RAISING EUCALYPTS

By O. W. Loneragan.

The two nurseries at Hamel and Dryandra have been developed primarily to meet a demand by the public for Eucalypts and other trees for planting in country areas. It is essential that a tree be sturdy and healthy. The public generally prefer large trees; to be satisfactory, a large tree needs a large container. However, factors such as packing, handling and rail freight have had to be taken into account and the container size used represents a compromise between what is desired by the buyer and what can be supplied to him at a reasonable price.

Although developed independently, the pots now in use at our nurseries and which have internal dimensions of $3\frac{1}{4}$" top diameter and depth of 4" contain a bulk of soil approximating to that considered by F A.O. authorities to be the minimum desirable for Eucalypt seedlings, viz. 300 cubic centimetres (see A. Metro, F.A.O. Eucalypts for Planting 1955).

Under natural conditions in south Western Australia, Eucalypts germinate in autumn and early winter and thus have cool conditions in which to establish. Plants raised artifically when seed is sown in autumn must either be planted out in the first winter at an early stage in their development or held over for more than 12 months in the nursery before planting out during the second winter.

These older plants become unduly large and develop severe root coiling particularly if grown in pots having only a small opening in the bottom. Coiled roots after planting strangle the main root development and the trees are subject to windthrow. This condition may be to some extent, relieved by cutting through the root coil before planting.

Sowing in spring under artificial conditions and planting out 8 months later in winter saves half the nursery establishment and space compared with raising plants by sowing in autumn. The spring sown seedlings are tender and need more protection and shade during the summer.

Containers of many types are used for raising trees. These may be broadly grouped into non-expendable and expendable. The more durable (non-expendable) containers which generally are recovered are the metal tubes, cement and earthen flower pots. The most favoured expendable tubes in Australia have been softwood veneer, but polythene plastic tubes and also pots of compressed peat have now been introduced into some nurseries. The surface area of tubes of the size normally used (about $1\frac{1}{2}$" diameter) is,

however, regarded by some authorities as inadequate for the development of sturdy plants. The bottomless earthenware pots now in use by the Forests Department constitute a compromise between tubes and pots. Being $3\frac{3}{4}$" in outside diameter the surface area is adequate for healthy shoot shape and development.

Another method of raising eucalypts is in flat trays which are transferred directly into the field for planting. A network of roots during growth extends over the bottom of the tray. Control of this network and restriction of root development to the individual soil ball by slicing crosswise frequently to separate each plant in the tray in practice is difficult and may need more thorough testing. In practice so far when transplanting from the trays into the field, the biggest plants receive the greatest root damage. This technique, therefore, is not favoured.

Trials comparing open-rooted plants with those raised with undisturbed roots in peat jiffy pots in a shorter interval has been tested by Australian Paper Manufacturers Co. Ltd. (Victoria). The compressed peat pot permits penetration by the root tips and desirable root shape and development without root coiling is encouraged. Establishment of open rooted plants in the field is uncertain and mortalities increase with adverse conditions. Re-filling 12 months later to replace mortalities is unsatisfactory. A higher take with the jiffy peat pots, however, is possible under adverse conditions in the field.

When the question of raising Eucalypts for establishment in the lower South West arose, cheaper and smaller plants were necessary. The cheaper plant in small containers such as the small jiffy pots could be raised in greater numbers of smaller size in a shorter period. This new technique was tested at Manjimup in 1963. A review of results reported in the same year by A. J. Hart follows -

1. Methods of raising Eucalyptus seedlings in jiffy pots at a field station with limited nursery facilities are described.

2. Potting soil of black organic sand and brown sandy loam was mixed with 3% and 6% Nitrophoska (red) by volume and sterilised with methyl bromide. Subsequently small additions of blood and bone to the 3% mixture gave results equal to the 6% mixture.

3. The rate of filling $2\frac{1}{4}$ inch pots was 100 per man-hour. 5,300 pots required 18 c. ft. of soil mixture. This represents 5 oz per pot as compared with 16 ozs. for the earth ball in the standard earthenware pot. This saving provided 3 times as many plants for the same weight of mixture - an important factor where trees need to be transported by hand over rough terrain.

4. The rate of direct seeding was 600 pots per man-hour. The use of a pepper shaker - shaking up and turning upside down - kept seed and chaff mixed, resulting in uniform seed distribution in pots.

5. Sowings were made at fortnightly intervals from January into March. Height attained at planting time ranged from 3 ins. to 15 ins. The larger plants were top heavy and difficult to handle for distribution in the field.

6 Karri plants of the most suitable size (about 8 ins.) at planting time were obtained from sowings made in mid-February.

7. In view of the very small size of the containers, frequent watering was necessary. The outer rows of pots dried more rapidly and watering intensity had to be regulated to provide for this.

8. The seedlings, 14 days after germination under 90% shade, were moved out under high bush shade (60%) for one month and then placed under 50% plastic weave (Sarlon cloth) over frames for one to two months before hardening off in May. Spraying once weekly with Zebtox at recommended concentrations using 3 gals. overall, prevented "damping off".

9. The calculated cost to produce seedlings in pots by direct seeding was £11. per thousand (including £4.3 for pots). To produce transplanted seedlings in trays cost the same. (These costs are nett and do not include overheads or administration charges.)

10. In other trials with open rooted Karri seedlings, wrapping in plastic sheeting was highly successful for preventing damage through desiccation during distribution.