

These two techniques offer the nurseryman the possibility of propagating large numbers of peach trees at a low cost and at a one year production cycle compared with the present two year cycle for worked trees with its high labour requirements for budding and heading back.

LITERATURE CITED

1. Issel, L.G. 1976. Propagation of canning peach trees from cuttings. Part 1. Leafy cuttings. *Victorian Horticultural Digest* No. 68: 3-6.
2. Issell, L.G. and P.F. Bolch, 1976. Propagation of canning peach trees from cuttings. Part 2. Hardwood cuttings. *Victorian Horticultural Digest* No. 68: 7-11.

PRODUCTION POT-POURRI

ELLABY MARTIN

*Martin's Nurseries Ltd.,
Rototuna School Rd.,
R.D. 1, Hamilton, New Zealand*

When we started our nursery we grew a moderate range of plants, some in fairly large quantities, and sold a substantial amount of our total production wholesale using the income derived from this to purchase other lines for our retail requirements. As sales in our new garden centre expanded from 1970 we started to experience real difficulties in obtaining sufficient stock in adequate variety for our retail sales. About mid-1974 we decided to change our production process and try to grow the maximum number of cultivars and quantities possible for our own garden centre sales. This policy has proved well worth while for us particularly over the last two years as we have managed to get our re-organised production system functioning in something approaching high gear. We still buy in substantial quantities of some lines but now grow a very large range of several hundred species and cultivars.

This method of running a business works for us with, I believe, real benefits, but I'm not suggesting that our method of operating would have similar benefits for other businesses. We now propagate and grow in containers, and in the field, some 100,000 trees, shrubs, basket plants, climbers, etc., each year. These are propagated in the estimated numbers required in batches throughout the year. For example, if we think we can sell 400 *Ceanothus papillosus* var *roweanus* annually we propagate them in three or four batches several months apart so that we have fresh groups coming into the garden centre throughout the year. Obviously we aim to have the largest group saleable in

spring, but we do not expect to be selling left-overs late in the year — instead we have a new batch coming forward. The advantages of this method of production are obvious, but there are also a few headaches. Some plants are produced in very small batches, often only 20 at a time. This rather complicated production programme would probably drive an efficiency expert or cost accountant crazy but the benefits for us make it worthwhile.

CUTTINGS

Propagating Benches. These are built of corrugated fibrolite sheets with Pyrotenax cables laid along the depressions and a concrete top poured *in situ*. The cables are thermostatically controlled and kept at approximately 24°C (76°F). Each bench is 4.1 m × 1.5 m with 17.8 cm deep timber sides filled with a rooting medium. Cuttings of some plants are inserted straight into the medium — others are put in boxes or pots of the medium and placed on top of the bench. All but one bench is supplied with time-controlled mist. The bench without mist has a polythene tent built above. On this bench we propagate these plants which do not do well under mist.

Hardening Off. When cuttings are rooted they are potted into tubes or small pots and stood on benches opposite the propagating benches, covered with a polythene tent and, after heavy watering-in, left hot and humid for 2 or 3 weeks. The tent sides are then gradually raised to facilitate hardening off before the young plants are transferred to a tunnel house or frame. Every rooted cutting is potted initially into the same medium which consists of: — 1 part by volume peat; 1 part by volume sand; 1 part by volume sterilised soil; and 1 part by volume sterilised abattoir mix. plus: 1.2 kg. potassium nitrate per m³; 1.2 kg. dolomite lime per m³; 100 g. Terrazole per m³.

Experience has proved that virtually all young rooted cuttings grow well in this mixture. Once established, however, many species must be quickly potted into a more nutritious mix. At that stage we use standard U.C. mixes which we produce ourselves.

Use of Cold Frames. We also propagate a number of cuttings in a type of cold frame 32.5 m long by 1.2 m wide running the length of one outside wall of a glasshouse. Cuttings of easy-to-root plants, such as *Photinia* × *fraseri* 'Red Robin', *Buxus*, most conifer cultivars, including Leyland cypress, are put into a 22 cm deep sand and peat bed in this frame. After heavy watering they are covered directly on top with thin polythene film. The frame top of polythene is then pulled over the structure. Sarlon shade cloth is also used through the sum-

mer. Cuttings are inspected once a week for watering and spraying with fungicide. About 30,000 cuttings are propagated by this very inexpensive method.

GRAFTING

We graft a number of conifers including Koster's blue spruce, *Cedrus atlantica* 'Glauca', *C. deodara* 'Aurea', *Camellia reticulata* cultivars, *Fagus sylvatica* 'Purpurea Pendula', *Wisteria*, and *Gleditsia triacanthos* 'Sunburst'. Usually all grafting is done about mid-August (late winter). We use four main methods of grafting based on past successes; side veneer for *Picea pungens* 'Koster'; tongue veneer for *Cedrus* spp; whip and tongue where the stock and scion sizes match e.g. *Gleditsia*, some camellias, and *Fagus* cvs.; and wedge grafts for camellias.

Before grafting, all potted rootstocks are dried off in a glasshouse for three weeks by withholding water. Scionwood of deciduous plants is cut in mid-July (mid-winter) and stored under a hedge in polythene bags. Coniferous wood is cut 2 to 3 days beforehand and stored in a refrigerator.

After grafting, all plants are sprayed with Wiltproof before going into the grafting pits. These pits are situated inside a larger glasshouse which is kept at approximately 13°C (56°F). They consist of a boarded-in bed filled with untreated sawdust and an 'A' frame structure over which a polythene sheet is draped and, later on, shade cloth. The grafts are plunged into the moist medium up to and over the graft union. Then a 70 µ clear polythene sheet is laid directly on top of the plants trapping condensation and humidity.

For six weeks the grafts are looked at once a week and sprayed with a fungicide, alternating between Maneb, Thiram, Benlate and copper oxychloride. At four weeks the rootstock is reduced by approximately one-third and, six weeks from grafting, the bottom layer of polythene film is removed. Over the next six weeks the grafts are "damped down" 2 to 4 times daily and gradually hardened off by raising the pots free of the sawdust and raising the tent sides, finally leaving only the shade-cloth and reducing the damping down to once daily. Rootstock growth is reduced a further third 6 to 8 weeks after grafting. Three to four months after grafting, the plants are shifted outside to a cool shaded and sheltered area. Five to six months after grafting all stock growth is removed, ties are cut, and plants are staked, or potted on as necessary.

SOME SPECIFIC SPECIES PROPAGATED

Clematis hybrids — We propagate these as early as possible in frequent batches throughout September and October (spring)

taking material off stock plants and the previous year's plants. Cuttings are softwood, nodal and internodal; they are dipped in sodium hypochlorite (NaOCl) and rinsed in water before using Seradix 1. After this they are inserted into pots of sand and put under the mist on bottom heat. These cuttings are potted up in December (early summer) with the crowns buried in U.C. mix straight into 12 cm Ace pots and put under a polythene tent bench in a glasshouse. After four weeks of constant nipping of the shoots (used for further cuttings) the plants are moved outside to our tree shade areas where they establish before the winter. The later batches of cuttings (November-January) are overwintered in the propagation pots and potted up in the spring.

Azaleas — These are propagated in March (autumn). We used to use Rootone hormone powder after a Captan dip but when Rootone became unavailable we used the Captan dip alone with fair success. This led us to compare Captan powder as a basal dip with Seradix 2. Captan proved the better and now we use Captan powder dip for all plants previously treated with Rootone, e.g. *Daphne*, *Leptospermum* and azaleas.

Proteas — Following a field trip to Owen Gibson's nursery and seeing his success with proteas and leucospermums propagated in clay beds outside, we tried using clay subsoil in boxes for proteas. The cuttings are made 8 to 10 cm long using half-ripe wood and Seradix 3 in July and August (late winter). The cuttings are then put into the clay medium, sprayed with Wiltproof, and put straight outside. A comparison was made with sand as the medium. Results proved that clay was better for rooting, e.g.:

Protea neriifolia in clay 95% rooted.

Protea neriifolia in sand 20% rooted.

All cuttings were dipped in NaOCl solution prepared as follows: *Stock solution*: 0.6 litre concentrate in 4.4 litres water. *Working solution*: 0.6 litre stock solution in 5 litres water. This is made *fresh daily*. All cuttings are dipped in the NaOCl working solution then are rinsed in water before the hormone powder treatment, if this is used.