# THE EFFECT OF REGENERATION METHOD AND SITE PREPARATION ON SUBSEQUENT FUEL ACCUMULATION

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## Introduction

The problem of the initial burning of karri regeneration areas will no doubt grow in importance as cut-over areas expand, with the movement of cutting into mixed marri karri.

The problem is accentuated by the relative intolerance of the young trees to fire and by the fuel build-up resulting from fifteen years of being locked up. Consequently, any means by which fuel accumulation may be avoided is going to be a distinct advantage when the time for the first burn arrives.

The following study arose from a request from S.D.F.O. Underwood to make quantitative measurements on what appeared to be a variation in fuel build-up resulting from different regeneration methods.

## Method

The site of the study was the "Collins Plots" in Pemberton Division, off Moon's Crossing Road. They were initially set up as a trial of various regeneration methods.

There were 3 types of regeneration (natural, planted, group selection), two types of site preparation (ploughed, not touched) and two treatments (fertilizer, no fertilizer). Details are given in Table 1.

Fuel sampling involved:

(a) Leaf litter - measured by depthing.

(b) Trash fuel - measured by heighting.

(c) Scrub fuel - measured by point sampling to give:

$$\text{Scrub Cover Density} = \frac{\text{Total No. contacts recorded on vegetation}}{\text{No. of rods with at least one contact}}$$

$$\text{Area Cover Density} = \frac{\text{Total No. contacts on vegetation}}{\text{No. of rods with zero contacts}}$$

The two expressions were needed because the Scrub Cover Density only gave the average value for the rods that recorded contacts, that is a measure of profile density. The Area Cover Density, however, indicated the spatial distribution of the scrub over the sample area.

Results (See Table 1)

(a) Leaf litter

Litter build-up was only moderate on all sites, with differences between treatments not significant.

(b) Trash Weight

Trash proved to be the bulk of the fuel build-up, and it was quite apparent that those areas with the least site preparation had the greatest trash build-up.

Sites N, $B_3$ and $B_1$ with 49, 47 and 42 tonnes/ha respectively had the highest values. These three sites were characterized by a complete lack of ground preparation prior to the sowing for the natural regeneration (N) and the planting for $B_3$ and $B_1$. $A_1$ and $A_3$, which had been felled, bulldozed and then ploughed, had significantly lower trash weights (17 and 12 tonnes/ha respectively). A direct comparison can be made between $A_1$ and $B_1$. In $A_1$, which had been ploughed prior to planting, a trash fuel weight of 17 tonnes/ha was recorded, whereas $B_1$, where no ploughing had taken place, gave a value of 42 tonnes/ha.

It is important when considering these results to realize that the trash layer was the remains of the original scrub germination following clearing. This scrub, which dies naturally or is eventually suppressed by canopy formation, forms the bulk of the fuel, and, because of its deep and well-aerated nature, it is very difficult to burn. It is apparent then that regeneration methods such as N, $B_1$ and $B_3$, which involve minimum site preparation, encourage profuse scrub germination compared to regeneration methods such as $A_1$ and $A_3$, which involve intensive site preparation.

(c) Scrub Cover

The results show that $C_1$ had the greatest Scrub Cover Density and Area Cover Density, followed by $B_3$. The other treatments varied in their order of Scrub Cover Density and Area Cover Density. However, allowing for equal influence from both, the progression from densest to sparsest would continue $C_2$, $B_1$, N, $A_1$ and $A_3$.

Once again, the trend is for a decreasing amount of scrub with an increasing degree of ground preparation, with one exception - the natural regeneration. This anomaly may be explained by looking at scrub top height. It appears that the original scrub consisted of a low variety (in this case, Acacia pulchella) and a tall variety (Trymalium spathulatum). The Trymalium survived to form a tall overstorey of medium density, whilst the Acacia died off to form the heavy trash layer. This appears to be the case with $B_1$ as well. $B_3$, however, which was on a par with natural regeneration as far as ground preparation goes, maintained a heavy scrub layer following the trash layer formation.

Conclusion

These results clearly indicate that ground preparation, and to a lesser extent planting, markedly reduce the subsequent fuel build up. Ploughing in particular appears to kill off the bulk of the germinated scrub, drastically reducing trash build-up and hence markedly decreasing total fuel weight. Planting with fertilizer would no doubt also lead to the formation of quick canopy closure, again inhibiting scrub formation.

From these results it would appear to be a major fire control advantage to conduct intensive site preparation and planting.

TABLE 1

| Regeneration Method | Site Preparation | Litter Weight (t/ha) | Trash Weight (t/ha) | Total Ground Fuel Weight (t/ha) | Scrub Cover Density | Area Cover Density | Scrub Top Height (m) |
|---|---|---|---|---|---|---|---|
| Natural (N) | Cut Burnt 1966 | 11.0 | 49.0 | 60 | 3.0 | 12 | 4.2 |
| Planted A1 3 x 3 m | Burnt, Bulldozed Ploughed 1966 | 8.0 | 17.0 | 25 | 2.4 | 13 | 2.6 |
| Planted A3 3 x 3 m | Burnt, Bulldozed Ploughed 1966 | 8.0 | 12.0 | 20 | 1.9 | 4 | 1.6 |
| Planted B1 3 x 3 m | Burnt, Bulldozed Not ploughed | 8.0 | 42.0 | 50 | 3.6 | 9 | 3.6 |
| Planted B3 3 x 3 m | Cut, Burnt No bulldozing Not ploughed 1966 | 10.0 | 47.0 | 57 | 3.9 | 36 | 3.2 |
| Planted C2 3 x 3 m | Cut, Unburnt, Cleared 1966 | 11.0 | 23.0 | 34 | 3.0 | 27 | 2.7 |
| Standards With Advance Growth + gaps planted C1 | Patches Burnt, Cleared 1966 | 7.5 | 23.0 | 30.5 | 4.7 | 42 | 2.7 |