

MODERATOR NIELSON: That certainly is a new and revolutionary technique which you have devised Mr. McLean. Are there any questions?

HUGH STEAVENSON: On out-planting the tube grown seedlings, how old are they, about 1 year from time of seeding to out-planting?

MALCOLM MCLEAN: This has been variable; originally the system was intended for the planting of young seedlings, perhaps 1 month old. Currently planting, in the case of pines is done at 6-7 weeks and with spruce at 10-12 weeks.

HUGH STEAVENSON: In terms of growth how will this tube-planted transplant compare in growth during the succeeding 2-3 years with say a 2/1 transplant?

MALCOLM MCLEAN: We would never expect the tube grown stock to out-perform the conventional stock but we don't know what the ultimate will be. In the case of pines we get 6-8 inches of growth and on conventional stock about 12 inches or more of growth the year following transplanting.

BRUCE BRIGGS: How long have you had conifers treated this way planted out in the field and what has been the survival rate?

MALCOLM MCLEAN: We set out the first ones in 1956. Survival has been terrible to excellent depending upon many factors the primary ones being the planting site and its hazards and the condition of the particular stock.

HOWARD BROWN: Why were you using only 3" tubes?

MALCOLM MCLEAN: We were trying to find the smallest tube size that would be acceptable because of cost. Cost increases with respect to the square of the diameter on the basis of the space needed for growing the plants.

BERT HENNING: Are the tubes available in Canada, what are their cost and are many other sizes available.

MALCOLM MCLEAN: The tubes are available in Canada and the current cost runs about \$2.25/M. Larger containers are available but I can't give you any details right at the moment.

MODERATOR NIELSON: Our next speaker is W. A. Cummings whose topic is "Trimmed Versus Untrimmed Cuttings under Mist."

TRIMMED VERSUS UNTRIMMED CUTTINGS UNDER MIST

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Introduction — There is nothing profoundly new in the evidence which has been collected over a three year period and is presented in this paper. Propagators have argued the pros and cons of trimming cuttings for many years and indeed some of you have already discontinued this laborious and meticulous

process. Trimming was originally necessary to reduce water loss by transpiration from the leaves and thus prevent wilting. Although modern techniques of maintaining high humidity make this reduction of leaf surface unnecessary, a search of the literature failed to reveal a single paper or mention of any evidence that the trimming of cuttings might be superfluous.

Dr. S. H. Nelson, Head of the Department of Horticulture at the University of Saskatchewan, has some interesting unpublished data on removing different percentages of the leaves from cuttings. This work was carried out at Ottawa in conjunction with experiments on the spacing of cuttings. In general, his results are in agreement with those presented here.

Method — The test was super-imposed on our routine propagation of woody ornamentals in outdoor frames under intermittent mist. The softwood cuttings were divided into two equal lots; one lot was trimmed in the conventional manner, i.e. about $\frac{2}{3}$ of the leaves were removed. The remaining cuttings were untrimmed except for the odd large leaf at their base, which was torn off to facilitate sticking. The test was carried out over a period of three summers.

Results — The following table gives a summary of the results obtained:

No of Taxa	Genera	TRIMMED			UNTRIMMED			X ²
		No of Ctgs	Rooted No	% Rooted	No of Ctgs	No Rooted	% Rooted	
2	<i>Acer</i>	120	31	26	120	49	41	4.05*
2	<i>Amelanchier</i>	65	4	6	65	10	15	2.57
5	<i>Berberis</i>	50	23	46	50	29	58	.69
8	<i>Cornus</i>	80	48	60	80	50	63	.04
17	<i>Cotoneaster</i>	170	81	48	170	116	68	5.59*
9	<i>Cytisus</i>	85	65	76	85	74	87	.58
13	<i>Euonymus</i>	140	120	86	140	125	89	.10
52	<i>Lonicera</i>	660	408	62	660	496	75	8.57**
35	<i>Philadelphus</i>	450	345	77	450	391	87	2.88
10	<i>Potentilla</i>	139	133	96	139	133	96	.00
2	<i>Prunus</i>	100	42	42	100	14	14	14.00**
6	<i>Ribes</i>	100	94	94	100	86	86	.36
21	<i>Rosa</i>	319	209	66	319	219	69	.23
4	<i>Syringa</i>	130	67	52	130	74	57	.35
2	<i>Tilia</i>	150	23	15	150	55	37	13.13**
1	<i>Ulmus</i>	150	76	51	150	93	62	1.71
17	<i>Viburnum</i>	216	132	61	216	148	69	.91
21	<i>Weigela</i>	270	234	87	270	236	87	.008

* significant at .05 level

** significant at .01 level

X² critical value 3.84

X² critical value 6.63

Although this was a preliminary test and not designed for statistical analysis, the average percentage of rooting appeared to show definite trends. These observed trends were substantiated by the application of a chi-square test from which the following conclusions are drawn:

- (I) Trimming of *Lonicera* and *Tilia* cuttings resulted in a highly significant decrease in rooting. Decreases in rooting of *Acer* and *Cotoneaster* also were significant.
- (II) In contrast, trimming of *Prunus* resulted in a highly significant increase in rooting.
- (III) Trimming had no significant effect on the rooting of 13 other deciduous trees and shrubs.

Discussion — Results obtained indicate that in seventeen out of the eighteen genera of deciduous trees and shrubs included in this test, trimming is unnecessary and is, in fact, detrimental in some cases. It is felt that further tests with *Prunus*, including some additional species and cultivars, should be carried out before a definite decision can be made for this genus. As you all know, there are other difficulties involved in the propagation of *Prunus* from cuttings.

Untrimmed cuttings require more space and each operator must decide whether providing additional propagation facilities is more economical than the extra labor required to trim the cuttings.

This, however, is not the whole story; indications are, and again I refer to unpublished results of Dr. Nelson's spacing experiments, that wider spacing results in heavier and stronger root development.

Further, if the results of the work being carried out with carbonated mist by Mr. Molnar and reported to you this morning by him, continue to the point where commercial application of CO₂ in the water used for misting is economical, then the retention of the maximum leaf surface will obviously play an even more important role.

MODERATOR NIELSON: Thank you for an interesting report. Once again we are running a little behind time and so I'm going to ask you to hold your questions on this paper and the next one for the Question Box Session this evening. Our next speaker is Dr. Paul Read.