TRIALS ON PROPAGATION OF CHAMAECYPARIS AT KINSEALY

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In recent years the demand in Ireland for trees and shrubs for amenity planting has increased more rapidly than home production, resulting in a sharp rise in imports. With the increasing interest by nurserymen in modern techniques of production we have initiated at Kinsealy a programme of research into plant propagation to encourage our nurserymen to expand their production of subjects well suited to propagation at home. The trials on the vegetative propagation of *Chamaecyparis* cultivars summarized in this paper are part of this programme of trials and demonstrations. All cuttings were treated with 0.4% proprietary IBA powder after immersion in a solution of Captan before insertion in a mist bench with bottom heat at 21° to 24° C.

Effect of time of insertion on rooting and development. Twenty cuttings of each of 20 cultivars were inserted at fortnightly intervals from the beginning of February to the end of March, 1969. The percentage rooted was generally higher from the earlier insertions, especially in the more difficult-to-root cultivars. Table 1 shows the results obtained with four easy-to-root and four difficult-to-root cultivars.

The rooted cuttings were hardened off and planted into a cold frame containing a standard growing medium of peat and fertilizers. This substrate, based on experimental work at Kinsealy and now marketed by a commercial firm has given very satisfactory results with a wide range of food and flower crops under glass. Rooted cuttings of trees and shrubs have also developed very satisfactorily in this compost. Table 2 shows the height attained by the rooted cuttings of *Chamaecyparis* in November of the same year, the figures being an estimate based on the measurement of three typical plants of each cultivar.

All cultivars in the trial showed a similar trend in development in relation to date of insertion of the cuttings, but the later insertions of the more difficult-to-root cultivars gave too few rooted cuttings. Apart from 'Ellwoodii' the easy-to-root cultivars showed no pronounced effect until the early March propagation. The results of this observational trial suggest, therefore, that cuttings of the more difficult to root cultivars should be taken earlier, the easy-to-root kinds can be left until later without reduction in numbers rooted and without marked effect on subsequent development.

Table 1. Effect of date of insertion on percentage rooting of eight cultivars of *Chamaecyparis lawsoniana*

Cultivar	Date of insertion of cuttings				
	4 / 2	18 / 2	4 / 3	18 / 3	31 / 3
'Glauca'	100%	95%	95%	90%	90%
'Ellwoodii'	95%	95%	95%	80%	70%
'Brilliantissima'	90%	90%	65%	55%	70%
'Pottenii'	90%	80%	100%	95%	80%
'Stewartii'	15%	30%	40%	0%	5%
'Lutea Smithii'	45%	20%	30%	0%	0%
'Versicolor'	15%	0%	5%	5%	10%
'Darleyensis'	5%	15%	50%	30%	15%

Table 2. *Chamaecyparis lawsoniana*. Height (cm) in November in relation to date of propagation

Cultivar	Date of propagation				
	4 / 2	18 / 2	4 / 3	18 / 3	31 / 3
'Glauca'	34cm	35cm	37cm	22cm	22cm
'Ellwoodii'	30	26	18	19	16
'Brilliantissima'	28	30	28	20	20
'Pottenii'	35	35	36	30	32

Effect of substrate. Cuttings of four cultivars were inserted in four substrates, peatmoss (P), sand (S), 2 peatmoss 1 sand (2P1S) and 2 sand 1 peatmoss (2S1P) on April 4. Table 3 shows the numbers rooted when lifted on June 11. The numbers in parenthesis are ball-rooted cuttings, i.e. with so much compost adhering that the individual roots could not be separated readily.

Sand alone gave results significantly poorer at the 1% level than peat and sand composts. The results from peatmoss alone were in-

Table 3. Effect of substrate on rooting of four cultivars of *Chamaecyparis lawsoniana*[1] (Inserted 4 / 4 / '68)

Cultivar	No. rooted in each substrate				
	S	P	2P1S	2S1P	Mean
'Fraseri'	2.5 (0.0)	6.0 (1.8)	6.7 (1.3)	6.2 (0.2)	5.4 (0.8)
'Stewartii'	2.8 (0.2)	2.5 (0.0)	4.7 (0.2)	3.5 (0.0)	3.4 (0.1)
'Milfordiensis'	5.0 (1.0)	6.2 (2.8)	7.5 (2.8)	8.7 (2.8)	6.9 (2.3)
'Pottenii'	6.5 (1.3)	7.7 (4.5)	8.7 (2.5)	9.0 (1.5)	8.0 (2.4)
Mean	4.2 (0.6)	5.6 (2.3)	6.9 (1.7)	6.9 (1.1)	
	F-test[2]	Substrate	**	(***)	
		Cultivar	***	(***)	
		Interaction	NS	(NS)	

[1] Means of 4 replicates of 10 cuttings
[2] On arc-sine transformed data

termediate and not significantly different from the other media, but the roots in this medium were brittle. At Kinsealy we are currently using 2P1S as our standard medium for rooting *Chamaecyparis* since peatmoss is obtainable in more uniform grade and composition than the washed river sand of granitic origin used in our trials.

Cuttings with and without heels. Cuttings of four cultivars with and without heels were rooted by four different methods (Table 4). The cuttings consisted of the growth of the current year stripped from the parent branch. In the heeled cuttings the heel of older wood was trimmed with a sharp knife according to the generally accepted practice. In the remainder the heel was removed by cutting through the stem of the cutting at a position circa 5 cm above the base. Forty cuttings of each cultivar were included in each treatment. All were immersed in a Captan solution before being treated with a proprietary 0.8% IBA powder.

In each cultivar the cuttings without the heel of older wood gave as high or higher percentage rooted as cuttings prepared with a heel. Cuttings of the same cultivars in a trial in a mist unit in February

(three replicates of 20 cuttings) gave as good (*C. l* 'Erecta viridis') or better percentages rooted from the cuttings without heels.

The effect of taking cuttings without heels was demonstrated on a range of conifers by Wyman in the U.S.A. as long ago as 1930. At Kinsealy similar results have been obtained with *Juniperus spp*, both in a mist bench and in a cold frame.

Table 4. Rooting of cuttings of *C. lawsoniana* cultivars with and without heels (Inserted 19 / 9 / '69)

Method	Treatment	Date lifted	Percent rooted and cultivar			
			'Pottenii'	'Allumii'	'E. Viridis'	'T. van Boskoop'
Mist	Heeled	11 / 11 / '69	37 %	57 %	30 %	25 %
	No heels	11 / 11 / '69	85 %	65 %	65 %	30 %
Single Frame	Heeled	30 / 4 / '70	25 %	7 %	20 %	5 %
	No heels	30 / 4 / '70	25 %	30 %	2 %	0 %
Double Glass	Heeled	30 / 4 / '70	35 %	57 %	22 %	25 %
	No heels	30 / 4 / '70	55 %	57 %	52 %	0 %
Glass + plastic	Heeled	30 / 4 / '70	42 %	60 %	30 %	2 %
	No heels	30 / 4 / '70	80 %	85 %	30 %	2 %

Effect of spacing. Two cultivars were included in a spacing trial, comparing 20 with 60 cuttings per 69 sq. in. (*C. l.* 'Pottenii') and 20 with 40 cuttings per 69 sq. in. (*C. l.* 'Fraseri') (Table 5).

In the relatively harder to root 'Fraseri', the wider spacing gave a higher percentage of rooted cuttings after 11 weeks. In the easier to root 'Pottenii' the trend was similar, as also with 'Argentea Nana' used in guard rows. These results suggest that under the conditions of this trial cuttings of less easily rooted cultivars should not be crowded. When material is plentiful and the cultivar easy to root it may be better to insert cuttings closely to obtain greater yield per unit area of propagating bench.

Table 5. Effect of spacing on rooting of two *Chamaecyparis lawsoniana* cultivars[1] (Inserted 15 / 1 / '69. Lifted 10 / 4 / '69)

Cultivar	Spacing	Mean percentage rooted	"t" (df = 3)
'Fraseri'	Wide	64	
	Narrow	25	
			5.51
'Pottenii'	Wide	89	
	Narrow	68	
			0.188

[1] 4 replications of each spacing treatment

While most of the results presented in this paper have been obtained during trials carried out on a mist bench, other methods may be more economic since conifers take up bench space for a long period (8 to 11 weeks) compared with many other subjects. The cold frame with a sheet of plastic over the cuttings is an example of an alternative method adopted by some nurserymen. An efficient propagation schedule implies the integration of two or more methods, based on thorough knowledge of the response of each of the species and cultivar and the provision of the appropriate environment for rapid rooting.

SELECTION OF MATERIAL WHEN PROPAGATING LEYLAND CYPRESS

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X *Cupressocyparis leylandii*, the "Leyland Cypress", is a bigeneric hybrid having as its parents, *Chamaecyparis nootkatensis* and *Cupressus macrocarpa*. It was first noticed as seedlings amongst a batch raised from seed taken from *C. nootkatensis* in 1888 but since that time it has arisen on a number of occasions, sometimes with *Cupressus macrocarpa* as seed parent. Stock has been maintained by vegetative propagation and today a number of clones exist to which names or numbers have been given. For a long time this tree was considered as little more than a botanical curiosity. Its true worth came to be realized when its fast growth, hardiness and ability to