INTENSIVE PLANT PRODUCTION

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At present the majority of plants produced for use in Forestry Commission forests are produced as bare-rooted planting stock. This is a cheap and relatively efficient system. However, there is wastage and while this is perhaps acceptable when the initial value of the product is low it is not so acceptable when the product being used has a high basic value. Thus when we are considering the use of genetically superior seed we must consider systems which have a higher guarantee of success, i.e. where virtually every seed produces a plantable plant.

In addition, situations arise where it is desirable to have a particular size of plant, e.g. on very weedy sites where the cost of producing a large plant would be less than subsequent weeding costs. Or on sites where, for example, initial survival is a problem and it may be more beneficial to have summer planting. In addition, as nursery costs increase so there is a demand to reduce the time a plant spends in the nursery. Under these circumstances the use of a plant grown under a plastic cover in a container can be justified.

We can, however, consider first an intermediate phase between the seed sown outdoors and subsequently lined out in an open nursery. In this situation the seed can be sown indoors and then pricked out into nursery beds. This produces a high survival rate and allows maximum use of valuable seed. The plants in the beds are still, however, liable to climatic injury particularly during the early growing period. It is perhaps better therefore to consider the use of an indoor programme for producing conifer seedlings. The development of the plastic house has made such a programme possible. In forestry use these plastic houses range from the fairly simple structure producing a few seedlings to the large complex producing millions.

Tube seedlings are now being used as fairly standard practice at least in north Scotland. Likewise paper pots are in use in parts of southern and eastern England although we have not yet reached the state which exists in Scandinavia where, for example, in Sweden 50% of forest plants are raised in paper pots.

A wide range of containers have been developed each with their own advantages and disadvantages. These range from the NISULA roll, which is really an extension of the bare-rooted plant principle in that the plants are grown in an peat base in a plastic roll. They are planted as bare-rooted plants. Others involve filling

with peat or a peat/sand mixture such as Japanese paper pots, senso pots, Kopparfors, Book planters and Finn pots. Some pots are produced in which the seed can be sown direct, i.e. no filling is required, e.g. Vermipeat pots which come in two sizes and Jiffy pots. For the tree breeding work in which I am involved I have found that the paper pots are eminently satisfactory. There are many more types of containers with appearance with differs as much as the names. I have even come across a South African one called the 'BLOB'.

All these can, of course, be used with a simple plastic house. If more rapid growth is required then it is necessary to consider the addition of soil warming cables to aid germination and a form of top heat. A regime of 20℃ soil temperature and a minimum air temperature of 15℃ will produce a seedling Sitka spruce up to three times larger than can be produced in the same time under standard nursery conditions.

If the conifer is particularly valuable, then the seedlings can be grown as individuals and treated like many other plant species which have commercial value. They can be grown in pots with increased soil and air temperature. In addition, supplementary lighting may be used. This will extend the growing season and offers the opportunity to produce a large plant or to have two or three crops in the one year. Various sources of illumination have been tried, but high and low pressure sodium lamps seem very suitable for conifer growth. Using an 18 hour daylength with a minimum air temperature of 15℃, a growth rate twice that without added light can be achieved for a total cost including depreciation of about 0.5p per sq. m. per day. The system to use depends on the end product but there can be no doubt that as labour costs continue to rise more and more intensive techniques will be adopted.