Blackwood

and other cabinet timbers

Info Sheet No. 3 – Management Regimes

Private Forests Tasmania

This series on Blackwood and other cabinet timbers has four parts. Each part can be read individually or as part of the series.

1. Overview
2. Establishment
3. **Management Regimes**
4. Labour Estimates

MANAGEMENT REGIMES

To produce high value plantation grown blackwood, pruning and thinning of the blackwood is required along with thinning of the nurse crop (if established).

PRUNING REGIME

As a general guide, pruning should be 'little and often'. This will be more expensive than more conventional pruning lifts. The aim is to develop a framework in the first 8-10 years on which to grow high-value clearwood.

FORM PRUNING

Annual form pruning is required from age 2 onwards. Blackwood possesses little apical dominance, with multiple leaders usually developing. Form pruning aims to concentrate growth in the dominant leader by removing or shortening competing leaders. This process must be undertaken annually.

Two methods of form pruning have been developed in New Zealand:

1. **Leader Training**

   An understanding of blackwood growth patterns is required. This is described in *BLACKWOOD: A Handbook for Growers and End Users*[1].

   - Leader training is appropriate for form pruning from the ground with secateurs (handheld and long-handled secateurs) to a height of 3-4 metres.
   - The most vigorous leader is usually selected, with competing leaders either removed or shortened. When two shoots are competing equally, the shoot with the lowest stem attachment should be selected.[1]

2. **Gauge Pruning**

   Easiest method of form pruning. Any competing leaders or branches that exceed a predetermined diameter are removed.

In New Zealand, a 30mm gauge is recommended.[1] Due to slower growth rates compared to many New Zealand sites, and the potential for Wattle grub infestation, the following gauge sizes have been used for pruning in Tasmania. An **18mm Gauge** is used for the removal of competing leaders and the shortening of branches to minimise branch development (Figures 1 & 2).

25mm Gauge - Any branches that do not fit within the gauge are removed, regardless of where they occur on the stem (Figure 3).

Important Note: The above gauge sizes are a guide and not recommended on the basis of formal research. Suggested sizes are based upon limited experience in Tasmania. Optimum gauge size may be refined over time and with further experience.

Form & Pre-emptive Pruning

- Form Pruning - Any competing leaders that do not fit within an 18mm gauge are either removed at their base or shortened (figures 1 & 2).
- Pre-emptive Pruning - Vigorous branches that are between 18mm & 25mm in diameter should be shortened by removing ~50% of the foliage. For example, should a vigorous branch of 24mm diameter not be shortened, it may attain a diameter of 35-40mm by the time it is removed 12 months later. Large diameter branches take much longer to occlude, increasing the risk of decay and infestation by wattle grub.

Figure 1 - Pre form pruning

Figure 2 - Post form pruning

The gauge can be seen in **Figure 1**. This gauge is made from plywood, with 18mm and 25mm gaps. In Figure 1, three competing leaders can be observed above the gauge. Of these, the dominant leader was chosen as that on the right.

Figure 2 shows the completion of form pruning, with all undesirable competing leaders removed. The diameter of the retained leader is ~20mm. As competing leaders have been removed at a relatively small size, the retained leader will straighten as growth continues. At the next pruning operation in 12 months' time the stem should be nearly straight, with only a slight stem kink. Form pruning continues annually until a straight stem of the desired length is produced.

The gauge in Figure 1 rests upon a branch that has also developed into a competing leader. It is less than 25mm but more than 18mm in diameter. As it is a competing leader, it has been removed at its base. If this branch were lower on the stem and not a competing leader, removing half the foliage would prevent excessive growth (**pre-emptive pruning**).

Figure 3 shows the removal of vigorous branches that exceeded 25mm in diameter. Pruning in this manner (pre-emptive clearwood pruning) ensures pruning wounds remain relatively small. Quality pruning cuts, small branch size at time of removal and continued diameter growth should ensure that occlusion of the branch stubs occurs within 2-3 years. Poor quality pruning, large branch diameters and/or suppressed growth may result in slow occlusion over 5-6 years, increasing the chances of decay and Wattle grub infestation of pruned branch stubs.

Figure 4 shows form pruning at age 5.5 from the top of a 4.2 metre ladder using a safety harness. Tree height is ~7 metres. Stem diameter at the top of the ladder is 7-8cm. Surrounding nurse crop trees are *E.nitens*.

Figure 3 - Removal of large branches.

Figure 4 - Form Pruning from a ladder.

CLEARWOOD PRUNING

Clearwood pruning should be undertaken with the following objectives:

- Maintaining at least 3 metres of green crown above the pruned height[1].
- Minimising the DOS (Diameter Over Stub) to maximise clearwood recovery.

Figure 5 shows an 80mm gauge placed on the stem where stem diameter is 80mm. All branches below this point are removed (**figure 6**). With an 80mm gauge and annual pruning visits, the largest DOS is expected to be 10-12cm.

Depending upon the growth environment, it may not be possible to attain a DOS as small as 10-12cm while maintaining 3 metres of green crown. In such circumstances, always retain at least 3 metres of green crown and accept a larger DOS. Research in New Zealand has found that retaining 1.5 metres of green crown achieves a DOS of ~11cm. At this level of pruning, height and diameter growth of the blackwood is significantly reduced compared to trees with 3 metres of retained crown[1].

NB - When blackwood is grown with a nurse crop of *E. nitens* experience suggests that a DOS of 10-12 cm may be achieved whilst retaining at least three metres of green crown.

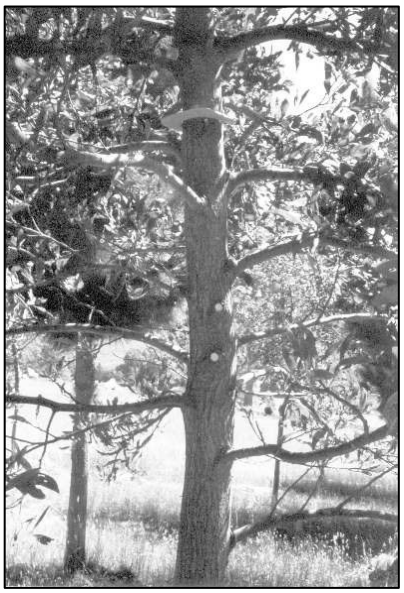


Figure 5 - Pre Clearwood Pruning

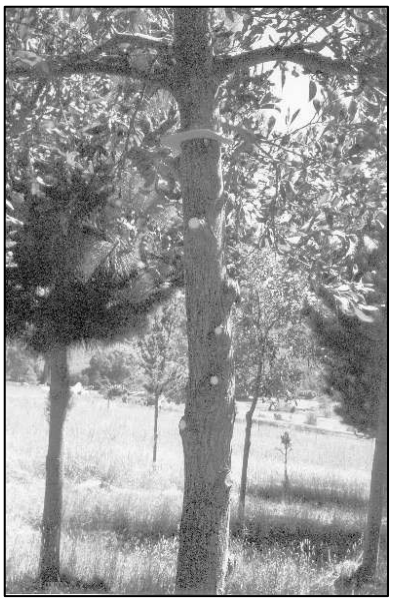


Figure 6 - Post Clearwood Pruning

How many trees should be pruned?

Final pruned stocking should be ~200 stems/ha at the completion of clearwood pruning and thinning by age 8-10[1]. More trees should be pruned early in the rotation to ensure the final selection of vigorous, healthy trees with relatively even spacing.

- Form prune all trees to a height that can be reached from the ground. Ignore those that are obviously not suitable due to excessively poor form and growth. This may mean form pruning as many as 80% of the stems.
- Once a ladder is required, continue form pruning the best 400 stems/ha.
- Clearwood prune the best 400 stems/ha to a height of 3-4 metres, ensuring that no more than 2 adjacent trees within rows or 2 trees/group are pruned.
- Once a second lift ladder is required to continue clearwood pruning above ~4 metres, prune the best 200 stems/ha. At this stage, thin all non-final crop blackwood and continue pruning to ~6.5m

Note: Pruning 400 stems/ha to a height of 3-4 metres may seem excessive. Selection of the best 200 stems/ha should depend on the following:

- Tree health: some trees may show an indication of crown dieback, decay in the pruned branch stubs and/or have Wattle grubs present. Such trees should be thinned.
- Height and diameter growth: where possible, select the dominant trees.
- Relatively even spacing of final crop trees is desirable. Pruning additional stems allows selection of the best trees while achieving relatively even spacing.

Pruned Height

A pruned height of 6.5m is recommended. Not all trees may be of suitable form to continue clearwood pruning to this height. On lower quality sites where growth is slow, a shorter pruned height of 4-5m may be appropriate. Pruning to greater heights may stress the trees, increasing the risk of decay and Wattle grub infestation. Prune as high as tree form and vigour allows. In summary, *the tree dictates the pruning height*.

When to Prune

Pruning should be conducted in November/December when vigorous growth is occurring. This is particularly important when form pruning, as pruning in winter or early spring before rapid growth has occurred may not allow selection of the best leader.

High quality pruning equipment is recommended including bypass loppers, holster (for carrying loppers when climbing ladder), pruning ladder (lightweight aluminum in 2.4m and 4.2m lengths) and safety harness for use with ladder. Safety must be a priority when working at any height above ground level.

THINNING REGIMES

Thinning the Nurse Crop

Thinning of the nurse crop must take into account the following:

- Increased exposure to wind and light following thinning often causes deterioration in tree form, further increasing form pruning requirements.

- Excessive thinning may result in windthrow of the blackwood, particularly if the blackwood has become suppressed.
- Potential damage to the retained Blackwood during felling of the nurse crop.

NB - Anticipated thinning ages are indicative only and will vary from site to site, depending upon stocking and the relative growth of the blackwood and nurse crop.

Group Planting with a High Nurse Crop Density *(refer to diagram over page)*
The following example is based upon:

- ~200 groups/ha (7.0m b/w groups) with 4 blackwood planted/group.
- ~600 nurse crop trees/ha for a total stocking of ~1,400 stems/ha.

Initial Plantation Layout
Nurse crop trees indicated by 'n' are closer to the blackwood groups (~2.7m) than those indicated by 'N' (~3.5m) when the blackwood is planted 2.0m apart within groups.

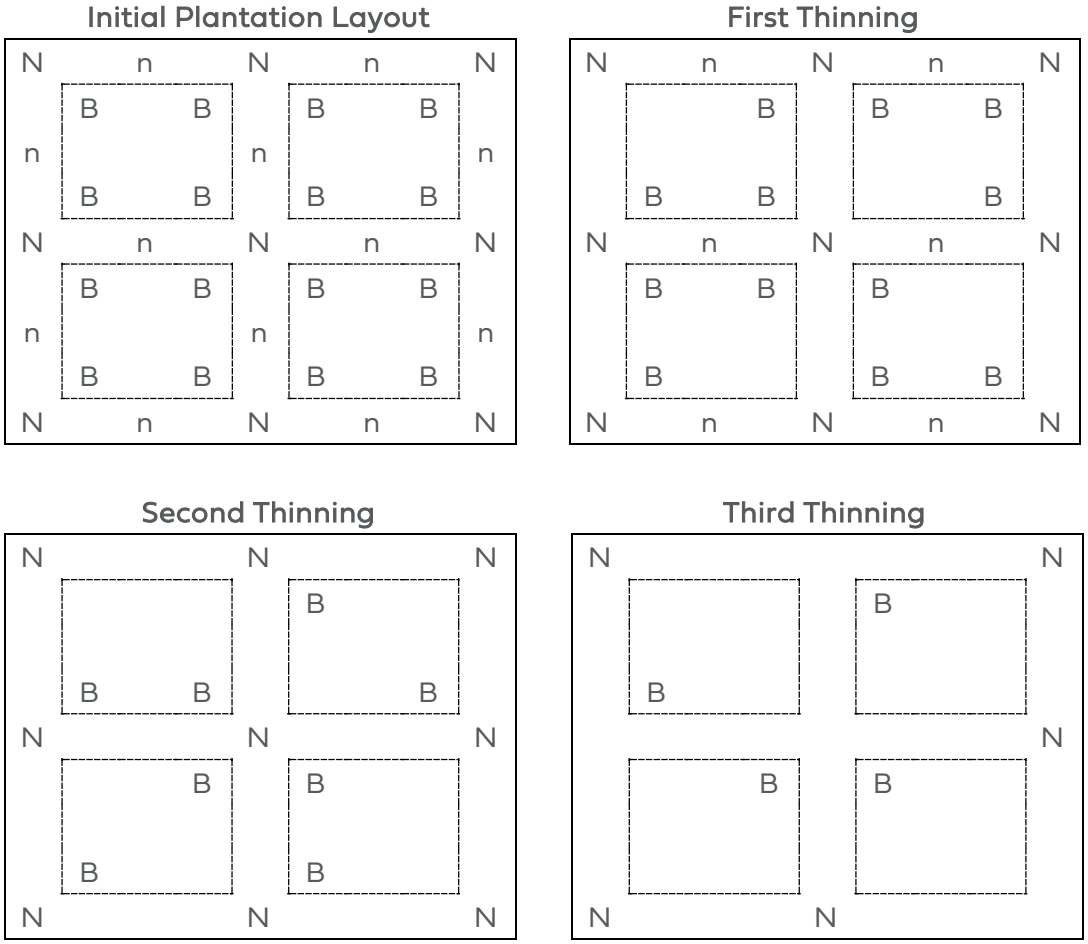
First Thinning (anticipated age of 4-5)
- Remove 50% of the 'n' nurse crop trees (~200 stems/ha).
- Stem injection with glyphosate to kill the trees is recommended. Manual felling may damage the blackwood, as gaps between trees are small.
- Thinning can be regular (as illustrated) or by thinning the dominant trees. Thinning the dominant trees first may reduce suppression of the blackwood.
- Blackwood reduced to the best 3 or 4/group (thinning of poor quality trees only) *.

Second Thinning (anticipated age of 5-6)
- Remove the remaining 'n' nurse crop trees (~200 stems/ha).
- Manual felling is recommended at this stage, including felling of the dead stem-injected trees from the first thinning. Dead stem-injected trees will eventually fall on their own accord as the stems decay over a number of years. This poses a safety hazard to anyone within the stand and potential damage to blackwood stems.
- At the completion of this thinning stage, the retained stocking of nurse crop trees 'N' is ~200 stems/ha with each group of blackwood surrounded by 4 'N' trees.
- Blackwood reduced to the best 2 or 3/group*.

Third Thinning (anticipated age of 6-8)
- Remove 50% of the 'N' nurse crop trees (~100 stems/ha).
- Stem injection with glyphosate is recommended.
- Thin the dominant nurse crop trees that are closest to the blackwood, while retaining an even distribution across the stand.
- Blackwood reduced to the best 1 or 2/group*.

Fourth and Final Thinning (anticipated age of 8-10)

- Manually fell the remaining nurse crop trees (N) and those that were stem injected during the previous thinning operation.
- Blackwood is reduced to final stocking.



* Blackwood of good form and vigour should be retained as long as possible. If they begin to grow away from each other and exhibit stem curvature, then they should be thinned immediately.

Thinning of the nurse crop occurs over a 4-6 year period, during which time the stand is gradually opened up. Gradual thinning minimises suppression and the potential for windthrow.

Group planting with a low nurse crop density

Thinning is undertaken in 2 stages, as outlined in the third and fourth thinning operations for nurse crops planted at high density.

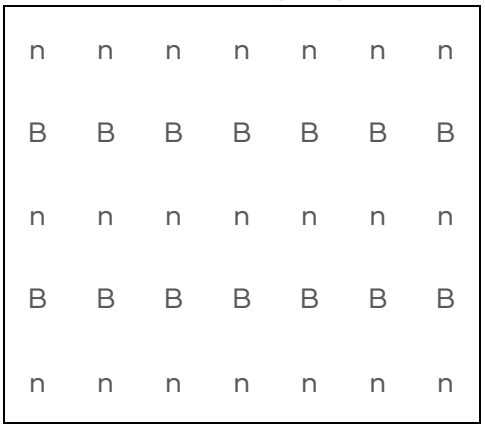
Thinning Regime for Row Planting

The following example is based upon:

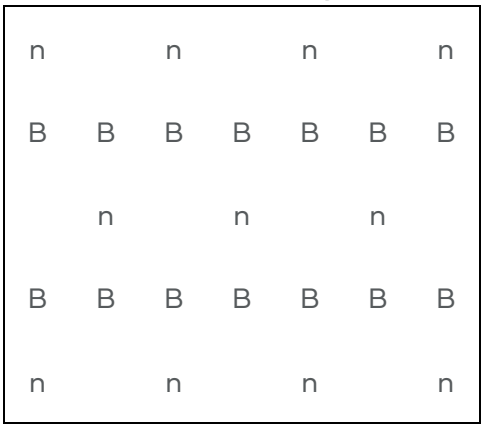
- Alternate rows of Blackwood and *E.nitens* with 3.0m between rows.

- 2.5m between trees within rows for a stocking of 667 stems/ha of each species.

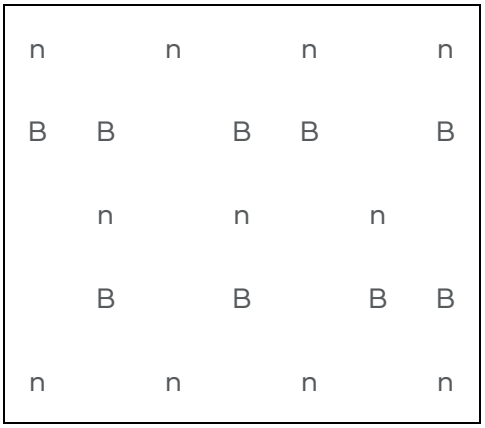
Initial Planting Layout



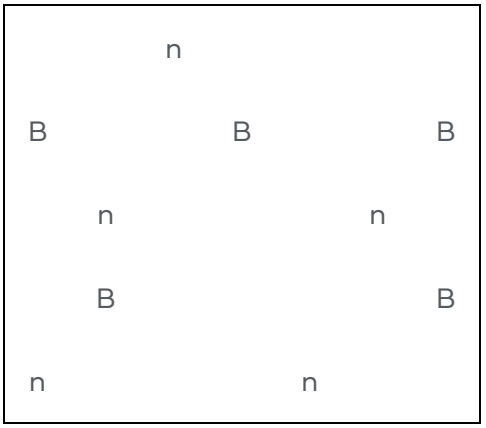
First Thinning



Second Thinning



Third Thinning



*** Fourth and final thinning removes the last of the nurse crop trees (n).**

First Thinning (anticipated age of 4-5)

- Remove 50% of the nurse crop trees. Every second nurse crop tree along a row is thinned. Thin alternate nurse crop trees within adjacent rows to provide an even distribution of nurse crop trees throughout the stand, as illustrated.
- Stem injection with glyphosate to kill the trees is recommended. Manual felling may damage the blackwood, as gaps between trees are small.

Second Thinning (anticipated age of 5-6)

- Blackwood is thinned to the best 400 stems/ha, with no more than 2 adjacent trees retained.

Third Thinning (anticipated age of 6-8)

- Manually fell ~50% of the remaining nurse crop and those previously stem injected. Thin the dominant nurse crop trees while maintaining relatively even spacing.
- Blackwood is reduced to the final stocking of ~200 stems/ha.

Fourth Thinning (anticipated age of 8-10)

- Manually fell the remaining nurse crop trees.

Blackwood Thinning (no nurse crop)

Retain unpruned trees for as long as possible to maintain mutual shelter throughout the stand, thereby increasing height growth and reducing branch development.

- Clearwood prune the best 400 stems/ha to ~4 metres (anticipated age 6-7) and thin blackwood of poor vigour (those that are small and not likely to influence the growth of neighbouring trees).
- Continue clearwood pruning the best 200 stems/ha to 6-7 metres while maintaining relatively even spacing and thin to the final stocking (anticipated age 8-10).

What distance between final crop trees?

It is recommended that the minimum distance between final crop trees following the completion of thinning is 4-5m. Retaining trees closer than 4.0m may result in crown 'shyness' and the development of an asymmetric (unbalanced) crown[1]. The result may be the formation of tension wood in the stem, with subsequent milling and drying difficulties. When trees are planted closer than 4.0m apart, no two adjacent trees should be retained as final crop trees.

REFERENCE

[1] Nicholas, I. & Brown, I., (2002). Blackwood: A Handbook for Growers and Users, Forest Research, Bulletin No. 225, New Zealand Forest Research Institute Limited.

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