

PROPAGATION OF PERENNIAL PLANTS

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This paper will consider mainly the herbaceous types of perennials, i.e. those that die down each winter and grow again from ground level.

SEED PROPAGATION

We grow a number of species from seed. Some species reproduce true from seed so long as there is no opportunity for cross fertilisation, but selections with improved characteristics (cultivars) are numerous and must be increased by vegetative means. However, in some cases seedsmen have "fixed" a number of cultivars by line breeding and these breed true or nearly so. These include cultivars of *Aquilegia*, *Althaea rosea* (hollyhocks), *Geum*, and *Delphinium*. However, seed should not be used of heterozygous cultivars. To illustrate this point take a look at aquilegias. The McKenna Long Spurred Hybrids are a lovely mixture of bright colours with large flowers and long spurs. None of the individual colours would breed true. But there are several named cultivars which do — 'Crimson Star' (crimson and white) and 'Nora Barlow' (double pink and green). But for other colours, it is necessary to go back to the species, such as *Aquilegia caerulea*, a species I saw at Kew, 60 cm, with blue and white flowers and *A. longissima*, 70 cm, which has glaucous leaves and 15 cm spurs on the yellow flowers.

The single pyrethrum, *Chrysanthemum coccineum*, is another example. Seed strains of pink and red come sufficiently true to have superseded the old cultivars, 'E.M. Robinson' and 'Harold Robinson', but the named doubles — so scarce in New Zealand — must be grown from divisions. The latter, and cultivars of *Scabiosa caucasica*, should not be divided until growth has begun in spring. Division in autumn in the colder climates can be fatal.

DIVISION

There are a considerable number of cultivars of perennial plants which may be increased from division of the roots quite easily, such as *Aster novae-belgii*, *Helianthus*, *Helenium*, *Monarda*, and *Physostegia*, to suggest just a few. This is normally done in late winter to early spring by which time many of the new growths will have initiated a new root system so that they may be replanted outdoors or potted straight away. In all

cases, when more increase is required top cuttings may be taken when the shoots have reached 20 cm and such cuttings can be rooted under glass.

There are some vigorous perennials, such as *Hostas*, *Hemerocallis*, and *Astilbe*, which develop into large clumps requiring considerable physical effort to break them up. For maximum production it is better to divide and replant each spring but this is not always done so that one can be faced with a solid clump of interlocking roots, say 30 cm across. Two border forks driven back to back and close together into the clump often is the only way to separate them.

In the case of hostas and others it is necessary to use a strong knife, cutting the crown vertically to separate the growth buds, each with a share of the root system. Each strong bud will develop into a satisfactory plant the first season but the full beauty of foliage and flower will not appear until the second or third season.

Alstromeria, on the other hand should be divided and replanted or potted when the plants are dormant at the end of the summer. Even 'Walter Fleming' can be safely handled then and will make new growth before winter.

Paeonia officinalis, *P. lactiflora*, and *P. lobata*, which are hardy tough plants, should be divided in autumn by cutting the roots with a sharp knife to leave one, two, or three eyes on each plant. They may be replanted straight away or potted for sale later. Delay after this time means less growth and fewer, if any, flowers.

PROPAGATION BY CUTTINGS

Perennials which form woody roots are normally propagated by cuttings, first taken in spring from the first flush of growth and subsequently as further suitable growth develops. The cuttings are struck in sand or a peat-pumice mix under close conditions, with or without bottom heat, and after the application of a hormone powder suitable for softwood material. *Lythrum*, *Anthemis*, *Gaura*, *Scrophularia*, *Aster amellus*, and *Gypsophila* 'Rosy Veil' are examples, while the more popular *Gypsophila* 'Flamingo' and *G.* 'Bristol Fairy' need ideal conditions for rooting or else they must be grafted.

Named cultivars of *Lupinus polyphyllus* and *Delphinium elatum*, need special treatment. The roots should be lifted in early winter from open ground, then planted in a cold frame, or a sheltered outdoor site in warmer areas. When growth develops the cuttings are removed when 7 cm long and taken with a solid heel. Often a second and possibly third batch may be taken, after which the stock plants are discarded. Cuttings

of both these plants must be rooted in cool conditions with little or no artificial heat, but shaded if the sun is strong. Hormones will assist rooting.

Campanula persicifolia and some other campanulas make numerous small white shoots around the crowns of 1-year plants. Lift the plants about midwinter and use these small shoots, with or without green leaves, as cuttings made 1½ to 2½ cm long. Dibble them into sand boxes 2½ cm apart with the tips at ground level. Usually every one will root and, if planted out later in light soil, will make good clumps by autumn.

Pelargonium (*Geranium*?) *regale* stock plants should be cut back in late summer while the weather is warm and growth is active. The new growth will provide excellent cuttings for rooting in frames or a cool greenhouse and may be grown on for a good display by the following spring onwards.

Grafting Gypsophilas. The two aforementioned gypsophilas are often grafted to obtain a better "take" than when they are grown from cuttings. Sow seed of *Gypsophila paniculata* in early spring and plant out in early summer to produce a batch of rootstocks for grafting. These are lifted with the root systems complete in the winter and bedded outdoors if necessary. Roots of pencil thickness are cut up into lengths of 7 cm with the tops cut square, but giving the bases a sloping cut. When your stock plants of 'Bristol Fairy' and 'Flamingo' have begun growth the root sections are cleft in the centre and a wedge-shaped scion of the desired cultivar is inserted with the cambium layers lined up on one side. The scion may be held in position in any convenient way but I have seen good results with no binding at all. The grafted roots are dibbled into sand, either in boxes, tubes, or beds and kept in close conditions. The advantage of boxes or tubes is that the plants are more easily hardened off.

ROOT CUTTINGS

A number of kinds of perennials may be propagated by means of root cuttings, which is very convenient. The stock plants should be grown in the open ground rather than in planter bags because thick cuttings root and shoot much better than thin cuttings. Generally they need to be pencil thickness or thicker except in cases where plants normally have thin roots. The following plants are usually propagated by root cuttings: *Papaver orientale*, *Verbascum*, *Romneya coulteri*, *Anchusa italica* and *Catananche caerulea*. The following have thinner roots but the same principles apply: *Primula denticulata*, *Anemone japonica*, *Phlox paniculata*. Phlox plants produced in this way are often free of virus, which is a serious disease in some countries.

Some tuberous plants have numerous dormant eyes, such as tuberous iris, *Acorus calumnus*, *Zantedeschia*, and *Liatris spicata*. It is possible to propagate these by removing the eyes with part of the tuber, treating them with fungicide, and strik-

ing them in a sterilised medium. With *Zantedeschia* the fungicide treatment is especially important, as the corms decay easily if damaged. The tubers should be in a dormant state.

FOLIAGE CUTTINGS

Lachenalia aloides 'Pearsonii' may be increased by cutting the mature foliage horizontally into strips 8 cm wide, treating with hormones, and setting the sections into sand boxes, lower edge in the sand, in a cool greenhouse. Numerous small bulbs will form on this edge and, in due course, may be separately boxed.

Haemanthus katherinae may be propagated in this manner, inserting the leaf cuttings in mid-summer. I have propagated from a partly decayed corm of *H. natalensis* by sterilising with Benlate (benomyl) and placing in sand. Some 25 cormlets developed in 2 years and it is still producing. I would expect *H. mutliflorus* and *H. katherinae* to behave in the same way.

MIST PROPAGATION

Generally speaking only a few herbaceous perennials get any benefit from mist propagation and, in the cases of pelargoniums (all types) and silver-leaved plants, mist is positively harmful and leads to a lot of stem rot.

GERMINATING EUCALYPT SEEDS

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Abstract. The optimum germination temperatures were determined for *Eucalyptus* species which failed to germinate satisfactorily at 25°C, using a range of temperatures (15 to 35°C), and including pre-chilling for some species. A broad relationship was found to occur between the optimum temperature for germination and the climatic conditions in which a species occurs naturally.

INTRODUCTION

There are over 500 species of *Eucalyptus*; some are tall trees while others are shrubs. Most species are native to Australia but a few are also native to the Phillipines, New Guinea, and Timor. Two species, *E. deglupta* and *E. urophylla*, do not occur naturally in Australia. In New Zealand some species have naturalized, e.g. *E. tereticornis* (forest red gum); others are grown as ornamentals, e.g. *E. ficifolia* (red flowering gum), or for timber, e.g. *E. saligna* (Sydney blue gum).

The earliest mention of eucalypts naturalizing around Auckland, New Zealand (Karaka District) appears to be that of