

and a tractor driver were planting 30,000 cuttings per short day and enjoying it!!

We have ignored ground preparation in comparative costings as this is similar for most crops, but it has become obvious that production from hardwoods is still the most economic way of producing many plants, and when we have improved the system of producing cutting material and improved the speed at which cuttings are made, by machine cutting, together with a change of attitude by the propagators so that they no longer look upon each cutting as an individual, then we can consider further expansion in cutting production with confidence.

We have seen increasing interest in tenders for shrubs in the 45 to 60 cm size and, by selecting cuttings, it should be quite possible to supply strong sturdy shrubs of this size in one year. We have not yet overcome the difficulty of producing two-year transplants of willows, poplars, etc., with a central leader but only 45 to 60 cm high, which is a specification often quoted in the North, and any suggestions would be appreciated.

EFFECT OF SPACING ON THE ROOTING OF *CHAMAECYPARIS*

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Abstract. In an attempt to maximize production from a given area of heated propagation bench, it is common practice for plant propagators to space cuttings densely. The close spacing of cuttings of cultivars of *Chamaecyparis lawsoniana* reduced rooting and the results show that this was wasteful of labour and propagating material. Less densely placed cuttings showed satisfactory rooting and a lower death rate.

MATERIALS AND METHODS

In two randomized factorial experiments carried out at Kinsealy Research Centre, the effect of spacing of *Chamaecyparis lawsoniana* cultivar cuttings in the propagation bench was studied. In 1969, basal cuttings (i.e. those removed from the parent plant by cutting through the junction of the new and older wood) of cultivars 'Fraseri' and 'Pottenii' were prepared for propagation. The cuttings were immersed in a solution of captan (3 gm per litre of water). After being allowed to dry, the bases of the cuttings were dipped in a proprietary powder containing 0.8% indolebutyric acid (IBA).

The cuttings were inserted in propagation trays containing a mixture of two parts moss peat to one of sand and placed in a mist unit. Heat was applied to the bases of the cuttings by

means of soil warming cables and a temperature of 21° to 24°C was maintained thermostatically. The minimum air temperature was 15°C.

The cuttings, inserted on January 5 and recorded for rooting on April 10, were at two densities — 20 and 40 per 450 cm². Table 1 shows the rooting response to density. The figures in parenthesis indicate numbers ball-rooted (i.e. with numerous roots so that they lifted with a ball of rooting medium adhering).

Table 1. Effect of two spacings¹ on rooting of cuttings of *Chamaecyparis lawsoniana* cvs.

Cultivar	Spacing	Total number rooted	Percentage rooted
'Fraseri'	Wide	51 (17) N.S.	64
	Narrow	40 (0)	24
'Pottenii'	Wide	71 (29)*	89
	Narrow	108 (37)	68

N.S. = not significant

* = significant at 1% level

¹ = four replicates fully randomized, with guard rows

A further randomized factorial experiment was carried out in 1977 to test the effect on rooting of spacing densities using the cultivars, 'Allumii' and 'Drummondii'. The former represents a cultivar which has proven relatively easy to root and the latter, a cultivar found more difficult to root under conditions at Kinsealy. Stem cuttings (i.e. cuttings removed from the parent plant by cutting above the joint of new and old wood) were prepared in the same manner as above described and were propagated under similar conditions. There were three densities of cutting insertion — 25, 50 and 100 per 750 cm². The date of insertion was February 8 and the cuttings were recorded for rooting on May 6. The results are shown in Table 2. Figures in parenthesis indicate numbers ball-rooted.

Table 2. Effect of three spacings¹ in rooting cuttings of *Chamaecyparis lawsoniana* cvs.

Cultivar	Spacing	Total number rooted	Percentage rooted
'Allumii'	Wide	78 (63)	78
	Medium	82 (67)	
	Narrow	74 (50)	
'Drummondii'	Wide	45 (20)	45
	Medium	70 (23)	
	Narrow	56 (30)	

¹ = four replicates fully randomized.

N.S. = not significant.

RESULTS

The trial in which *C. lawsoniana* 'Fraseri' and *C. lawsoniana* 'Pottenii' were tested indicated little difference in numbers between the two spacing densities and in number of plantlets with a large root system. It was particularly noticeable that the cuttings at the perimeter of the propagating boxes were very well rooted irrespective of spacing and this suggests the importance of light for successful rooting during the winter. With *C. lawsoniana* 'Fraseri' there was no significant difference among the treatments in numbers rooted, but with *C. lawsoniana* 'Pottenii' (a very easy-to-root cultivar) there were higher numbers rooted in the narrow spacing. This indicates that for the easy rooting cultivars, spacing is less important than for difficult-to-root cultivars.

Where *C. lawsoniana* 'Allumii' and *C. lawsoniana* 'Drummondii' were tested, very high numbers of cuttings died due to basal and foliage rot at the medium and narrow spacings. The total numbers of cuttings inserted at the medium and narrow spacings were 200 and 400 respectively and of *C. lawsoniana* 'Allumii', 126 and 319 died, and of *C. lawsoniana* 'Drummondii', 126 and 342 cuttings died whereas at the wide spacing 15 and 38, respectively, died. There was no significant difference in numbers rooted among spacings within each cultivar.

DISCUSSION

To obtain optimum rooting in a given area of heated propagating bench the results show the risk of overcrowding cuttings. This is especially true of the difficult-to-root types of *Chamaecyparis lawsoniana*. An exception would appear to be those cultivars which are easily rooted, as demonstrated by the experiment with *C. lawsoniana* 'Pottenii'.

SCALE PROPAGATION OF LILIES WITH CONTROLLED TEMPERATURE STORAGE

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Lily bulbs are produced on a field scale at Rosewarne Experimental Horticulture Station, Cambourne, Cornwall. As the large bulbs are sold off, small bulbs must be raised each year for replanting and the best method is by scaling. Any lily grower, large or small, can use this simple method which is both fascinating and offers the means of rapidly increasing your stock of bulbs. The method is as follows: