A New Method of Stool Bed Layering

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Layering is a common commercial method of propagating plant material, particularly plants such as currants and gooseberries, which reproduce naturally in this manner. European nurserymen have used layering extensively for the propagation of ornamental shrubs and trees (5). Mound or stool layering (stooling) is a method which involves cutting a plant back to the ground during the dormant season and mounding soil or other media around the base of the newly developing shoots to encourage roots to form on them (1, 2). Stooling is the most common method of propagating clonal rootstocks (4) especially for material, such as some East Malling, Malling-Merton and *Malus robusta* apple stocks that are not always easily rooted as cuttings.

A simple modification of the usual method of stooling based on the root-promoting effect of stem girdling (3) has been introduced in nursery beds at Frelighsburg, Quebec.¹ This method produces better rooting and greatly facilitates the removal of the rooted shoots in spring. It involves the placing of a galvanized steel strip of screen (3/16" squares) 18 inches wide, over the cut back stumps of the mother plants before covering these with soil. A variant of this consists in placing the screen above bent-over trees in juvenile form instead of the stumps. As the new shoots develop, they grow upward through the screen; as the shoots grow in diameter, the screen begins to girdle them. This girdling promotes rooting above the girdle and facilitates the separation of the new shoot from the mother plant. A light tug will cause the rooted shoot to break away when it is time to collect the shoots.

Data collected in April 1968 on *M. robusta* No. 5 stoolings illustrate the increased rooting of the shoots (Table 1). The figures represent the average number of roots on ten shoots taken from an 18 to 24 inch randomly selected section of nursery row, replicated five times. The shoots of one replicate usually belonged to only one mother plant. The average length of the shoots was 31.7 and 29.2 inches per

¹The authors wish to gratefully acknowledge the use of Mr. Marcel Gagnon's nursery beds where this method was first developed.

**Fig. 1.** Three classes of roots, found on *M. robusta* No. 5 shoots in stoolbeds are left to right, minor, medium and major roots. The measurement on the right is in centimeters.

shoot taken from the conventional stooling bed and the screened stooling bed respectively. Shoots less than 18" in length were not considered as these will rarely root.

The difference between the three root sizes (Table 1) is shown in Figure 1, and the different types of rooting in Figure 2. The roots were arbitrarily classified into major, medium or minor roots if individually they weighed, respectively more than 5g, less than 5g but more than 1g, and less than 1g. With screen-girdling the shoot produces at least one major or medium-sized root, usually immediately above the girdle. In the conventional stool beds the shoots that root will do so over a longer
distance on the stem, and the roots are smaller and less developed than those on girdled shoots. The heavier-rooted stems assure a greater percentage of successful transplants and quicker establishment of these transplants. The screen-girdle also simplifies the transplant operation and reduces labor.

The method is presently being further tested on apple rootstocks as well as being applied to other difficult-to-root deciduous ornamental and fruit trees.

Literature Cited

Table 1. Rooting of screen-girdled M. robusta No. 5 shoots in stool beds, April 1968, Freelighburg, Quebec.

<table>
<thead>
<tr>
<th>Method of stooling</th>
<th>Av. no. of roots/shoot</th>
<th></th>
<th></th>
<th></th>
<th>% rooted shoots</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Major (&gt; 5g)</td>
<td>Medium (1-5g)</td>
<td>Minor (&lt; 1g)</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Conventional</td>
<td>0.02</td>
<td>0.17</td>
<td>2.15</td>
<td>2.34</td>
<td>78.0</td>
</tr>
<tr>
<td>Screen-girdling</td>
<td>1.12**</td>
<td>0.88**</td>
<td>2.92</td>
<td>4.92</td>
<td>98.0*</td>
</tr>
</tbody>
</table>

** Significantly greater than the conventional method at 1% level (non-pairing t-test).
* Significantly greater than the conventional method at 5% level (non-pairing t-test).


Fig. 2. The two shoots at left illustrate typical rooting in conventional stoolbeds. The shoot at left has only minor roots, the shoot in the center, in addition to minor roots has one medium-sized root. The shoot at right was taken from a screen-girdled stoolbed and illustrates the heavy rooting (major roots) immediately above the girdle. Reference measurement is a meter stick.

Moisture and the Use of Simazine on Prunus

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Abstract.
Weed competition reduced the growth of young peach and plum rootstocks. Heavy sprinkler irrigation increased the phytotoxicity of simazine to young Prunus rootstocks. Recovery from severe foliar injury occurred during the season and normal growth resulted at the lower rates of simazine. No detrimental residual effect on tree growth was noted during the following season.

Although simazine (2-chloro-4,6 bis(ethylamine)-a-triazine) has been relatively safe on citrus, apples, pears, walnuts, and grapes in California, its safe use has been marginal on trees of the genus Prunus (3). Severe chlorosis, with accompanying marginal burn, has occurred in both experimental plots and commercial applications, particularly on light, shallow soils, with excess water. Previous studies indicated that both tree variety and rootstock can influence susceptibility to simazine (2). Injury to trees has also occurred more frequently with sprinkler and basin than under furrow irrigation (4). Greenhouse tests have shown virtually no selectivity when simazine in solution reaches the roots of stone fruit seedlings (1). In the field, trees with severe chlorosis, marginal burn, and leaf drop have usually recovered by the end of the growing season, and in most cases, such recovery has occurred with an apparent minimum carry-over effect. The objective of this study was to relate the degree of foliar-expressed phytotoxicity with growth.

METHODS
One-year-old nursery rootstocks of S-37 (a Lovell selection), Nemagard, and Marianna 2624 were planted in a sandy soil (OM = 1.0; sand = 40.5; silt = 39.5; clay = 20.0) in rows with 2 trees of each variety per plot on February 4, 1966. The experimental planting was divided into 3 blocks, each block received one type of irrigation treatment only. One irrigation treatment received 6 hour sets, one 12 hour sets, and one 18 hour sets per irrigation. High rise sprinkler irrigation was used. In each block, four times replicated sub-plots of dormant, newly-planted trees were treated with 1/2, 1, and 2 lb. of simazine per acre in 100 gal. of water on April 20, 1966. The untreated check plots were left weedy except for being sprayed out five times with parquat. The differential sprinkler irrigation was initiated on April 21, 1966 and repeated 11 times through the season for a total of approximately 9.6 A", 12.4 A", and 16.0 A". The differential by July 20, 1966 was 3.6 A", 6.0 A", and 8.4 A".

Phytotoxicity ratings (0 = no effect, 5 = severe chlorotic pattern with slight marginal burn, and 10 = all leaves dead) were made on May 16, June 11, and September 8, 1966. Weed control ratings (0 = no weed control, and 10 = complete control of all weeds present) were made on June 11, 1966. The diameter of the trunk of each tree was measured on June 23 and again on