes to New Zealand natives like *Leptinella* and *Lobelia* species.

What plants? *Carex*, *Iris*, ferns, daisies, *Ajuga*, *Hosta*, *Clivia* and so much more in the perennial lines.



Figure 7. Division of *Lomandra*.



## Spores and pups

Why? This is in some cases the only way to propagate many fern species other than division; pups (Figure 8) are found on some perennials and is an additional method used by us to produce these particular plants.

When? These can only be taken when ready and something that may need constant observation to make best use of your materials. In most cases spores will need to be harvested and dried and then sown within days of spore drop. Pups on the other hand will need placing in propagation medium. Once harvested these are best done in spring to get optimal results and the longest possible growing time with the best temperatures.

What plants - spores? Most fern species we mainly grow including *Adiantum*, *Asplenium*, and *Blechnum*.

What plants - pups? *Asplenium bulbiferum*, *Neomarica*, and *Ajuga*.



Figure 8. Pups on a leaf of *Asplenium bulbiferum*.

## Seed

Why? This method is great for numbers; but for us, this is important when growing natives for revegetation work because we have more diversity which has become more important in recent years with several new pest and diseases having arrived on our shores. The larger the diversity the higher chance of having more resistance occurring than with clonal material. Extinction of plants is always a threat when new pests are found on a species and this can have major consequences not just for one species or genus but a whole chain of plants, fungus, and insect's—whole eco systems can be put at risk. Seed has the advantage of potential new introductions with ornamental or medical possibilities this is why seed production would be my favorite propagation methods.

When? These would be harvested preferably when ripe although some seed can be harvested a little premature, this is not ideal but may be necessary if this is the only opportunity to collect. Other reasons to collect when premature may include if left to fully ripen seed may be eaten or the fall season makes harvesting impossible. Seed sowing will vary, but in many cases, we will sow within days of harvest unless it can be stored and not all seed harvested are need for production at that time. Some of our New Zealand native plant seeds are what we call “green seed” which if not sown very soon after harvesting it loses viability while others will hold better in propagation trays for 2 or more years before germination or before the need to tube. Many species we have found germinate better if left to go through cycles of hot, wet, cold, or dry which if sown and placed outside will break dormancy better than any storage methods in many cases.

This is due to inhibitors in the seed that may require several different temperatures for best results.

What plants? Most New Zealand native species, exotic trees, and many perennial species and bulbs (Figure 9).



Figure 9. Seed cleaning of the native *Pennantia corymbosa*.

## Hybridization

Why? Because we can and we love to see what results may turn up. How else are we to get new cultivars and someone has to do it? But the main reason is to improve on what we have with better forms, new colours, and better cultivars for a wider range of climates.

When? They are in flower or the opportunity arises.

What plants? Whatever takes your fancy, plants that Joy Plants have worked on are *Alstromeria*, *Agapanthus*, *Clivia*, belladonna, *Bergenia*, *Erysium*, *Eucomis*, *Helleborus*, *Iris*, *Libertia*, *Magnolia*, *Phlomis*, *Primula*, *Watsonia*, and a number of additional bulb species (Figure 10).

Hybridization leads into plant selection which I guess is one of the reasons we do it but also the how, when and what fore's. How does one select a new cultivar? It depends on what you are after. When should you make a selection? I think when you have reached the end goal, certainly not until you have improved on what was already available.

## SUMMARY

The best time to propagate something is when the opportunity arises or when someone offers you the material. Take the opportunity or get out of the propagation shed; it's your loss not mine.



Figure 10. Examples of our hybridization program: Top row left to right: *Helleborus*, *Clivia*; Bottom row left to right: *Magnolia*, *Bergenia*.