

## Using the Opportunities for Geranium Propagation

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**A range of techniques, both modern and traditional, for the propagation of *Geranium* species and cultivars are considered. The assessments are set in the context of a growing market for herbaceous perennials with customers demanding both new introductions and a continuous supply of established cultivars.**

### INTRODUCTION

A successful herbaceous producer must be able to supply plants suitable for a variety of purposes and markets. Geraniums are currently very fashionable in Great Britain with many exciting new cultivars like *Geranium*  $\times$ *riverleaianum* 'Mavis Simpson' helping to stimulate a market also boosted by media coverage. Among the 400 or so species and cultivars of *Geranium* available in Great Britain there are plants for nearly all market niches.

Various factors will determine the production technique to be used on any particular nursery. Some techniques will be preferred for convenience or necessity to make the operation work but may not initially appear to be the cheapest and simplest method. This paper details the solutions evolved by Howard & Kooij's Nurseries to produce 173,000 geraniums of approximately 40 cultivars, while spreading the work-load throughout the year and fitting in with demands of propagating many other genera.

### OPTIONS FOR GERANIUM PROPAGATION

The geraniums considered in this paper are the perennial species that essentially consist of a rootstock which can produce vegetative and flowering stems. Within the basic structure the species vary widely, creating a range of opportunities for propagation.

The rootstock is made up of a permanent stem and the root arising from it. This root can be thick and form buds readily, as in *G. sanguineum*, offering the chance of root propagation.

Division is often the first choice for propagation. *Geranium endressii* and its hybrids are typical of the clump-forming plants that lend themselves to division. The rooted stem usually has short internodes but some species have longer internodes to become a stout rhizome, tuber, or even creeping stolons, again providing potential propagation pieces. *Geranium macrorrhizum* is typical of rhizome-forming species while *G. orientalitibeticum* produces tuberous roots.

Some rootstocks can become woody or the stock remains small producing trailing stems, making them difficult, if not impossible, to divide. Then cuttings have to be considered—either heeled cuttings taken early in the spring or stem cuttings in early summer. Heeled material can readily be obtained from plants, such as *G.  $\times$ riverleaianum* 'Russell Prichard'. The branching, short-lived aerial stems of many species are really inflorescences and will not root readily. In other species,

nearly all the foliage leaves are borne on flowering stems and are more persistent, e.g. *G. wallichianum*, so stem cuttings are possible.

*Geranium procurrens* is unusual because its flowering stems run along the ground and take root so stem cuttings can definitely be considered, but its hybrid, 'Ann Folkard', does not root itself readily so tissue culture has to be considered.

Choice of propagation technique is also determined by the intended market. At Howard & Kooij's Nurseries the aim is to grow field-grown material on a 1-year system to produce strong, young rootstocks that a customer could divide into 3 or 4 divisions for planting or potting should they wish.

The plants can be grown in a single batch for sale during the dormant period, typically October to April. Division at a suitable time of year is ideal for this production.

For container production, it becomes necessary to produce plants in batches for sale in flower if possible. Here cuttings, and ultimately tissue culture, allow more accurate programming. The control offered by propagating in modules also comes into play here.

## PROPAGATION BY DIVISION

Traditionally gardeners carry out division while plants are dormant but commercially this is often impractical as this clashes with the main sales period for field-grown stock. Geraniums, however, can be divided successfully over a surprisingly long period. The principal period for division at Howard & Kooij's is April to June. Typically the first species divided would include those that also provide heeled cutting material, e.g. *G. ×riversleaianum* 'Russell Prichard', *G. renardii*, *G. nodosum*, and species, such as *G. psilostemon*, which are more sensitive to cutting back of their foliage.

Next, *G. macrorrhizum* cultivars, *G. ×cantabrigiense* cultivars, *G. sylvaticum* cultivars, *G. pratense* 'Mrs Kendall Clark', and *G.* 'Johnson's Blue' where simple division often provides sufficient stock. Practical necessity often means *G. ×oxonianum* cultivars, *G. clarkei* cultivars, *G. ×monacense*, and *G. ×magnificum* are divided in May and June when well into growth and even flowering, but these species readily throw up new shoots.

Another window for division exists during October and November as plants become dormant. At this time of the year the split pieces could be replanted directly but cool soil could lead to poor establishment while weeds would need to be controlled before the re-emergence of the geraniums in the spring. At Howard & Kooij's Nurseries we prefer to store these splits outdoors in boxes filled with peat, ready to be planted out in February or March. This method has been used to reduce spring division work load on *G. himalayense* 'Gravetye', *G. ×magnificum*, and *G. ×oxonianum* 'Winscombe' for example.

**Some Tips to Minimise Damage and Improve Establishment.** Firstly, propagation staff should be encouraged to look and feel for the natural divisions in the clump. An experienced splitter will readily pick these up, usually using their thumbs as the main guide. Plants, such as *G. ×oxonianum* cultivars, will readily pull down into these natural division.

The next progression is to use a sharp knife to nick the plant so that it will again pull apart with minimum wounds. The last resort is to pass the knife through the centre of the clump causing large wounds, but with compact rootstocks, such as *G.*

*psilostemon*, this is often unavoidable. The use of a 1-year growing system means that division is carried out on young active crowns with little wastage resulting from dead centres and damage can be minimised because forks and spades are not required to smash the plants apart.

The end product of the division process is a split plant with roots trimmed back to 8 to 10 cm for planting and with 1 to 3 strong shoots. The extent to which foliage can be trimmed depends on the species. Early in the growing season it can often be avoided but typically stems are cut back to 10 to 12 cm. It is expected that damaged stems will die back but the main function will be to protect the new leaf in the centre of the division during planting, especially if planting is mechanised as at Howard & Kooij's Nurseries. *Geranium psilostemon* is an example where success depends on doing the minimum damage to the foliage.

**Use of Material from Saleable Stock.** Splits and cuttings can be obtained from saleable plants during the winter if they are larger than the size required by customers. The pieces obtained can be peat stored as with other splits and planted out in the spring. This is often done with plants that are in short supply, e.g., *G. clarkei* 'Kashmir Purple' or *G.* 'Johnson's Blue'. But it is a costly procedure and one that should only be used as a last resort as the customer may receive a damaged plant and may well have been hoping to take propagating material from it themselves.

### PROPAGATION BY HEELED CUTTINGS

These are young shoots removed with a nick from a knife so that a piece of old stem comes away with them from the root stock. Typical geraniums propagated by heeled cuttings include *G. x riversleaianum* cultivars and *G. renardii*. Heeled material is generally taken while the plant is dormant and so can be collected from saleable plants in short supply or as plants start into growth in the spring. Therefore, the technique can be valuable for difficult cultivars, such as *G.* 'Ann Folkard' or *G. cinereum* cultivars.

An important part of the process is placing the cuttings in a warm, moist environment to encourage rapid growth but success declines rapidly if cuttings are already in vigorous growth when taken. At Howard & Kooij's we use 150- or 77-unit modular trays according to the size of the heel, filled with Levington F2 peat-based compost.

Cuttings are rooted in a glasshouse with cable-heated sand beds, under mist if plants are in growth. Mini Osmocote fertiliser may be added to the compost mix in the autumn to carry cuttings through to spring potting and planting.

In the past, heeled cuttings have also been inserted in open-ground nursery beds between November and March and covered by low polythene tunnels. The old system gave reasonable takes but was costly to weed and lift plants ready for lining out in the fields. The modules reduce the transplant shock associated with planting or potting, improve uniformity, and permit a longer season for taking heels as material may be rooted under the mist in April or May.

Recently we have been extending the use of modules for material that is not strictly heeled cuttings but is more like miniature splits, pieces of rootstock possessing roots and leaves but too delicate to treat directly as splits or potting pieces. The use of the modular stage under mist improves success rates when transplanted and can give 100% establishment in pots. Such material can be

obtained at nearly any time of the year, for batch production of plants, such as *G. himalayense* 'Gravetye' and *G. xoxonianum* 'Wargrave Pink', for sale in flower in pots. For example, late June cutting pieces can produce plants for sale in September to October.

### PROPAGATION BY STEM CUTTINGS

Once the time for heeled cuttings has passed and plants are in active growth in May or June it is possible to take cuttings from the flowering stems of a few species. The stems should be cut into pieces with the cut just below the node. The cuttings are treated with 0.5% Synergol rooting hormone and inserted in Levington F2 compost in 150-unit modular trays under mist.

The technique only works well if the resulting plants have time to form resting buds once potted. Cuttings taken from July onwards will root but only produce long trailing flowering stems and the plants frequently die with the onset of autumn.

This technique should be considered for building up new cultivars, such as *G. xriverleaianum* 'Mavis Simpson', and otherwise slow cultivars, such as *G.* 'Ann Folkard', but it is problematic and I would not recommend it for general geranium propagation.

### PROPAGATION FROM ROOT CUTTINGS

A traditional low-tech means of propagation is from root cuttings which can be remarkably effective when a little thought is applied to the handling of the job.

*Geranium sanguineum* and its cultivars are typical sources of root cuttings but sections of the rhizomes of *G. macrorrhizum*, *G. dalmaticum*, and *G. xcantabrigiense* can be treated in a similar manner. Propagation material may be collected at any time while the plants are dormant but February to March would be usual for these species. Two-year-old stock plants provide the best root cuttings.

Ideal geranium root cuttings are 4 to 5 cm long and 6 to 8 mm thick. Maintaining correct polarity is important but rather than use the traditional slanting cut to indicate the distal end of the cutting, propagators at Howard and Kooij's are trained to store cuttings with the proximal end facing the outside of the box, saving considerably on cutting time. The root cuttings are stood up in a sand and perlite mix covered by 4 to 5 mm of the mix.

Finished boxes can be placed in glasshouses or polytunnels and kept frost free until the cuttings have well-developed shoots. They are then hardened off outside, shading if necessary. A sand and perlite (5% to 10%) mix is used because this facilitates rapid knocking out of the rooted cuttings. Crops can be timed so that they are just beginning to draw new root when potted or planted in April to May. Up to this point cuttings merely require regular watering and survive on their own nutrient reserves.

If peat, or another medium on which young roots can take a hold is used, handling of the cuttings is slowed considerably and root damage increases. The sand and perlite medium gives 90% to 100% takes and, because it is free draining, loss resulting from root rots is minimal.

### PROPAGATION FROM TISSUE CULTURE

Generally geraniums propagate readily and quickly by conventional means. There are some cultivars with high merit as garden plants that are slow by division and

difficult by cuttings, for example *G.* 'Ann Folkard', that could justify the expense and effort of tissue-culture propagation. Tissue culture, like cutting production, offers the chance to produce in batches for successional sale in flower. The danger is rapid over-supply, especially if nurserymen propagate-on from their tissue-cultured plants.

### **PROPAGATION BY SEED**

Seed is of value for raising new cultivars and propagating species—quite a few of which will come true providing there are no other compatible species near the parent. Some species, such as *G. endressii* and *G. pratense*, are notoriously cross-fertile.

Geranium seed is dispersed by the explosive break up of the rostrum as it dries out. Close attention must be paid to catching seed pods just as they ripen. Fortunately most cultivars flower and set seed over a long period. As well as species some cultivars come true from seed, e.g. *G. wallichianum* 'Buxton's Variety'.

Once collected, seed may require a period of after-ripening by storing in a paper bag in a warm place. Autumn sowing in modules is possible, provided the seedlings can be over-wintered under protection. If not, sowing can be delayed to the spring.

Germination may be prolonged, with the main flush not taking place till spring. This means it is often quicker to propagate by division and cuttings.