

PLANTING KARRI NURSERY STOCK

by

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Previous trials have shown that Karriwildings can be successfully planted on failed regeneration burn areas, and that a lightly trimmed root pruned 46 to 76 cm wilding is the best size to plant. With a good karri seedfall only every 3 or 4 years however, and the difficulty of obtaining suitable wildings when required, wilding planting will have to be supplemented with nursery plants. If the right type of plant can be raised in the nursery this could give an easier and cheaper supply of planting stock than wildings, and ensure that burning in karri clear felled areas can be done, if desirable, even when there is little or no seed available on the remaining trees.

Wildings have the great advantage of no initial establishment costs - i.e. seed collection, storage, sowing and nursery tending. Their disadvantages are that there may not be an adequate supply when required, or what there are may be so far from the planting site that transport costs are prohibitive. Pulling and trimming will cost more than the equivalent operations for nursery stock. And wildings are necessarily of one type, no root or top pruning can be done until the plants are actually lifted just prior to planting.

The main problem of raising nursery stock would appear to be the provision of a sturdy 46 to 76 cm plant at the optimum planting time. Spring sown seed usually gives a much larger plant than this by the following planting season, but if sowing is left until early or mid-summer, germination is much poorer and the seedlings require more treatment and care in their early stages.

There are 2 ways of overcoming this problem:

- (i) Retarding the growth of plants from spring sown seed.
- (ii) Increasing the germination percentage and survival of summer sown seed.

The object of this experiment was to test ways of achieving the former - i.e. retardation of plants from spring sown seed, and to compare the survival and growth of such plants after planting in the field.

A trial plot was planted on 9 June 1970 at Pine Creek Road, Grey Block, using plants raised in Nannup nursery.

In the nursery, seed was sown on 17 September 1969 and the pre-emergent weedicide, GESATOP, applied at the rate of 1.12 kg/ha.

After germination, the nursery plants were divided into 4 approximately equal sections, and the following treatment applied:

- (i) Control, no treatment other than the normal rate of watering received by all treatments.
- (ii) Root-pruned, i.e. under-cut about 15 to 20 cm below soil level. Commenced 6 February 1970 and continued at monthly intervals.
- (iii) Topped, at about 15 cm above soil level on 6 February 1970 and continued at monthly intervals.
- (iv) Root-pruned and topped on 6 February 1970 and continued at monthly intervals.

When the plants were lifted, the control was divided into two, half being left and half stumped to 15 cm above the root collar.

There were thus five treatments planted in the field.

- a. Control 0.3 to 1.5 m high plants.
- b. Stumps. Cut back to 15 to 23 cm above root collar, no foliage left.
- c. Root-pruned - Average slightly smaller than control, but no extensive tap root.
- d. Topped. Topping had reduced these to squat scrubby looking plants with multiple leaders.

e. Topped and root-pruned - similar in appearance to (d).

Because of the variation in size of the Control plants they were divided into small (up to 0.9 m high) and large (0.9 to 1.5 m high). Stumped plants were treated likewise, being divided into small and large before stumping was done. Though small and large were planted and assessed separately, they still comprise one treatment and must therefore be analysed as one.

The number of plants in each treatment varied, but all plants received were divided equally between a hill site and a valley site. Normal spade planting methods were used, and 57 g of Nutrifert were applied to each tree soon after planting.

It was necessary to root prune most of the stock on planting, as the control and topped plants had developed both tap and fibrous roots, and nursery root-pruned plants had extensive side roots.

A survival count taken at the end of winter, on 18 November 1970, gave the following results:

Treatment	Total Number of plants on two sites	Percentage survivals		
		Hillside	Valley	Combined
Control - large	100	50*	28	39
Control - small	40	30	20	25
Stumps - large	100	0	6	3
Stumps - small	40	5	20	12.5
Topped	175	90	82	86
Root-pruned	140	96	97	96.5
Topped & root-pruned	175	97	93	95

* A further 32% had lost all foliage and looked like dying.

Remaining trees were vigorous in all cases, those on the hillside plot had put on more height growth than those in the valley plot.

A further assessment of the plots in July 1972 showed considerable height growth, though little change in percentage survival. On the hillside site it was impossible to locate all survivors in the control and stumped plots, as there was so much wilding regrowth. It appeared that the 32% doubtful survivors in the 1970 count of large control trees had died, and additional casualties in the other treatments had also shown signs of dying at the 1970 count.

Results were as under.

Treatment	Total Number of plants on two sites	Percentage survivals		
		Hillside	Valley	Combined
Control - large	100	?	18	?
Control - small	40	?	5	?
Stumps - large	100	0	2	1
Stumps - small	40	?	20	?
Topped	175	90	75	82.5
Root-pruned	140	96	94	95.0
Topped & root-pruned	712	92	93	92.5

Remaining trees were vigorous in all cases, those on the hillside plots had put on more height growth than those in the valley plots.

No clear comparison of percentage increment can be made, considering the variety and types of treatment of planting stock, but total heights in July 1972 were as follows:

Treatment	Hillside			Valley		
	No. of survivors	Top Ht in m	Av. Ht in m	No. of survivors	Top Ht in m	Av. Ht in m
Control - large	-	-	-	9	2.99	1.89
Control - small	-	-	-	1	1.71	1.71
Stumps - large	-	-	-	1	0.91	0.91
Stumps - small	-	-	-	4	1.92	1.58
Topped	81	4.85	2.71	64	3.60	1.89
Root pruned	68	5.55	3.72	66	3.41	1.98
Topped & root pruned	83	4.60	2.83	79	3.23	1.83

It will be seen that root pruned plants give the best survival percentage, and topped plants also give good results, but combination of root pruning and topping gives no advantage over straight root pruning. Stumping at time of planting, particularly of the larger plants, is disastrous. The untreated control trees, both large and small, show poor survival, and these have to be planted with great care. Many may be loosened by wind and the consequent drying out of the roots undoubtedly contributes to the death rate.

Untreated plants from September sowings obviously grow too large, and have too much variation in size to be suitable for field planting. They cannot be left to be stumped at planting time, and some form of nursery treatment is essential. Root-pruning would appear to be the most beneficial treatment both for survival and subsequent increment.

The survival figures for root pruned plants might be improved further if some method of side pruning could be carried out in the nursery, though the already high rate of 96.5% would hardly justify too much extra nursery cost. However, the large side roots that develop when undercutting alone is done make pre-planting handling and transport more difficult and necessitates rather drastic side pruning at planting time. Side pruning could be done at the same time as the monthly tap root pruning, by incorporating a set of small discs, keeping the entire pruning to one operation. This would increase costs hardly at all.

Topping is a fairly quick and easy nursery operation being done by a motor mower set at 15 cm above soil level, and driven along the beds. Though topping gives no advantage over root-pruned plants in survival after planting it does give a smaller overall plant, and could reduce transport costs, though it does make handling during planting more difficult. The main disadvantage of using topped plants is their tendency to multiple leaders.

An inspection of the planting site was made in December 1973. While the majority of the topped plant survivors showed little sign of their early multiple leader stage, on the hillside site 7%, and in the valley site 8% of survivors still retained two or more co-dominant leaders.

It appears therefore that some form of nursery treatment is essential, and the most successful is tap-root pruning. Side-root pruning would probably be economically justifiable to reduce handling and transport costs and could give better field results - though this would have to be tested. Topping gives no advantage on survival or increment and a definite disadvantage in tendency to multiple leaders, so should not be done in preference to root pruning.