

ASPECTS OF NURSERY PROPAGATION OVERSEAS

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The main impressions of the nursery industry received when travelling overseas can be briefly stated as:

1. The continuing or increasing demand for ornamental plants in all advanced areas of the world.
2. Increasing specialisation in production, particularly the production of plants for cut flower growers.
3. The reappraisal of existing techniques of propagation rather than the development of entirely new techniques.
4. The increasing research being carried out in nursery production.

A brief survey of the re-evaluation of existing techniques is appropriate.

The use of plastic film. Increasingly plastic film is being used in the nursery industry in the U.K. and warmer areas. In several nurseries cuttings of softwooded plants, e.g. chrysanthemums or woody plants, both broadleaf and conifers are being propagated under white plastic tents in existing glasshouses. In one case at least the film was laid directly on the cuttings; additional light shading may be necessary. With the high humidity and high temperatures, little attention is given to the plants other than fungicidal sprays, usually benomyl, at weekly intervals; hardening off merely involves ventilation and gradual removal of the sheet.

A similar technique is employed outdoors with easily rooted softwood cuttings. The soil is disinfected with chemicals and additional sand incorporated; mist lines are laid down the centre of the beds and white plastic sheet is laid on hoops over the cuttings. Again ventilation is increased as rooting takes place and the plants are left in place for that season, subsequently being lined out or potted into containers.

Plastic film houses are being used extensively in the U.K. ranging in size from "walk-in" tunnels to extensive areas of $\frac{1}{4}$ hectare or larger; they are used both to hasten growth of mother stock plants and to increase the growth of propagated material. Ventilation is usually by fans at one end and automatic vents at the other, while in low light areas, the plastic is sprayed with "Sunshield" which increases light transmission in wet weather and provides shading at other times.

Hardwood cuttings. Government research stations in many countries have assisted fruitgrowers, in particular, with improved virus status plants; as a spin-off from this, several ornamental

Malus and *Prunus* cultivars of improved virus status, especially Japanese flowering cherries, are also available.

Breeding of new rootstocks continues and one criterion in their evaluation is their ability to root as hardwood cuttings. The technique currently applied to hardwood cuttings is the quick-dip in concentrated IBA, followed by root stimulation in a heated bins of sand. This has been extended to other deciduous woody plants such as *Cotoneaster*, *Platanus* and *Ulmus*, the optimum concentration of IBA and temperature of the rooting bin depending on the cultivar.

Budding. Chip budding, rather than other methods of budding is becoming more popular in Great Britain, not only for apple trees but also for *Acer*, *Fraxinus* and similar deciduous plants. In contrast, the "budding gun" (very similar to a pistol) designed by Mr. L. Pettifer of the University College of North Wales, Bangor, offers possibilities in mechanising the budding operation, or the employment of less skilled operatives.

Propagation of Proteaceae. In warm temperate and subtropical regions such as Israel, California and Hawaii (at higher altitudes) there is considerable interest in the growing of proteaceous plants, especially *Banksia*, *Protea*, *Leucadendron* and *Leucospermum*, as commercial cut flowers. In South Africa where these are already an established export cut flower crop, the majority of plants are raised from seed. This is usually sown in autumn in a very well-drained low nutrient medium in containers exposed to the open or just protected by mesh netting. New Zealand nurserymen probably have more experience in the vegetative propagation of proteaceae than those in most other countries and there would appear to be good export prospects for plants of specific clones.

Gerbera propagation. Gerberas are another extremely popular cut flower in Europe, where they are usually grown in greenhouses. The realisation of cropping differences between clones has stimulated the propagation of these plants vegetatively. Plants are now being produced from cuttings. In this technique, the parent clumps are defoliated and the roots shortened; they are then bedded in peat on a glasshouse bench kept at 25°C. When two leaves have been produced from the vegetative buds, these are severed at their base, dipped in IBA, and rooted at 25°-30°C. The original crowns will produce several crops of cuttings.

Growing on lines. The Finnish system of growing on forestry seedlings in rolls of polythene filled with growing medium should be applicable also to liners which need to be held for a short period before potting on or planting out. The technique has been mechanised and very large quantities of plants may be grown on a limited area, while it dispenses with traditional potting methods.

Growing media. In various parts of the world considerable interest is being shown in the use of ground tree bark as a constituent of growing media; usually the bark is composted before use and amended with lime and nutrients depending on the tree species from which it originated and its nutrient status.

Blocks of compressed pure peat are prepared at some nurseries in the U.K. and used for the production of green plants, such as AYR chrysanthemums and lettuce. In general, there is a tendency to use more peat in the propagation and growing media than in New Zealand; to date, liquid feeding and the addition of trace elements have been standard practice, but gradually the value of slow release fertilisers incorporated initially is being realised. Again this may be supplemented by liquid feeding.

However, in Denmark an entirely synthetic material called Grodan made from basaltic rock is used for nursery production. This is formed into blocks which are used for propagation and growing on plants. The nutrients are entirely supplied by liquid feeding, the system being pioneered by the soil chemist, Dr. Fr. Knoblauch, of the Statensforsogstation at Hornum.

Microculture. At all Research Stations and in many University Horticultural Departments, aseptic microculture is being widely practised. Initially used to obtain improved virus status economic plants, it is now being extended to a wide range of ornamentals with plants as diverse as *Anigosanthos* and roses. Where the Research Department is closely associated with the nursery industry the improved plants are rapidly multiplied and distributed. It would appear desirable that a central register be set up and maintained to reduce duplication of effort and ensure that improved strains of plants are widely available.

Conclusion. The chief impression one gains overseas is the extensive research in ornamental plants which is now being carried out. This has been stimulated by close liaison and financial support from the industry while producers themselves are overcoming increasing costs by application of new techniques, the growing of improved strains of plants, and in some areas the greater employment of technically trained staff. In general, New Zealand nurserymen are aware of these developments. Research and change are essential requirements of a thriving nursery industry, and nurserymen here must be aware of these factors.