

DEVELOPMENT OF GRAFTS OF RADIATA PINE MADE WITH SCIONS OF VARIOUS ORIGINS

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ABSTRACT

Scions from seven sources were grafted onto seedlings of one full-sib family of radiata pine (*Pinus radiata* D. Don). The object of the trial is to obtain data on juvenility/maturation and incompatibility effects, particularly the differential diameter growth of stock and scion. Ten months after establishment, grafts with scions of one-year seedlings showed the best survival and height growth.

INTRODUCTION

Previous investigations at Mt Burr on the vegetative reproduction of radiata pine have been reported by Pawsey (1970, 1971a and b). An experiment was initiated in June 1972, as described below, to obtain information on the differential growth of scion and stock when grafts were made with scions of various origins.

MATERIALS AND METHODS

Grafting onto 10-month-old full-sib seedlings of the family 033 × 31 was carried out in the nursery bed using, where possible, 20 scions from each of the following sources:

- (1) the 17-year-old seed-parent, tree 033;
- (2) 4-year-old ramets of clone 033 (from that tree);
- (3) 16-year-old ramets of the pollen-parent, clone 31 (R₄);
- (4) 4-year-old ramets of clone 31 (R₇);
- (5) siblings in the same nursery line;
- (6) the tops of the respective seedlings themselves.

R₄ and R₇ designate the 4th and 7th clonal generations. Effects of topophysis were avoided as far as possible by collecting from only the upper crown in the case of the 16- and 17-year-old trees.

Survival counts and interim height measurements were made 8 and 10 months later. A seventh source was introduced then, to extend the range of relationships represented between scion and stock, i.e.:

- (7) seedlings of the same age, from two unrelated families.
(These seedlings had been lined out in the nursery in 1972 to supply refills if required in 1973).

Several additional grafts were attempted also from sources 2 and 3 in order to provide a minimum of 10 grafts for each of the seven sources. All grafts are to be planted in the field at, say, 4 m spacing for periodic observations, particularly on diameter of stock and scion and on health.

RESULTS AND DISCUSSION

Results of the assessment 10 months after grafting are summarised in Table 1.

TABLE 1—Survival* and height* of grafts after 10 months

Source of scion	Survival (%)	Height (cm) \pm S.D.
1. 033, 17 yr	45 a	44 \pm 17.4 x
2. 033, 4 yr	30 a	48 \pm 16.6 x
3. 31, 16 yr	25 a	32 \pm 10.5 x
4. 31, 4 yr	55 a	43 \pm 11.5 x
5. Sib. 0 yr	84 b	72 \pm 9.9 y
6. Self 0 yr	83 b	77 \pm 20.0 y

* Values which do not share a common letter differ significantly at the 5% level (survival) and the 1% level (height).

Grafts made with seedling scion material (sources 5 and 6) had substantially higher survival and early growth rates than those made with scions from physiologically mature trees. From the work of Sweet (1973), also with *radiata* pine, it seems clear that this is a genuine juvenility/maturation effect. The lack of significant differences between sources 1 and 2, and 3 and 4, indicates that the repeated propagation of mature clones did not in this experiment have any effect of "rejuvenation". Libby *et al.* (1972) suggested that to maintain juvenility it may be necessary to begin repeated propagations at an early age, and to restrict at all times the height growth of the trees where juvenility is to be maintained.

REFERENCES

- LIBBY, W. J., BROWN, A. G. and FIELDING, J. M. 1972: Effects of hedging *radiata* pine on production rooting and early growth of cuttings. **N.Z.J. For. Sci.** 2: 263-85.
- PAWSEY, C. K. 1970: Development of grafts of *Pinus radiata* in relation to age of scion-source. **Aust. For. Res.** 5 (1): 15-8.
- 1971a: Inherited susceptibility of *radiata* pine to fused-needle disorder. **Aust. For. Res.** 5 (2): 39-44.
- 1971b: Comparisons of vegetatively-propagated and seedling trees of *Pinus radiata*. **Aust. For. Res.** 5 (3): 47-57.
- SWEET, G. B. 1964: The effect of physiological age of scion on growth of grafts in *Pinus radiata*. **N.Z. For. Res. Note** 37: 8pp.
- 1973: The effect of maturation on the growth and form of vegetative propagules of *radiata* pine. **N.Z.J. For. Sci.** 3: 191-210.