YOUNG PLANT PRODUCTION

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This paper deals with plant production in two sections: (A.) the setting up of the production unit and (B.) practicalities of propagation and production on the resultant nursery.

A. **Setting up the Production Unit.** Points to consider before choosing the site.

1. Type of nursery it is to be: for example, Pot Grown, Field Grown, etc.
2. The location (this was decided before-hand in my case), and the size of the piece of land (3 acres in my case).
3. Accessability of the site to road, water and electricity.
4. Ease of location of the site; e.g. situated on a main road, etc.
5. Location of horticultural suppliers.
6. The physical properties of the site. These include: soil type, frost pockets, drainage, liability to flood and exposure to wind.

The site was then tile-drained and subsoiled so as to improve soil structure etc., as the parent soil was of a clay loam type.

The main areas of the nursery were:

1. Stock plants
2. Cold frames (low capital cost)
3. Growing areas
4. Standing out/Collecting Area

1. The first step was to plant the stock plants with the main cultivars grouped. The rows were, on average, 3′ apart.

2. The cold frames were then constructed on the driest part of the nursery; railway sleeper sides were used to the width of 4′6″ internal measurement. The length of the frames is 50′. Dutch lights are used for the covering. Water was then laid on to the maximum bore available which was only 1 inch, so a 5,000 gallon reservoir was installed with a Grundens CP 3R pump. Enough stand pipes were installed so as to reduce to a minimum hose pipe movement.

3. A 80 × 14′ Dutch Light House was erected for growing and later housed a mist unit. A second-hand 10′ × 8′ shed was bought for potting, etc. An access road was put into the site making sure it included a large turning space for lorries with standing out beds adjacent for ease of loading.

During this second year a mist unit was built in the glasshouse at ground level. The measurements of the unit was 75′ × 4′ wide at both sides of the house, leaving a 6′ wide path.

The concrete base was placed on 4″ of ashes to deter earthworms and to provide drainage. The sides of the mist unit consists of kerb edges obtained from the local council. Once the base was set, 1/2″ diameter holes at 1′ square intervals were knocked through to the ashes below.

The mist bed was now made up and consisted of the following:

Two inches of 1/8″ grit. Electric cables were laid down. One 3KW section and one 2KW section on either side. This gave four independent, thermostatically controlled sections. One inch mesh chicken wire was placed on top, to give even heat distribution. On top was placed 1/2″ of 1/8″ grit.

The mist line was then suspended over the bed. It was of an aluminum type with straight brass anvil nozzles. This was later found out to be a mistake for the following reasons:

1. The amount of water discharged from the jets was too great due to the coarse spray pattern, resulting in some damping off.
2. The hard water reacts with the aluminum pipe causing aluminum oxide deposits, thus blocking nozzles. The line is now being replaced with galvanized pipe and MacPenny mist nozzles.
3. Next to the access road two 65′ × 14′ poly tunnels were erected. One tunnel was planted with stock plants for the production of early cutting material. The other was for potted material. Spray lines were placed in them, but these only partly eliminated hand watering as there are still dry spots along the backs after being sprayed.

The production unit is still being built up and 8 more 65′ × 14′ tunnels and a 30′ × 12′ potting shed have been erected. One of the new tunnels houses more stock plants, which are mainly *Viburnum davidii*. Nicofence 27 covers the tunnel and it has been found to create optimum growing conditions.

B. **Practicalities of propagation.** Stock plants cover 1 acre of the 3 acre nursery at present and, to me, they are the central core of the nursery. The main objective is to keep them vigorous and weed-free. During the month of February the stock plants are pruned fairly hard to keep them tidy and to promote vigorous growth in the spring.

A 1:1:1 semi-organic fertilizer is spread at the rate of 5 cwts/acre; 50% Simazine at the rate of 1 lb 4 oz per acre is sprayed on at the end of April for weed control. This low rate is used as the whole stock area is treated and this includes some

non-Simazine tolerant plants. This low rate gives good weed control up to mid-September and if any weeds appear 2,4,5-T is used as spot treatment for thistles and knot grass and is applied on a very cool day so as to minimize the risk of vapour damage. Kerb (50 W), applied in November, has been used to control grass at the rate of 3 lbs/20 gals/acre. Gramoxone, plus washing up liquid, is also used for spot treatment throughout the summer. Paths are sprayed with Weedex where surface run-off is not a problem, as this material can result in damage to nearby plants. Headlands are sprayed with 2,4,5-T, plus Weedazol.

Cold frames are used for the protection of Lavander, Rosemary, *Hypericum*, *Berberis*, *Cotoneaster*, *Cistus*, *Phlomis* and Senecio.

The rooting medium consists of the parent loam + 2"-3" of grit and 2" of peat, well forked to a depth of 9". After this it is rotovated to obtain a more consistent tilth.

When the frames are vacant during the summer, Basamid at the rate of 4 oz/7' of 4'6" wide frame, is used as a sterilant.

Cuttings are taken from early September to the end of October. The first are 4" long cuttings of lavanders and rosemaries which are treated with Seradix 3 and generally these will root before winter. This reduces winter losses. Deciduous *Berberis* are then taken, using a mallet or nodal type cuttings. Berberis *b., thunbergii* and *B., ottawensis* cultivars lend themselves to both types of cuttings. Seradix 3 is used as the rooting powder.

Evergreen Berberis cuttings are taken at the end of September to early October and given the same treatment as the deciduous types. *Berberis stenophylla* lends itself to a nodal type of cutting.

Of the other genera mentioned for Cotoneasters, heel type cuttings are taken. Those of *Cistus*, *Phlomis* and *Senecio* are nodal. Seradix 3 is used in all cases.

A spray line is placed along the center of the frame, and shading is applied immediately. This shading is removed during the November to January period and replaced during February.

When rooted, the cuttings are hardened off and potted as soon as they have a large enough root system.

The Mist Unit is in use most of the year with the exception of the winter months. Due to the decline in demand for conifers and the cost of electricity, a system of seed trays is used so as to facilitate ease of handling.

The rooting medium in most cases consists of 50% peat and grit mix but occasionally coarse sand is used for subjects needing a drier medium, which includes *Lonicera* and *Ceanothus*.

The bottom heat is set at 18°C which is left on throughout the summer so as to keep an even basal temperature during the night.

Once the cuttings have rooted they are weaned off by placing them on the path for a week. There they receive some spray but no bottom heat. Once weaned they are placed in a poly tunnel and fed with a liquid feed diluted to 1 in 200. After a period of 3 weeks they are then potted. It has been noted that once the rooted cuttings have taken up the liquid feed and started growing they withstand any root disturbance much better.

Polythene Tunnels. These consist of railway sleeper sides at 3'9" spacing with heavy gauge wire hoops fixed to pre-drilled holes at 3' spacings. The frame is dug over to improve drainage. On this is placed 2"-3" of peat and grit. Old mix from the mist unit is ideal. This is followed by a 2" layer of plasterer's sand which is fairly coarse, giving good drainage. An irrigation line is placed along the center of the frame suspended 8"-9" above the rooting medium.

Cuttings are normally taken from mid-June onwards: 4"-5" long cuttings are placed into pre-formed holes and watered in.

A roll of 6' wide 250 gauge white polythene is placed over the hoops and secured with battens to the sleeper sides. An important point is that the nails are only hammered in half way so as to facilitate ease of removing the battens to check on the progress of the cuttings.

The irrigation line is turned on every 2 hours for 1 minute on warm days. On cooler days every 3 hours. It has been noted that if the number of sprays are decreased in hot weather, some scorching does take place.

The irrigation lines are permanently connected to the mains so as to prevent foreign matter entering the lines and so causing costly blockages.

The cuttings are normally rooted within 4 to 5 weeks and, once rooting has taken place, some air is admitted to the tunnel. An important point to note is that, if possible, cuttings of the same duration in rooting should be placed in the same tunnel so as to get uniform rooting.

Most cultivars of plants on the nursery root very well with this method. These include *Viburnum*, *Weigela*, *Cornus*, *Callicarpa*, and *Kerria*. It has been noticed that with *Cornus*, in particular, if the polythene is left on too long after they have rooted, botyrtis soon starts, so constant checking is vital.

One other method tried in these tunnels is rooting the cuttings in trays of sand. This seems to work equally well and, in

fact, we shall be using this method next year. A great advantage is that when the cuttings have rooted they can be moved and the tunnel can be used again the same year. Instead of peat and grit, a 2" layer of gravel is placed under the trays.

Potting is carried out from the beginning of February to the end of August. Any done after that date gives poor results due to plants not being established before the winter.

All potting is carried out by hand using 3" poly pots. These are a little slower to use but the compost used consists of 50% peat, 25% loam, 25% grit by volume and made up to J.I.2 strength with Vitax Q4.

Once potted, the plants are placed in an Airfax or Correx tray at 40 per tray. They are placed in a polythene house to become established. Shading is needed during summer.

Once established, the liners are placed in a standing-out bed to harden off. At this stage Vitax 101 liquid feed is used at the rate of 1 in 200 in 50% of the waterings. This has been found to give a steady mature growth.

EFFECT OF TWO TEMPERATURE REGIMES ON ROOTING CUTTINGS

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Abstract: Cuttings of 19 different genera and cultivars were rooted by the warm bench and plastic system. The base temperature was thermostatically controlled at 21-24°C. The air temperature was 15.6°C minimum. In most cases rooting was as good or better when the heating current was cut off for 12 hours daily than when it was available for 24 hours, with economy in cost of electricity.

In these days of high energy costs, economy in the use of electricity for the maintenance of base temperature in the propagating bench is an obvious necessity.

In a previous season (January 1971) an attempt was made to save electricity by reducing the base temperature in a mist unit from the standard 21°-24°C to 16°-18°C. In several species the result was reduced rooting (Table 1). *Viburnum davidii*, however, gave better rooting at the lower temperature. *Ilex* 'Golden King' also showed some indication of higher rooting percentage at 16°-18°C.

Similar results were obtained with cuttings of the same species rooted under plastic instead of mist. Although these were unreplicated observational trials they indicate some scope