REGENERATION BURNING IN KARRI

by

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I wish to make it quite clear from the start that this article only examines Karri regeneration burning from the silvicultural point of view. No consideration has been given to any of the management factors that may affect the problem.

Karri is regenerated by leaving seed trees and burning in a seed year. The burn, if reasonably hot, causes total seed fall within a few weeks (see fig. 1). It also creates favourable conditions for germination.

There is usually a period of two to three years without seed, between Karri seed years. The quality of consecutive seed crops also varies considerably.

Also under the clear-felling system far fewer trees are left standing than was the case when the group selection system was in use. These factors have necessitated a greater knowledge of seed supply. A system currently in use (see Ref. 1) allows predictions of future seed years and their quality. The forester can then plan accordingly, i.e. breaks can be prepared in advance around areas it is wished to regenerate. If a good seed year is forecast, the normal 1 to 1.5 trees per acre should provide sufficient seed for successful regeneration. It is also possible to prepare for seed collection during good seed years. If a mediocre seed crop is forecast it is wise to leave slightly more than the usual 1 to 1.5 seed trees per acre to ensure success. If a poor seed year is forecast, it is possible to make preparations for artificial regeneration if this is desired.

Thus preparations for regeneration burning can now be made two to three years ahead with much confidence as we are ever likely to achieve under the present regeneration system.

But the problem of which season to burn in still remains. The situation as regards seed supply is illustrated in Fig. 11.

Fig. 1. SEEDFALL IN KARRI STANDS AFTER BURNS OF VARYING INTENSITY.
Seed crop was approximatly the same in all areas.

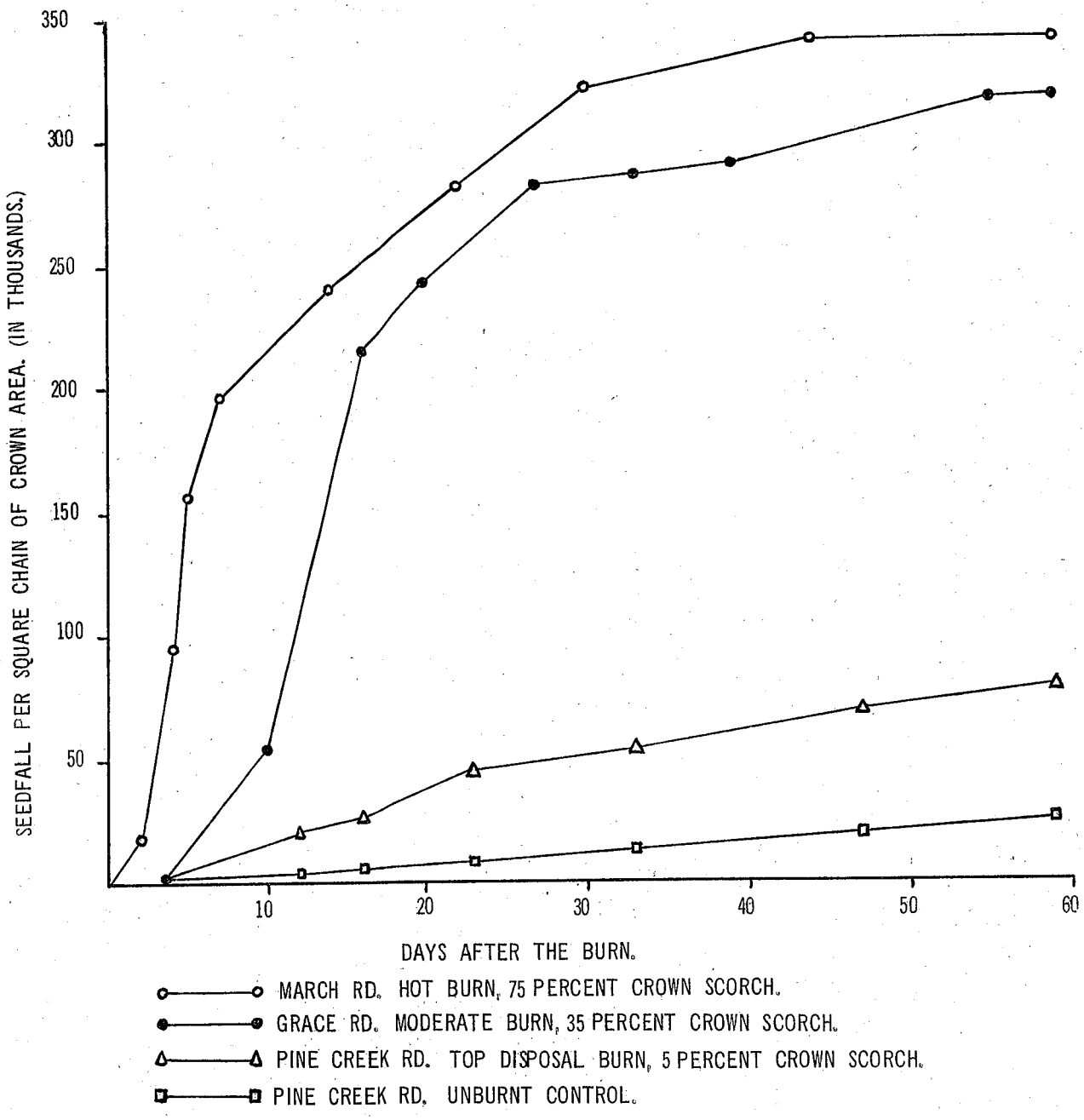
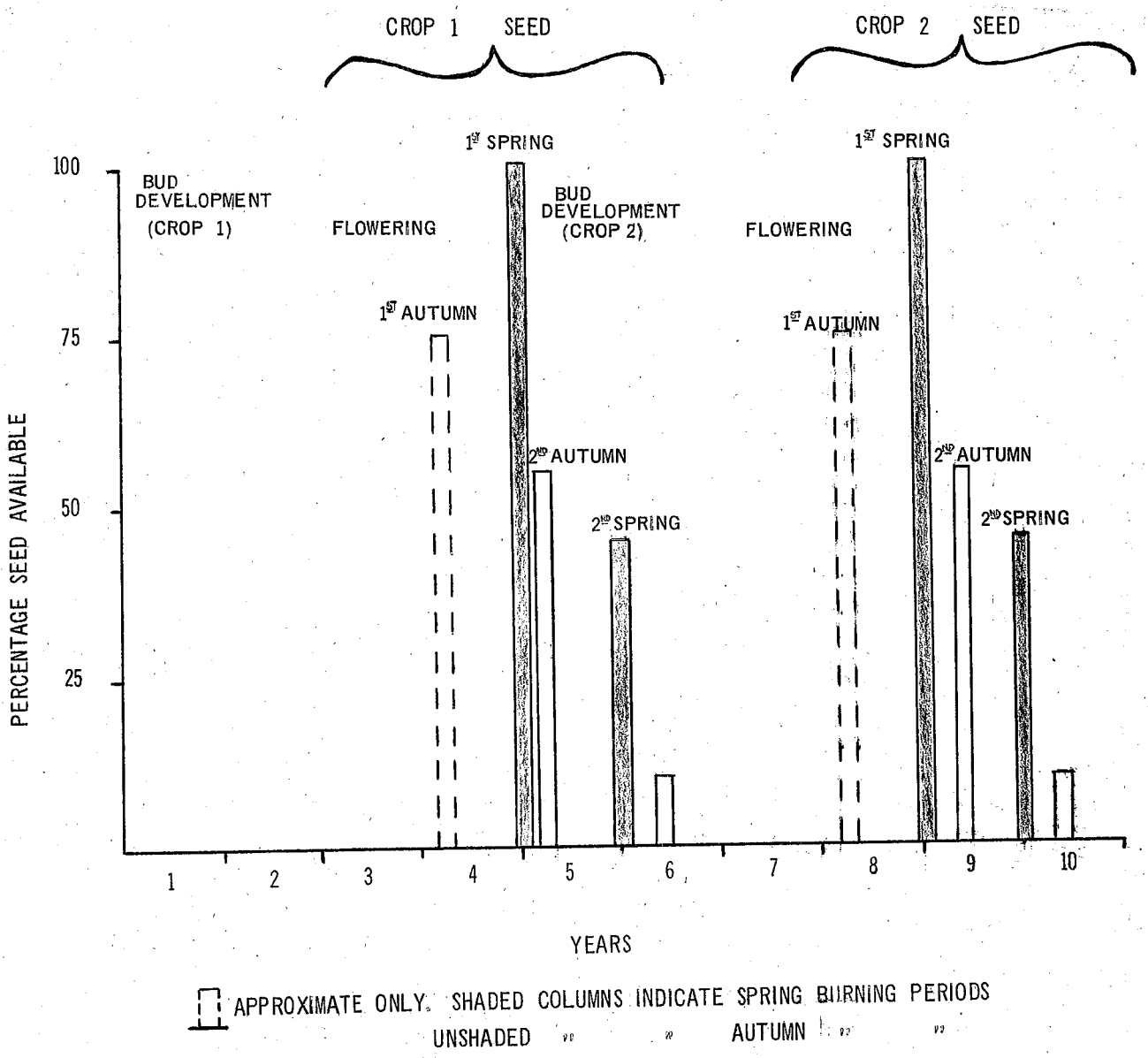


Fig. 2. RELATIVE AVAILABILITY OF KARRI SEED FOR TWO HYPOTHETICAL CROPS DURING REGENERATION BURNING PERIODS.

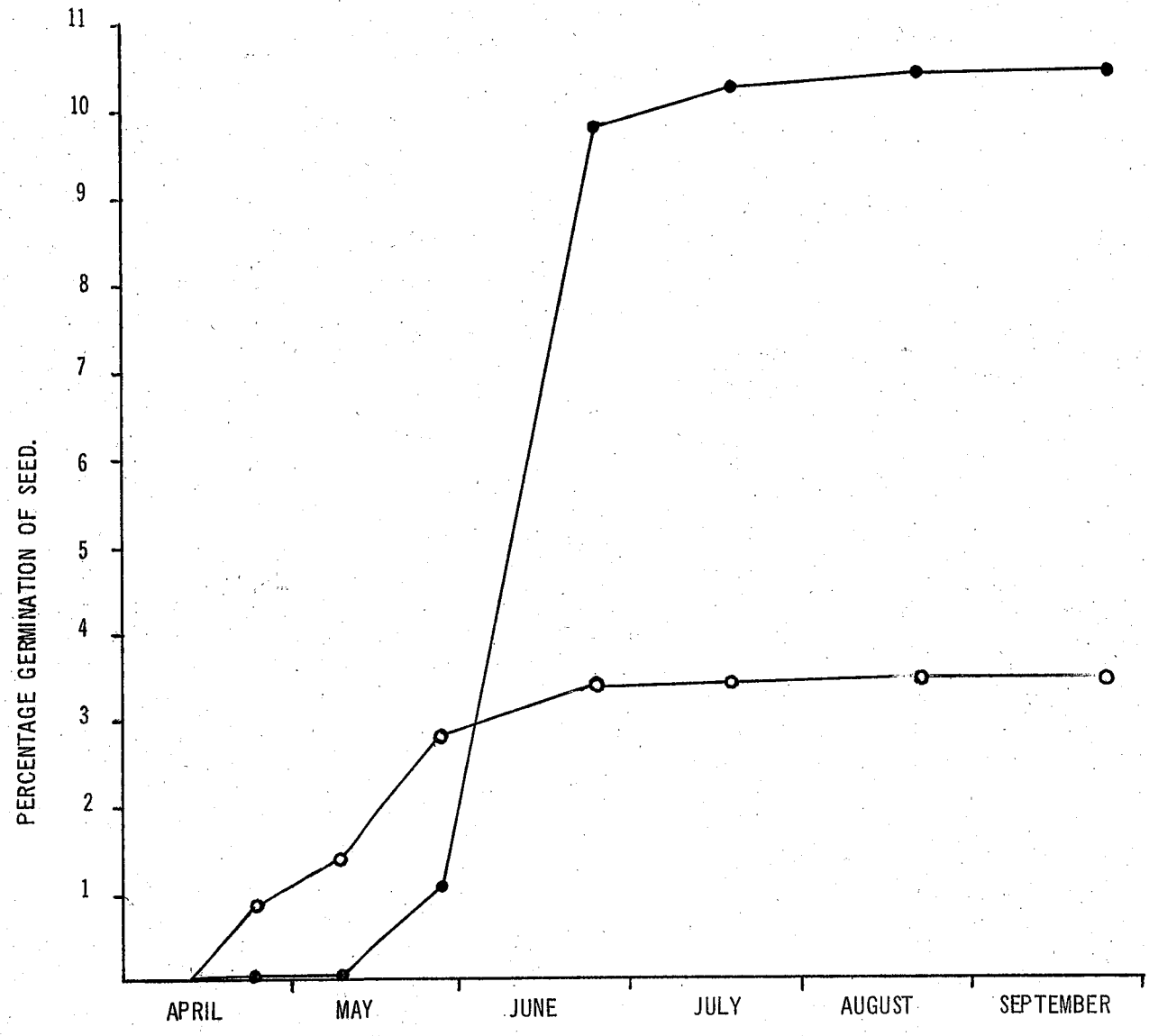


Two crops are illustrated in Fig. 11. Small crops sometimes develop between the main crops, but these seldom reach maturity. If they do then they tend to merge with the main crop. In the first autumn of a crop, it is believed that approximately 75% of the seed only is ripe. This is not yet certain and needs to be confirmed. In the first spring all the seed is ripe., and the maximum amount is available for regeneration. 45 - 50% of the seed is shed over the summer, so that by the second autumn only 50 - 55% of the seed is available. A further 10% may be lost over winter so that only about 40 - 50% is left by the second spring. Most of the remaining seed is shed over the second summer. The best time to burn would then appear to be during the 1st spring or 2nd autumn of a crop. The 1st autumn, if investigations bear out our present beliefs, would also be a good time to burn. Crops are seldom large enough to allow successful burning during the 2nd spring since a large seed supply is required for spring burns. *

*Spring burns 120, 000 seed/acre. Autumn burns 80, 000 seeds/acre.

However it is not that simple. Autumn sown seed in a well replicated trial last year gave 160 - 180% better germination than spring sown seed (see Fig. 111).

Fig. 3. GERMINATION OF SPRING AND AUTUMN SOWN KARRI SEED. MARCH ROAD PLOT.



* GERMINATION OF AUTUMN SOWN SEED IS DELAYED BECAUSE IT WAS SOWN AFTER THE FIRST RAINS, ON 10 / 4 / 69.

AUTUMN SOWN SEED, 10 / 4 / 69

SPRING SOWN SEED, 21 / 1 / 69

DIFFERENCE SIGNIFICENT AT 0.01 LEVEL.

The poor performance of spring sown seed is attributed to the activities of insects over summer, since dieldrin treated seed shows significantly improved germination.

Autumn burning then, even though 45 - 50% of the seed has been lost over summer, should prove better than spring burning. i.e. A 90 -100% improvement in autumn sown seed will make up for the 45 - 50% loss over summer. This is amply made up for by the 160 - 180% gain in germination achieved with autumn sown seed. The 2nd autumn should thus be the best time to burn, and if it is confirmed that 75% of the seed is ripe by the 1st autumn, then this will be by far the best time to burn.

After detailed investigation it has been found that accurate estimates of seed supplies prior to regeneration burning are difficult to achieve. Seed fall has been found to vary by 50 - 60% from the estimated figure. In some cases poor results have also been achieved even though adequate seed was available. This appears to be due to some physical characteristic, as yet unidentified, of certain soils. Because of this it is extremely important to try to burn under the most favourable conditions. A certain percentage of failures is inevitable under the present system, however it pays to reduce this percentage as much as possible, as failures present a number of problems.

Because the seedlings are not big enough earlier it is not usually possible to do a regeneration count till early spring, (see Fig. 1V).

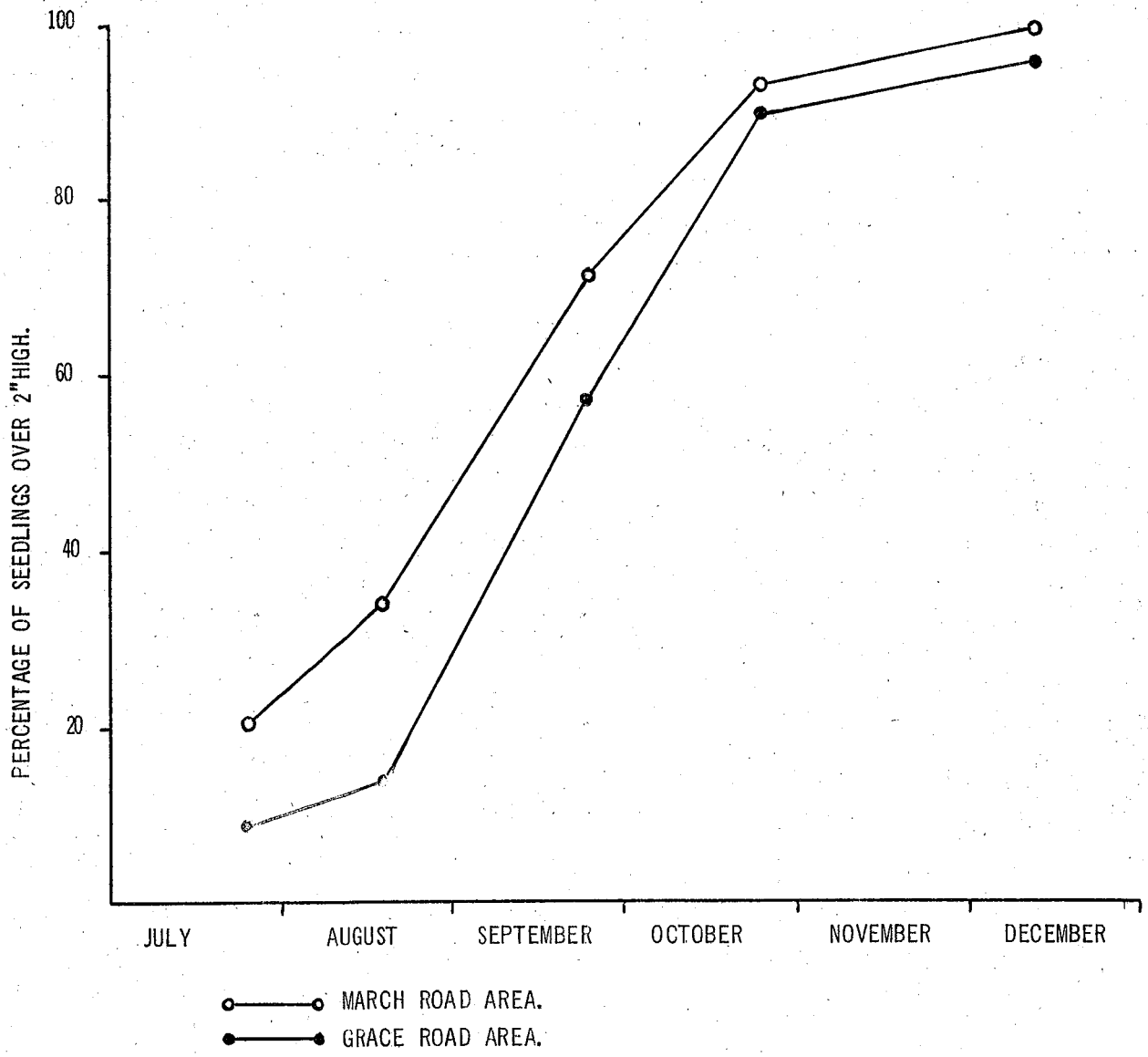
This means that if the area is a failure it cannot be artificially re-stocked till the next winter. The result is a scrub problem. If Karri is planted into scrub it has difficulty suppressing it and may remain 'scrub bound' for some time. Spraying can of course be carried out, but this is an expensive procedure.

Thus from this point of view it pays not to burn unless satisfied that the result is going to be satisfactory. However, not burning in a seed year means planting or leaving the area till the next seed year. As can be seen from Fig. 11, the next seed year is likely to be two to three years away. This time wasted is expensive in terms of lost growth. It could also mean that the area would have to be scrub rolled before it could be burnt.

Thus there is not simple answer to the question, "Shall I burn now or wait?" It is virtually impossible to guarantee success with a seed tree system of regeneration. However, the chances of executing a successful regeneration burn can be increased by proper utilization of the available information on seed crops and germination.

A certain percentage of burns are still destined to be failures, and a certain amount of artificial regeneration will always be necessary.

Fig. 4. PERCENTAGE OF KARRI SEEDLINGS OVER 2" HIGH ON TWO REGENERATION BURNT AREAS IN 1969.



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3. White, B.J. - W.P. 44/65 A: - Final report (Pine Creek clearfelled area). W.A. Forest Dept. Research Officers report.