

Some Aspects of Stock Plant Management®

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INTRODUCTION

For a nursery to have a good stock of mother plants is like having money in the bank. An asset of guaranteed vegetative stock material gives assurance, for on-going production and continuity of supply to customers. A wide range of stock plants gives production a choice of diversity, flexibility, and peace of mind for planning ahead, and also allows the luxury of variety and change.

To yield high quality propagation material however, the mother plants have to be managed correctly to give best results, if mismanaged or neglected the mother plants can quickly become a valueless liability. At Duncan and Davies, depending on genera and species, our mother plants generally can be divided into four basic groups:

- 1) In-ground, longer-term, permanent stock, planted out in stock bed rows.
- 2) In-ground, short-term, nursery row, temporary stock.
- 3) Containerised temporary stock:
 - From saleable potted crops where conformation trimming can yield useful cutting material or scion wood.
 - Liner grade plants where tipping to promote bushy young plants can provide useful propagation material.
- 4) Permanent containerised stock.
 - Herbaceous perennial type species, where dividing the plant material gives new crops, e.g., *Liriope*, *Phormium*, etc.
 - Species to be propagated from root cuttings such as *Albizia* or *Toona* (syn. *Cedrela*) cultivars.
 - Production from rhizomes, e.g., *Yucca*, *Cordyline*, etc. These are easier to handle when grown for propagation purposes in containers of the appropriate size.

PERMANENT IN-GROUND MOTHER STOCK

This is arguably the best system to use for permanent stock plants. Duncan and Davies have had at various times in the past up to 35 acres of mother stock plants in ground, at present approximately 18 acres. Stock of the main plant groups that are grown by the nursery, are considered to be the likely on-going money earners for the immediate foreseeable future. Provided suitable land is available and thought is given to layout, shelter, and irrigation; this permanent stock will give the business some assurance for its future production. However, extra labour is required to manage this asset and together with land costs, are not likely to be highly profitable but rather giving a “peace of mind” to the necessary availability of production material.

Before planting permanent stock, suitable site aspects should be carefully considered: land available at reasonable cost, sheltered for wind tender species, good drainage, frost pockets noted, soil nutrient tests undertaken, any flooding possibilities assessed, access to irrigation, and rabbit fencing considered. Consider how the

area is to be maintained: access inter-row for various mechanised activities, spraying herbicides and therapeutants, and allowing extra row width for the dimensions of the plant species and mechanical operations.

When planting mother stock we have grouped by crop types. Genera of evergreen shrubs together, camellias, conifers, deciduous shrubs, maples (*Acer*), magnolias, deciduous-tree species planted together to give a convenience for operational procedures. Arranging rows, generally 2.5 m apart, with hardy species rowed to give wind protection and shelter to tender species where required, allowing space for inter-row mowing, etc. By planting together genera that require similar maintenance, pruning, spraying, etc., the rowed system takes on some order.

Spacing within the rows varies with the size and type of plant. A larger gap is left at change of cultivar so that labels are clearly visible. With over 2500 cultivars of a broad range of trees and shrubs we have had to devise a cost-effective and workable labelling system. Our original system provided sticky backed printed labels, adhered to aluminium strips, stapled over the name tape and aluminium into a pine stake, approximately 50 cm long. More recently computer generated labels of synthetic plastic card treated with ultra violet light (UV) inhibitors, printed with UV-protected inks, stapled directly to the pine stake, have superseded the sticky backed label method. Labels show genus, species, and cultivar names.

Stock-Bed Records. Stock-bed records, (stock-bed computer files) and printed lists containing:

- Genus, species, and cultivar name.
- Area location (block number).
- Row number.
- Number of plants in that location, presented in two formats.

The first is a basic alphabetical listing of all plant's and location details, to make it easy to find any particular plants location. The second is a locational listing by row, recorded in order of planting, left to right, front to back (Table 1).

Table 1. Stock bed location P52.

Name	Block location	Row (no.)	Plants (no.)
<i>Magnolia stellata</i> 'Jane Platt' (syn. <i>M. × loebneri stellata</i> 'Jane Platt')	P52	1	15
<i>Magnolia liliiflora</i> 'Nigra'	P52	1	10
<i>Magnolia stellata</i> 'Dawn' (syn. <i>M. × loebneri stellata</i> 'Dawn')	P52	1	15
<i>Magnolia × loebneri</i> 'Green Mist'	P52	2	10
<i>Magnolia</i> 'Susan'	P52	2	22
<i>Magnolia × loebneri</i> 'Pink Cloud'	P52	2	8
<i>Magnolia liliiflora</i>	P52	3	10
<i>Magnolia stellata</i> 'Royal Star' (syn. <i>M. × loebneri stellata</i> 'Royal Star')	P52	3	15
<i>Magnolia</i> 'Pinkie'	P52	3	15

This (by location listing,) makes ease of locating each cultivar in the stock bed block and row. If labels should inadvertently get dislodged they can be readily replaced, with complete assurance, in the correct position.

Maintenance. Soil nutrient tests are undertaken to ascertain the annual fertilizer requirements, which may be made in spring or autumn, depending on the genus and or propagation period nominated for that genus. Regular herbicide and therapeutic spraying is essential to keep the stock plants and their environs in a clean and healthy state, with “crop scouting” used to pinpoint any extra remedial treatments needed.

Stock plants within the row can be planted through black polyethylene mulch, which can be very useful in the establishment stage, assisting with moisture retention in the soil and in weed control around the stem base. Weed matting is also very useful and should be used when planting widely spaced cultivars and for wisteria species, where the widely ground-spreading juvenile runners are selected for propagation. The best cutting results are obtained from stem cuttings. The weed matting eliminates the need for herbicides that can damage spreading runners.

As an alternative to inter-row herbicide weed control, grassing down and mowing should be considered. We have used rye grass and white clover inter-row, which assists with conservation of humus, reducing erosion and herbicide residues in our light volcanic loam soils, with the clover fixing some nitrogen.

Pruning and Hedging. This is a vital part of stock bed maintenance, necessary as vigour and rejuvenation is desired for each fresh crop of stem cuttings or scion wood as needed on a seasonal basis. The advantages of hedging are:

- Increased vigour, and an increase in the number of cuttings produced.
- Promotes a vegetative state that improves cutting rooting and vitality.
- Shapes and controls plant growth, improving ease of collection and general maintenance.
- With correct timing, produces growth to reach the desired state of maturity at the optimum time for best cutting or scion utilization.
- Timing of pruning can be altered to manipulate growth, (within plant capability) to fit tight or varying production schedules.

Depending on the genera, one annual trimming with additional heavier pruning to keep the stock plant within a workable framework is generally all that is required, but a secondary trim can promote further shoot breaks providing another flush if required. A renovation of mature stock plants every 2 or 3 years is recommended, pruning heavily into the framework to promote a rejuvenated replacement branching of the plant. Variegated-foliaged stock plants that throw the occasional reverted shoots, can be selectively pruned, removing reverted shoots to promote the true variegated form.

Plant Library. It is important to plant a few permanent stock as reference plants, of genera and species that are propagated from temporary stock origins, to return to, if sources of temporary stock fail. Temporary stock can be vulnerable to becoming mixed, or may fail through disease, etc. Reference plants or a small number of backup stock can be particularly important as a fall back with particularly difficult crops, such as some *Acer* cultivars, where variable seasonal weather conditions can, in some seasons, cause high losses in some field-budded crops.

Stooling. With crops that respond best to propagation from etiolated stem bases, another stock cropping method is used. Duncan and Davies have utilized this method for *Corylus avellana* cultivars, *Malus* understocks, and *Hamamelis* × *intermedia* understock production, where other sources were unavailable. Established stoolbeds are pruned to within a few inches of the base, to promote multiple low branching shoots. These shoots are allowed to grow undisturbed until late spring to early summer (November), when humus-enriched soil is banked up over the bases of the shoots. This is repeated again in December if required. This covering of humus soil etiolates the basal stem tissues, which stimulates the formation of root initials and roots at the base of each shoot.

The following winter the mounded soil is raked away to enable the shoots to be harvested — cut just above the stock framework with the etiolated stem bases, root initials, and or roots included with the severed stems. These hardwood stems are then planted out into nursery rows in the normal manner. The stock plants shoot again in spring with the moulding of shoots repeated in early summer. We have found the best spacing of stooled stock plants to be 2 to 2.5 m between rows to allow space for mechanical incorporation of humus material and the moulding up process, which can be rather laborious if done manually.

Useful Life of Stock Plants. Most genera and species of plants have a limit to the length of time that they should be considered useful for vegetative propagation purposes. This is obviously a varying period for different genera, and other than age, other factors, such as climate, soil, fertility, etc., good nursery practice, and maintenance all play their part. Over time the vegetative vigour and juvenility of youth diminishes, and health and vitality becomes influenced by factors such as pests and diseases, reduced nutrient availability, seasonal stress influences induced by weather variances, pollution, and herbicide residues. Physiological maturation influences, the demands of flowering and seed production, take their toll on the vegetative vigour that the propagator has utilized to advantage in the past seasons. Reduced juvenile and vegetative vigour generally result in a decline in results achieved when propagating from older vegetative cutting and scion material.

A new stock source, or a replacement programme for permanent stock for ongoing top production needs to be implemented. Time periods of useful vegetative production for such crops as hebe and lavender, may be relatively short, as their mature flowering stage is quickly reached. Other genera may however not reach maturity for many years, and their useful vegetative life for the propagator will likewise be longer.

Some plants signal their change, many conifers having distinctive juvenile foliage characters that can change dramatically when adulthood approaches. The propagator needs to be aware of these physiological changes taking place to the plants in his stock beds. A stock plant replacement programme, with sufficient lead in time to allow the new plants to be usefully productive, should be introduced before the established stock matures beyond economic productiveness.

NURSERY ROW IN GROUND TEMPORARY STOCK

In the production of field-grown nursery stock of larger grades or specimen plants, in ground for 2 or 3 years or more, the pruning and shaping processes can produce good quantities of excellent propagation material. The utilization of this vigorous, more

juvenile, healthy material has, at Duncan and Davies, given high rooting percentages and excellent vitality of the resulting liner plants. With field-budded crops too, improved bud takes have resulted from vigorous-nursery-row-collected scion wood. Examples of genera showing good responses from this type of material include:

- From stem cuttings, hardy hybrid rhododendrons.
- Half ripe summer cuttings: deciduous Azalea, *Rhododendron molle* and Ilam hybrids, and *Pseudopanax* species and cultivars.
- From nursery row scion wood: *Acer palmatum* cultivars, *Cercis* species, and cultivars, *Cornus* species and cultivars.

Disadvantages of propagation from this source of material are that careful “true-to-type” checking is needed to ensure the integrity of the cultivar is not jeopardised by mixes. Rouge out of any suspected mix to maintain the cultivar line. This can be problematical with cultivars that have very similar vegetative characteristics, that may look the same until mature traits or blooms are evident.

When this temporary propagation source crop is sold, the stock opportunities are lost. A few plants of each cultivar should be planted as permanent “fall back” stock, from which a new start can be made, should any untoward difficulty occur in production.

CONTAINERISED TEMPORARY NURSERY STOCK

- This can have the same disadvantages as other temporary stock sources, with a careful watch needed at all stages to maintain cultivar integrity. However this can be a most useful source of propagation material and should not be overlooked if material is required. It can be most advantageous for short-term quick turnover products grown in small pots on a short seasonal rotation, such as evergreen azaleas, lavender cultivars, *Daphne odora*, etc., where crop tipping to encourage branching can be used as a cutting source. Container crops can be forced under cover to give earlier material, or more rapid successive batches when bulking a new variety.
- Liner-grade growing-on lines (GOLs) can also be used, where the tipping to produce a bushy grade branching young plant, can be a useful source of cutting material. We have used such crops as evergreen azaleas, *Deutzia*, *Philadelphus*, *Forsythia*, and others in this way.

CONTAINERISED PERMANENT STOCK

- Container-grown herbaceous perennial crops, such as *Astelia*, *Phormium* (New Zealand flax), *Liriope*, *Ophiopogon*, and others, that are perpetuated by division, where manipulated nutrient levels and or root restriction can promote heavier production of offsets. This can give an improved production out turn. With *Phormium*, the retention of the smaller more juvenile offsets for new stock is desirable, with the larger, stronger, less juvenile fans, potted on for sale.
- Containerised stock has benefits where propagation from root cuttings is to be undertaken. Growing this stock in containers of

appropriate size makes “bare rooting” without loss of root material easier. After selecting and thinning of roots for propagation without too much undue stress, plants can be repotted for sale or future stock purposes. Genera that can be used in this way include: *Toona sinensis* ‘Flamingo’, *Albizia julibrissin* cultivars, *Daphne bholua* selections, *Romneya coulteri*, and others.

- Container-grown stock, of genera to be propagated from below ground rhizome sections. Species handled to advantage in this way include *Yucca* species and cultivars and *Cordyline* species and cultivars. With *C. australis* and *C. banksii* hybrids, it is a useful initial propagation method to increase mother stock, and to provide multiple initiations for tissue culture propagation in bulk numbers.

CONCLUSION

Permanent mother stock in ground gives the nurseryman a guaranteed source of propagation material, but must periodically be renewed when it declines in juvenile vigour and vitality. Temporary mother stock on the other hand, is usually young and healthy being replaced frequently, but is not always available when required, is more easily mixed, and does not give the full “peace of mind” assurances that a permanent stock bed offers.