

EXTENSIVE METHODS OF RAISING CONIFER PLANTS

PAUL BIGGIN

*Forestry Commission, Northern Research Station
Roslin, Midlothian, Scotland*

The Forestry Commission's annual programme of plant production is fifty million plants. To improve on the techniques used research is carried out at the Northern Research Station at Roslin on Bush Estate, near Edinburgh. Facilities for research include a research nursery at Bush, also two others at Gatehouse of Fleet, and Newton near Elgin. A polythene house is used for research on containers, also another at Fort Augustus. The Physiology Section does research on cutting propagation and has glass and polythene house facilities.

Research started first into seedbed technique, pre-war, and later into nutrition and weed control. The basic techniques are described in Forestry Commission Bulletin 43, "Nursery Practice" and Bulletin 37, "Nursery Nutrition".

Plant production falls into categories. Bare-rooted stock take up the bulk of the programme. Container plants, such as tubed seedlings, are used for special purposes such as in North Scotland where 500,000 are produced annually. Paperpots are another container of interest and currently used in Thetford forest for Corsican pine where 300,000 are produced annually. Finally, we are currently very interested in developing methods of propagating conifers by cuttings, the objective being to produce stock which has been genetically improved.

Current research is aimed at labour saving methods and production of better plants. Herbicides are screened for their effects on conifers and any promising ones are given trials first in experiments and then later in large scale nursery trials. A recent herbicide of great value is Diphenamid. This can be used as a pre-emergent spray on Sitka spruce and Lodgepole pine seedbeds. The rates used should be 5kg a.i./ha.; caution is recommended on other species. Weed control is very effective particularly on grasses such as *Poa annua* and control lasts for a whole season.

A fair research effort has been put into improving growth of seedlings in the first year so that a large proportion are ready for lining out after only one year. Recently Dazomet has been used to sterilize seedbeds. Not only has good weed control been achieved but considerable improvements in growth.

Prechilling of seed involving soaking seed and then storing at 3-5°C in moisture for 3 to 6 weeks improves the rate of germination and subsequently the height of plants after the first year. Cloches have been tried but though the height growth is improved

there is a substantial mortality from excessive heat; labour costs for adding ventilation would be excessive. One could say that cloches are a first step toward intensive plant production.

Tubed seedlings are produced intensively (eight weeks) after sowing in a polythene house at 25°C day, 15°C night, gives a plantable seedling. The costs of production are about two-thirds that of transplants. One 15m × 7m polyhouse produces half a million plants per annum. The plants can be planted at twice the rate of conventional stock and out of the normal planting season. However, the plant is small and susceptible to damage and is always a year at least behind in growth of those conventionally produced. On mineral soils tubed seedlings are heaved out of the ground by the first frost. So paperpots have been looked at as the container that can be used on a wide range of sites. They have been tried and tested alongside other containers of similar size and not much difference has been found. the paperpot has been chosen because it has the best cost and handling properties. However, plants in paperpots take up five times the space of tubes so, in fact, are more expensive to produce than transplants. Their main advantage is that useable plants can be produced in the same year as they are demanded.