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STOCK AND SCION STUDIES. XIII. SOME NEW CLONAL PEAR ROOTSTOCKS

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SUMMARY

In a stock-scion trial in south-eastern Queensland, 12-year-old Williams Bon Chretien trees propagated on several Australian rootstocks selected for their ability to root freely in layer or stool beds and designated "T", and on East Malling D3 clonal stock, made better growth and produced heavier crops than trees on Kieffer's seedling. Williams Bon Chretien propagated on its own rootstock gave a poor performance.

The most promising rootstock was T7. It can be propagated in layer beds and confers vigour and earliness of bearing on the scion variety.

I. INTRODUCTION

At the present time most pear trees in Australia are grown on seedling rootstocks of either *Pyrus calleryana* or Kieffer's Hybrid pear.

Greenhalgh (1962) reported the performance of the variety Packham's Triumph on clonal rootstock selections from *P. calleryana* in New South Wales. Trees on the best clone (D6) showed much the same cropping habits as those on open-pollinated D6 seedlings. In nursery practice, therefore, there is a preference for the easily raised D6 seedling rootstock. Trees on seedling rootstocks are normally vigorous but come into crop late. This is a disadvantage in commercial orchards.

Trees on clonal pear stocks such as East Malling D3 produce earlier and heavier crops than those on seedling *P. calleryana* D6 (Thomas 1953). The East Malling clone, however, is shy-rooting in layer beds and its pointed thorns make it unattractive for nursery propagation.

An alternative stock to East Malling D3, with good nursery characteristics and the ability to confer vigour and earliness of cropping on the scion variety, was therefore sought.

II. MATERIALS AND METHODS

Root cuttings and occasional suckers from vigorous trees with an outstanding cropping performance were collected both locally at Stanthorpe in Queensland and in the Goulburn Valley and Harcourt districts of Victoria. Trees which showed a pronounced suckering habit were excluded from the selection on the

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ground that suckering may be a genetic characteristic. From the 65 original selections, 38 were successfully established in layer beds. Six of these, designated T1, T5, T7, T8, T13 and T22, were finally chosen for investigation because of their free-rooting habits and ease of propagation. All produced consistently more than 50% of rooted shoots from layer beds.

In 1952, Williams Bon Chretien trees on each of the six clonal stocks in the T series, on clonal East Malling D3, on Kieffer's seedling, and on their own roots, a total of nine stock-scion combinations, were planted at Applethorpe in a randomized block with 10 replicated single-tree plots. A 10 ft x 10 ft spacing was used in the trial. The trees were pruned to a vase shape by moderate pruning of the laterals and leaders.

Trunk girth was measured 9 in. above the union. The crop was weighed each year, and in 1964 the fruit was also counted.

III. RESULTS

Growth as measured by trunk girth.—From the trunk girth data (Table 1), it is noted that own-rooted Williams Bon Chretien trees were the smallest in the trial. All other rootstocks, both seedling and clonal, increased the vigour of the scion variety.

Growth of trees on Kieffer's seedling was greater than that of own-rooted trees but less than that of trees established on stocks in the T series, of which T8 had the greatest girth.

TABLE 1

GROWTH AND CROP DATA
Mean values

Treatment No.	Rootstock	Girth, 1964 (cm)	Accumulated Crop, 1958–1964 (lb/tree)	Crop, 1964 (lb/tree)	No. of Fruit/lb, 1964
1	T7	31·66	254·0	103·8	3·81
2	T5	29·27	223·4	98·8	3·70
3	E.M.D 3	27·80	219·3	93·8	3·57
4	T1	29·23	206·4	91·9	3·79
5	T8	32·19	179·6	96·2	3·48
6	Own roots	21·16	134·7	47·3	3·93
7	Kieffer's seedling	24·14	103·8	46·2	3·46
8	T13	25·28	*18	*12·7	2·96
9	T22	24·43	*11	*8·1	3·23

* Not included in analysis

Significance:—

Girth, 1964—$1 \geqslant 6, 7, 8, 9$; $2 \geqslant 6, 7, 9$; $3 \geqslant 6$; $4 \geqslant 6, 7, 9$; $5 \geqslant 3, 6, 7, 8, 9$; $1 > 3$; $2 > 8$; $3 > 7, 9$; $4 \geqslant 8$; $8 > 6$

Accumulated Crop, 1958–1964—$1 \geqslant 6, 7$; $2, 3 \geqslant 7$; $2, 3 > 6$; $4 > 7$

Crop, 1964—$1, 2, 3, 4, 5 \geqslant 6, 7$

No. of Fruit/lb, 1964—$1, 2, 4, 6 \geqslant 8$; $1, 4, 6 > 9$; $3 > 8$

Cropping.—Table 1 includes data for the accumulated crop per tree up to 1964, crop weight in 1964, and the number of fruit per lb in 1964.

The heaviest yields were recorded from trees on clone T7, which greatly out-yielded those on Kieffer's seedling and showed a distinct early-bearing habit. Trees on East Malling D3 stock also came into bearing early, confirming a previous finding of Thomas (1953). Trees on clone T8 came into crop more slowly than those on clones T1, T5 and T7 but are now producing comparable yields. Trees on T13 and T22 rootstocks were still quite small and low yielding in 1964.

Suckering.—Suckers are an obstacle to cultural and other operations in an orchard and must therefore be rated as an undesirable character in a pear rootstock.

By 1957, 8 of the 10 trees on clone T22 and 5 of the trees on clone T13 had suckered freely. By 1963, all trees on these two stocks showed persistent suckers and had poor growth and cropping history.

Some suckers developed from trees on clones T5 and T8 but no regrowth took place when these were cut off. No suckering has been recorded from trees on clones T1 and T7 to date.

Propagation.—The value of a clonal stock depends, to a large extent, on the ease with which it can be propagated. T7 and T8 appear to be the most promising nursery types in the T series. In 1964, rooted shoot production from 15-year-old layer beds was 70% for T7 and 53% for T8.

IV. DISCUSSION

The data obtained in this trial indicate that clonal rootstocks T7 and T8 could be commercially useful in Queensland and possibly elsewhere in Australia for the variety Williams Bon Chretien. Both are comparatively easy to propagate. Further, growth and cropping records from 10-year-old trees on these stocks were superior to those of trees on the Kieffer's seedling and *P. calleryana* stocks used commercially at the present time.

V. ACKNOWLEDGEMENT

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