COMMERCIAL ASPECTS OF DIRECT STICKING OF CUTTINGS AT HILLIERS

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Abstract. "Direct sticking" is defined as the insertion of a cutting(s) into an individual receptacle. Direct sticking into a liner, intermediate, or final pot may be appropriate. By blending pine bark with blends of different grades of peat to which controlled release fertilizers (C.R.F.) are added, a medium with an air filled porosity (A.F.P.) of 20% or more can be obtained and good nutritional status achieved. This is able to serve as a combined rooting/growing medium. The choice of receptacle (container) size is dependent upon the final objective of producing rooted material. Advantages of this system include quicker and higher quality plant production. Disadvantages involve the higher input required at the propagation phrase.

Definition of terms. What is normally understood by the term, "direct sticking", is the insertion of an unrooted cutting or cuttings directly into an individual receptacle. This enables the rooted material to be subsequently handled without being shaken apart and reduced to a bare root or semi-bare stage before potting off or planting out.

To some growers direct sticking implies the insertion of one or more cuttings directly into the container into which they are to be sold. It may, therefore, be appropriate to add to the term an explanation of the type of container into which the cuttings are placed, e.g.:
— direct sticking into liner pots/cells/blocks.
— direct sticking into intermediate pots.
— direct sticking into final pots.

Rooting/growing media. As long ago as 1959 Peter Vermeulen in a paper to the IPPS recognised that new developments in compost additives had made the concept of a rooting/growing medium much more feasible than previously. Further understanding of the factors and materials which affect crucial features such as porosity and aeration, and the provision of appropriate levels of nutrition have all helped in the development of suitable media for rooting cuttings and allowing them to be subsequently grown on in the same medium.

Because larger containers have better internal drainage and aeration characteristics, the use of rooting/growing media has been more commonly seen in these. Small "cells" and "liner pots" require that more emphasis be placed on rooting rather than on growing medium aspects. In general, the use of synthetic materials to produce blocks and the finer-textured peats compressed into blocks or plugs, have not provided an

answer to the rooting problems associated with the whole range of difficult-to-root species grown on the nursery.

MEDIA USED AT HILLIERS

(1) Physical Ingredients

(a) *Containers up to and including 8.5 × 8.5 cm square or diameter.*

At present we use pure fine Cambark, which is pine bark pulverised to produce particles from dust to ¼ in. diameter. To this is added controlled fertilisers according to the guidelines shown in Section 2.

For ericaceous subjects Hilliers use a mixture of 50% Cambark 100 (pine bark produced to give approximate particle size within the limits ¼ to ½ in. in diameter), and 50% peat. The peat is a blend of coarse grade Irish and very fibrous Finnish peat (Finn Fibre). This mixture gives an A.F.P. normally in excess of 20% or more commonly 22 to 23%, as measured by the A.D.A.S. method.

It seems likely that in the future Hilliers may increasingly use the bark:peat mix rather than pure fine bark for all species. The addition of peat appears to aid the production of a heavier quality liner and makes subsequent culture easier, especially if the containers of rooted plants are not potted on quickly. The big advantage of 100% bark is that no mixing is required before filling the containers.

(b) *Containers of 9 × 9 cm (square or diameter) and above up to 3 liters.*

Into these are always placed mixtures of bark and peat fortified with C.R.F. Because of the better aeration characteristics of the larger containers Hilliers use a blend of somewhat finer grade peats than mentioned previously, up to 40% of the total peat content being medium grade Irish or Scottish peats. The addition of finer peats means that subsequent culture of the plants is made even more easy, the mixture being reasonably well-buffered and having good moisture retention properties.

Recently Hilliers have added polyacrylic gels (Broadleaf P4) to the mixture to further enhance aeration and moisture holding. The normal medium used at Hillier's now comprises:

40 to 45% Cambark 100, plus
55 to 60% peat blend, comprised of:
40% Scottish peat, 30% coarse Irish, and 30% Finnish Fibre

The exact proportion of bark:peat is adjusted according to

the propagation system (coarse mist vs. fog), the time of year, and the species.

To the above is added 1 to 1.75g of pre-hydrated Broadleaf P4 per cubic metre of the bark:peat mix.

In all cases containers are filled by mechanically trickling the rooting/growing medium into them. No further firming is carried out before insertion of cuttings. In practice this means that cuttings inserted in the summer/autumn of year one need some topping up by late spring of year two unless, as is usually the case, they are potted on.

(2) **Addition of controlled-release fertiliser (C.R.F.)**

The factors considered when adding C.R.F. are:
a) Percentage of bark
b) Length of time cuttings require to take root.
c) Whether or not artificial bottom heat is used.
d) Conditions under which rooting takes place, i.e. fog or polythene, etc.
e) The season at which the propagation takes place.

The C.R.F.s used are Osmocote (16:9:9), 16 to 18 months formulation, and Ficote 140 (17:10:10), 12 to 14 months formulation. Because the release patterns of these products differ and because their release is influenced by different factors they are normally blended in varying proportions according to the guide-lines as follows:-

With or without bottom heat, summer -

Fast rooting: early nutrient requirement, bottom heat unlikely to be significant as temperatures are high throughout. Use high proportion of Ficote.

Early autumn - rooting somewhat slower but affected by bottom heat. Higher proportion (say equal) of Osmocote. Without bottom heat, higher proportion of Ficote to make up for slower release.

Late autumn - rooting is slower, with or without bottom heat; with bottom heat, little Ficote or too much nutrient released too soon. Without bottom heat, more Ficote to make up for slower release.

General Rates of C.R.F. to Apply:-

100% bark

Summer	2.25 Kg/cu.m
↓	
Late autumn	1.05- 2Kg/cu.m

(Bottom heat→cold)

50:50 bark:peat
Summer 2.25 Kg/cu.m
↓
Late autumn 1.00 - 1.05 Kg/cu.m
(Bottom heat—cold)

Note: in the case of 100% bark mixes the C.R.F. is applied to the base of the pot only, before filling the pot.

Pot Sizes. Normally 7.5 × 7.5 cm. pots are used as the main "liner pot" for direct rooting. Into this, containing pure fine Cambark, or the 1:1 peat:bark mix mentioned, is inserted cuttings of some species and cuttings of virtually every genera grown by Hilliers.

Rooting results have been equal or better than results achieved by conventional rooting into boxes or beds. By inserting more than one cutting into the liner pots, 95% + rooting can be ensured for virtually all species. Cuttings of the difficult species, e.g. deciduous azaleas and *Syringa vulgaris* cultivars are still stuck in boxes in the conventional way. Then 9 × 9 cm and 1-litre pots are used as an "intermediate" pot, that is, something for growing an extra heavy liner before final potting. This container, filled with the rooting/growing medium is used to produce a wide range of species but especially some of the flowering shrubs such as *Potentilla, Philadelphus, Weigela, Buddleia*, etc.

Finally, 1½, 2, and 3 litre pots are regarded as the pots from which the plants are sold directly. The smaller sizes are normally used as an Amenity Grade whilst 3 litre pots can produce Garden Grade plants. *Buddleia* is the most commonly used species for direct cutting insertion into 3 litre pots. Three vigorous cuttings of *Buddleia davidii* cvs. inserted into 3 litre pots in mid-July will be good quality saleable products by the following April. *Cornus alba* 'Sibirica' or *C. alba* 'Spaethii'LA 79' normally requires until the following autumn to produce saleable plants.

All plants rooted into rooting/growing media require supplementary feeding in the spring following rooting. This can be supplied as Sierrablen, Glasgro granular compound fertilisers, or a liquid feed, according to the grower's particular circumstances.

Advantages of Direct Sticking:

1. Highly suitable for container production
2. Avoids root damage/disturbance
3. Saves labour in overall production
4. Produces a saleable plant substantially more quickly (up to one growing season saved)
5. Can produce better quality plants

6. More flexibility in subsequent handling/potting-on procedures
7. Possible reduction in disease, especially in propagation phase
8. Higher percentage out-turn of saleable plants from initial number of receptacles produced.

Disadvantages of Direct Sticking

1. Substantially more propagation facilities required (× 3 to × 15)
2. More labour involved at propagation phase
3. Materials cost higher at propagation phase
4. Care in nutrition (feeding) required
5. Care in spacing to maintain quality
6. Rooting-through can be a problem
7. Because of the high A.F.P. final pots dry out readily
8. More winter protection required the first winter

VEGETABLE PLANT RAISING USING SPEEDLING TRANSPLANTS

JOHN COOLEY

Modular Transplants
Springfield Nursery
Pick Hill, Waltham Abbey, Essex

My objective as a plant raiser, is to enable my customer, the intensive vegetable farmer, to reduce his unit cost of end product; for example, a crate of cauliflowers. In order to do this, the system I use has to be economical but, above all, has to give a high percentage yield of uniform, marketable produce which brings the unit cost down.

Traditionally, vegetable growers have direct-seeded into their fields, or thickly sown in one field or greenhouse then pulled the plants and transplanted them into their final position in the field.

When I became involved in plant raising, growers were starting to use the first form of module — the peat block — which was having some success, especially with lettuce. This technology had come from Holland where the system was well developed, albeit mainly for glasshouse growers. Production of peat blocks in Holland was highly mechanized and was a large industry. However there were disadvantages in this system when used by outdoor vegetable growers in the U.K. mainly because of the slow development of roots into the field soil and the peat block's inability to re-wet if it dries out.