

Propagation of Rootstocks by Trench Layering

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INTRODUCTION

The trench layering method of vegetative propagation has endured the test of time. Its modern rival, tissue culture, has so far not been able to match it in terms of producing the first choice product nurseries require for the production of high-quality, high-performance trees. Rootstocks propagated by trench layering remain the most cost effective, meet the size specifications required, are easy to transplant and handle, and are available when required to take advantage of optimum planting conditions. In addition, rootstocks are not usually adversely affected by the vagaries of weather and in the event of a bad growing season are usually of a buddable size at planting time anyway.

WHAT IS TRENCH LAYERING?

Trench layering consists of growing a plant in a horizontal position in the base of a trench and filling in sawdust around the new vertical shoots as they develop. The shoot bases are etiolated by this procedure. Roots develop from the base of these new shoots and grow into the surrounding sawdust. Trench layering is used primarily for woody species difficult to propagate by mound layering (stool layering). I should point out here that my method differs from that outlined in *Plant Propagation Principles and Practices* by Hartmann and Kester in that I take two years to establish the mother layer instead of one as they outline.

TRENCH LAYERING PROCESS

Establishment Phase (Year One).

- Mother plants, after 1-year's growth in the nursery if from tissue culture or alternatively well rooted 9- to 11-mm rods from an existing trench layering bed, are planted in a straight line down the middle of a trench. Each plant is planted at an angle of 30° to 45° —this angle is critical. Too little and you will not get the desired growth the first 9 months, too great and you will never be able to pin the mother plant in the required horizontal position in the bottom of the trench. The plants are planted 65 to 70 cm apart down the row. This operation will take place in July to August.

It is important that mother plants are not doubled up in the trenches. While it is tempting to do this to get higher production quickly, it is short sighted for it causes an early drop off in production and quality of stock produced.

- After the mother plants have become established and made some growth, usually by the following February, they are laid flat on the

bottom of the trench and secured with wire fasteners. The mother plant must be kept completely flat. At the same time a moderate amount of lateral growth is also pinned down. The plants are then left to continue growing.

- During the first winter (June to July) the mother plants are repinned where necessary to ensure they are flat in the trench. The lateral shoots pinned down the previous February are thinned out as required and shortened. It is important to avoid overcrowding. All other growth is cut back to within 2 cm of the mother plant. This leaves two or three buds to grow the next spring. At this stage it is advisable to use a wound dressing or spray to guard against *Chondrostereum purpureum* (silver Leaf) a major pest of *Malus* species.

Production Phase (Year Two).

- In the second spring as the buds on the now established mother plants break and develop vertical growths, layers of sawdust (untreated) are applied at intervals to etiolate 5 to 7.5 cm of the base of the developing shoots. Apply the first 2.5 to 5 cm before buds swell. Repeat as shoots emerge and before they expand. Later coverings are less frequent and should only cover half the shoot at any one time. The final depth of sawdust should be 15 to 19 cm. In a large-scale operation it is not practical to apply frequent small applications. Usually two applications will suffice and produce good results. However, it is important that final application is completed by the end of November, and that you do have an adequate depth of sawdust. This will vary from cultivar to cultivar. As a general rule, within reason, the more sawdust the better, especially with M793 or harder-to-root cultivars.
- At the end of the second growing season (June to July) the sawdust is removed and the rooted layers cut off close to the original layered stock leaving a small stub for next year's growth. Layering by this process may be repeated annually from the same mother beds. Mother beds if well cared for could last for 15 to 20 years.

Establishment of Mother Plant Beds. As beds are a long-term capital investment and can be expected to produce for 15 to 20 years, thought should, therefore, be given to the following points.

Site Selection.

- 1) Soil should be fertile, well drained.
- 2) Free of soil borne diseases.
- 3) Free of perennial weeds.
- 4) Sheltered from wind—wind can move sawdust around.
- 5) Availability of irrigation water.
- 6) Warm and sheltered with good light, avoid shading.

Mother Material Selection. This is of the utmost importance.

- 1) Must be known to be FKV preferably from a single mother plant or plants that have been individually virus indexed.
- 2) Free from diseases, such as silver leaf and *Phytophthora* spp.
- 3) Good grade and size of mother plants—9 to 11 mm diameter, 500 to 600 mm long.
- 4) Must be in a juvenile form.

Bed Preparation.

- 1) Drain soil if necessary.
- 2) Eliminate weeds, especially perennial weeds.
- 3) Sterilise ground if likelihood of soil borne diseases exist or if sight previously grew apple or pear trees—likely to have been virus infected.
- 4) Conduct a soil test and correct any nutrient deficiencies.
- 5) Thoroughly cultivate area and level.
- 6) Form trenches. These should be 70 to 75 cm wide and 10 cm deep. Rows should be about 1.6 m apart. This will depend on management practices. The number of rows per block will also depend upon individual management practices. I work on six rows and then a tractor bay.

Management of Beds

- 1) Fertilisation programme—fertiliser should be applied annually as site and beds dictate soil tests are helpful in determining amount.
- 2) Irrigation—depending on climate and season—should be applied to obtain maximum growth and to keep sawdust moist.
- 3) Weed control programme in place and working.
- 4) Must have a planned pest and disease control programme in place and working.
- 5) Application and mounding of sawdust must be done on time and accurately. Optimum time is October/November.

QUALITY CONTROL

QUALITY IS NEVER AN ACCIDENT; IT'S THE PRODUCT OF INTELLIGENT EFFORT.

Sadly, quality is often something which is left to chance. At best given lip service, at worst ignored, and usually thought about at dispatch time. Careful attention must be paid to the quality aspect right from bud burst to dispatch.