



Farm Forestry in the Adelaide Hills/Fleurieu Peninsula

PRUNING GUIDELINES FOR FARM FORESTRY

Martyn England, farm forestry development officer

This Farm Forestry Note provides an introduction to tree pruning for commercial timber production, and more specifically a guide as to:

- whether pruning is necessary
- the timing of pruning operations
- practical requirements and considerations.

Why Prune?

There are two aspects to pruning which are relevant to farm forestry operations:

- form pruning
- clearwood pruning

Pruning involves removing growing branches to prevent their development. It is undertaken to produce high quality, high value logs. Therefore only prune if it will make your product more saleable or profitable. There is little sense in pruning a firewood planting, unless you can attract a market premium for knot-free firewood!

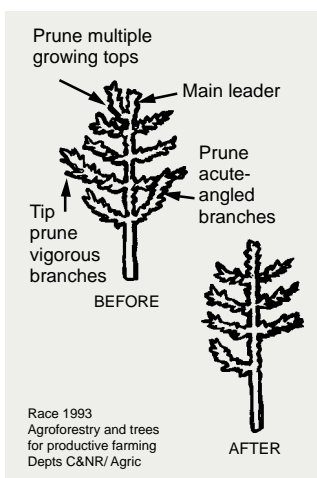
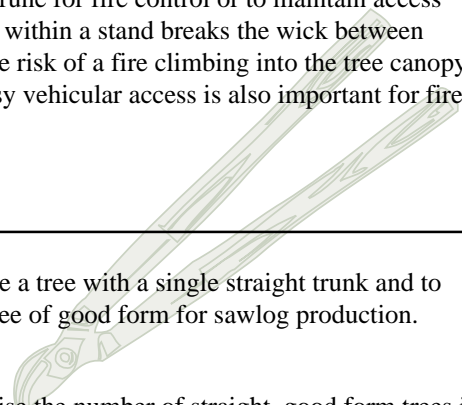
In some situations you may need to prune for fire control or to maintain access along tracks. Pruning lower branches within a stand breaks the wick between ground and canopy fuels, reducing the risk of a fire climbing into the tree canopy and “crowning”. Pruning to allow easy vehicular access is also important for fire protection and stand management.

Form Pruning

The aim of form pruning is to produce a tree with a single straight trunk and to restrict branch growth to produce a tree of good form for sawlog production.

Aspects of Form Pruning

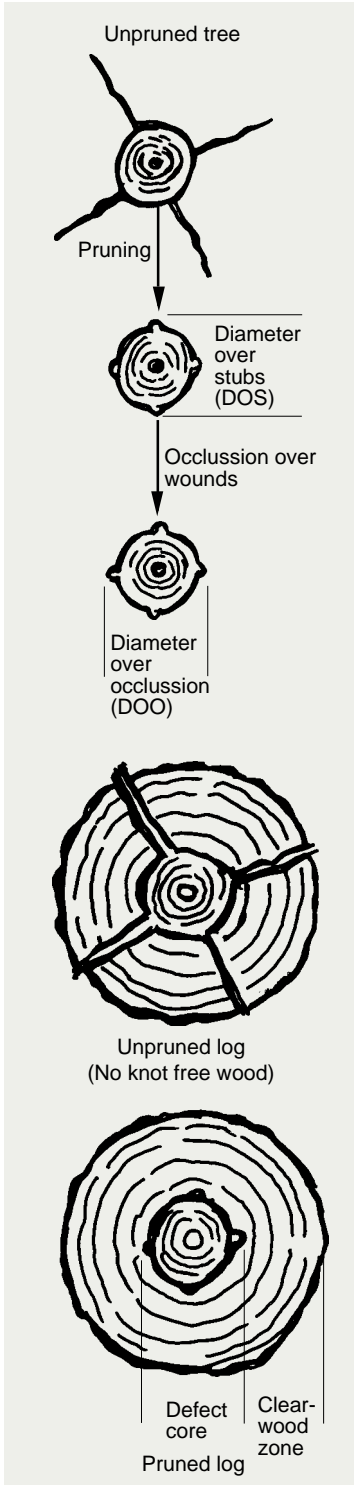
Good early form pruning will maximise the number of straight, good form trees in a stand. This will provide greater flexibility and control in spacing and selecting the final crop trees.



Effective form pruning will:

- maintain one main straight growing shoot by removing double and triple leaders
- remove any branches greater than 2.5 cm in diameter, regardless of the stem diameter. Note: if you judge that branches are likely to be greater than 2.5 cm in diameter before the next pruning, you can “tip prune” which will reduce branch development without excessively retarding tree growth
- remove any branches growing at an acute angle (less than 30°) with the main stem
- on windy sites reduce the “sail area”, minimising the risk of trees leaning over

Comparison of an unpruned log and a pruned log



Clearwood pruning — direct regime

The aim of clearwood pruning is to produce high-quality timber free of knots.

After the branches are removed the branch stubs will occlude (grow over) and outside this growth of knot-free or clearwood will commence. This will result in a low-quality knotty cylinder in the centre of the tree surrounded by a sheath of high quality clearwood. The “target” defect core should be 15-18 cm.

Prospects

Clearwood from pruned trees is a direct substitute for wood products from old plantation trees. Government policy has reduced the rotation length which means less clearwood will be produced from State forests in South Australia. Old clearwood producing stands are being harvested in the short term. Pruning is currently uneconomic for industrial forestry operations because of high labour costs.

This means there is an ideal opportunity for farm forestry to produce clearwood for a niche at the top end of the market.

Certification

A scheme recording and certifying pruned stands is operating in conjunction with the Australian Forest Growers. This will guarantee the size of the “defect core” and provide a guide of log quality to sawmillers. With such certification pruned high-quality clearwood logs will be more likely to attract a premium price.

Planning your clearwood pruning

It is essential to cull poor trees from the stand before starting to prune. This will ensure you don’t waste time and effort pruning poor trees with little or no potential for producing quality sawlog.

The timing of pruning operations is critical in achieving value for effort:

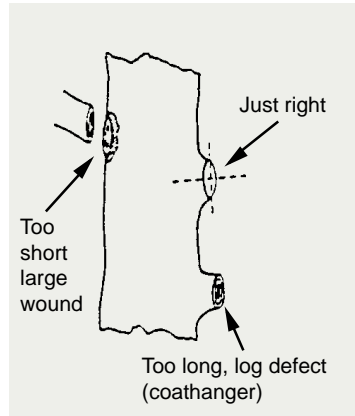
- pruning too early reduces the leaf area and retards tree growth
- pruning too late results in a large knotty core, with loss of valuable clearwood; pruning large diameter branches is also heavier and more difficult work

Although the timing of pruning is important, it is flexible enough that you can do it on a seasonal or casual basis, so it can be worked around other farm jobs.

Tree diameter determines:

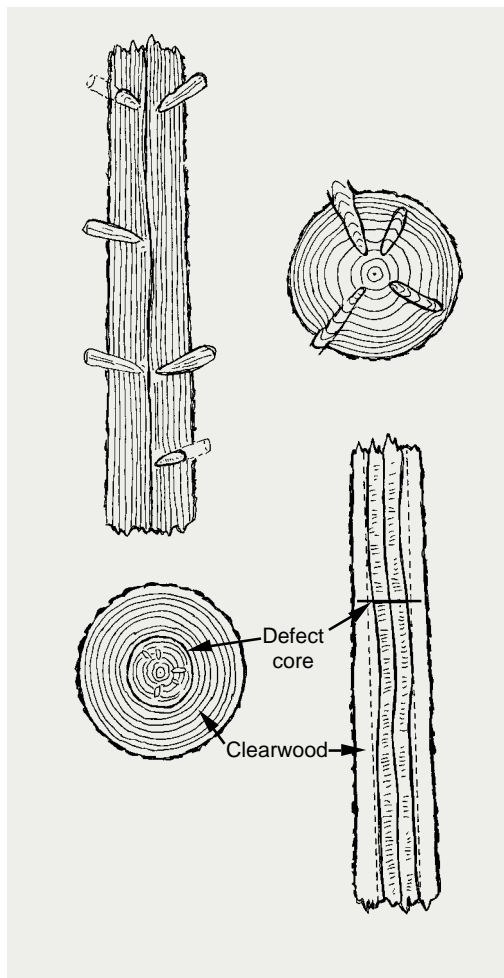
- when to start pruning
- how many branches to remove
- the height each pruning “lift” is taken.

The length to leave pruning stubs



After Race 1993

Cross-sections and longitudinal-sections of an unpruned tree (upper) showing knotty wood, and a pruned tree (lower) showing clearwood sheath around the defect core.



MacLaren 1993
Radiata pine growers manual
FRI Bulletin No.184

Clearwood pruning should start when the tree diameter is 10 cm or greater.

Trees should be pruned up to and *not past* a stem diameter of 10 cm until the desired final log length is reached. This depends on the species and is normally 6 m but slower growing or more valuable species may be pruned to 4 m or even less. The final pruned height is the desired log length plus an allowance for the height of the stump at harvest —typically an extra 30 cm, giving pruned lengths of 4.3 m or 6.3 m.

A pruning regime is a relatively short term commitment within the total rotation (growing period) and is normally undertaken from 3–4 years until 8–10 years of age, depending on the growth rate and the particular tree species.

General guidelines for project planning purposes are:

Form Pruning — several hours per hectare twice a year for the first three years.

Clearwood pruning —two to three days per hectare per year from Year 4 to possibly Year 10.

How to prune

The branch stubs left after pruning should be short, enabling the wound to occlude quickly. You must ensure that the branch collar is not damaged by cutting off the branch too close to the stem, as this will increase the size of the wound and delay occlusion.

The target defect core of 15-18 cm should include an allowance of 3 cm for the occlusion scars as the branch stubs grow over. Thus the defect core is often expressed as the *Diameter Over Stubs* (DOS), or *Diameter Over Occlusion* (DOO).

Equipment required

Form pruning:

- secateurs
- long handled pruners.

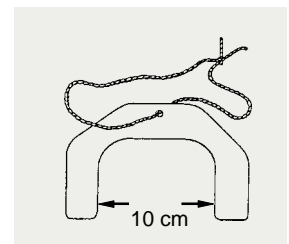
Clearwood pruning:

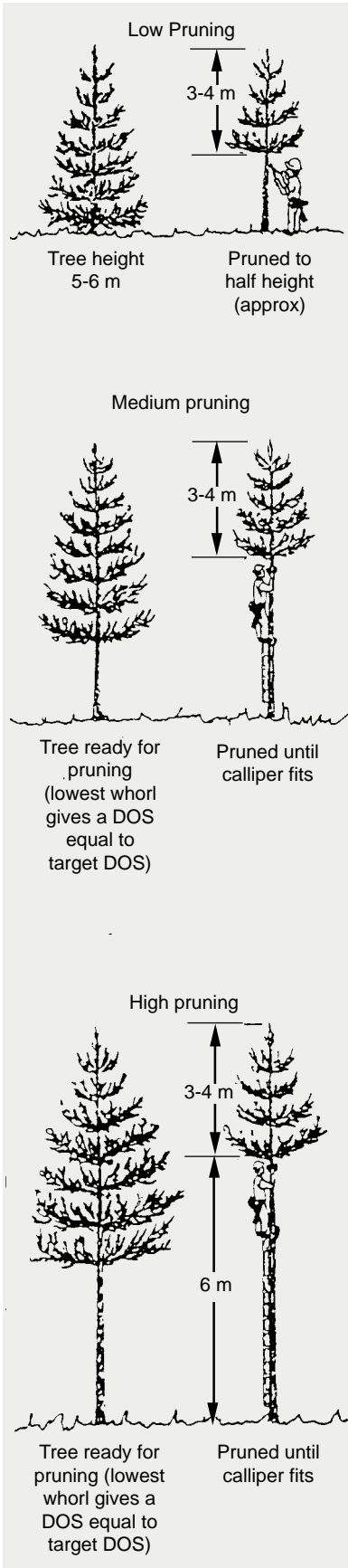
- long handled pruners
- hand saw (jack saw) for larger branches
- pole pruners and pole saws in some instances.

For all pruning:

- a calliper to gauge tree diameter and determine the height to which each pruning lift is taken. Do not guess as your “calibration” will drift!
- a safety helmet to protect you from falling branches, pine cones, etc.
- for elevated pruning, use an extension ladder or cherry picker if on flat ground.

Pruning calliper





MacLaren 1993

Note:

- always use sharp clean equipment.
- Resist the urge to use a chainsaw as even with care you will very likely damage the branch collar, causing defect in the log and slow occlusion of the branch stub. (The only exception to this rule may be when you need to remove large branches on outside rows to provide access).

Low pruning with loppers



General Pruning Guidelines

- prune at the right time
- cull trees which are not likely to make a saleable product before you prune
- avoid pruning in January or February, due to the risk of sunburn to soft fresh bark
- don't start pruning too early
- don't prune past the 10 cm diameter point of a stem
- more frequent light pruning is better than less frequent heavy prunings — better for the tree, as it causes less shock and reduction in growth, and easier for the operator as the branch size is smaller
- prune from the lowest branches and work up the stem as you work around the tree
- use a calliper to identify the 10 cm diameter stopping point
- always leave 3-4 m of green crown to keep the tree growing
- never remove more than 50% of the crown at one time
- prune each tree according to its height and diameter — respect any variation in the stand and do not implement a blanket pruning regime at any particular time
- continue to form prune the crown until the desired log length is reached

Pruning equipment



High pruning with a pole saw



Pruning in Woodlots

Trees in woodlots do not generally require pruning. The competition between close-spaced trees restricts lower branch development negating the need for pruning. Early form pruning can be undertaken to improve the overall quality of the woodlot but is not essential.

In some situations clearwood pruning of the best trees (final crop trees only) may be warranted. However, you must be careful not to give unpruned trees too much of a growth advantage — more branches, more leaves and crown, more “factory” resulting in more growth in comparison to the pruned trees.

If the stand is to be pre-commercially thinned (PCT) it is important that this is not undertaken before the lower branches have lost their vigour. If done too early, PCT may promote strong growth in these lower branches, producing a knotty log of poor quality.

Pruning in Timberbelts

You should prune the outside rows of timberbelts to prevent excessive branch development. Whether you prune the internal rows usually depends on the width of the belt. Generally the more rows, the more akin to a woodlot a timberbelt becomes and the lower the pruning input required.

Internal rows of narrow belts may have access to sufficient light for branches to continue to develop unless you prune them. Internal trees of wider belts may be pruned — depending on the amount of labour available and the enthusiasm of the pruner!

Pruning in Wide-Spaced Agroforests

It is essential that wide-spaced agroforests are pruned to prevent branch development and degrade of logs. Wide spacing causes excessive branch growth and unless you prune all trees your timber will be worthless.

The higher trees are pruned the greater the time commitment *per tree*. However, the higher the stand is pruned, the fewer trees need to be pruned as only the best are kept. Thus the time required is maintained at a relatively constant level at all stages through the pruning regime.

No need to paint!

Painting wounds is not recommended. The traditional technique of “painting” would be expensive in farm forestry and there are also questions about its effectiveness. Painting may actually provide protection and conditions for fungi to thrive.

Because you are pruning vigorous healthy trees, small wounds will heal over quickly. Allow the tree to fend for itself, using pruning as another factor in the tree selection process.

Second Log

Pruning to a height to produce a second log, that is beyond 6.3 m, is not recommended because:

- most log volume within a tree comes from the butt log
- it is difficult and expensive to prune beyond 6 m
- continued pruning removes the growing factory of the tree, extending the time taken to produce a merchantable log.

It is best to accept that the second log will be of lower quality than the high value butt log. The main aim should always be to produce a valuable butt log as efficiently as possible.

A reasonable quality second log is best achieved by maintaining an adequate tree stocking (250-350 trees/ha) which will provide sufficient shading and competition between trees to control branch size.

Do-it-yourself or contractors?

Consider doing it yourself before engaging a contractor. The timing of pruning is flexible; it can be done on a convenient casual basis throughout the year.

The time needed to prune depends on the number of trees to be pruned and the height to which you take the pruning “lift”.

The trick is to plan your planting so all stands don’t require pruning at the one time and to plant manageable sized areas.

Typical Regimes

These regimes are a guide and the timing of pruning operations will be dependent on the actual growth rates achieved.

Branches on radiata pine occur in rings or “whorls” around the trunk. After pruning and occlusion of the branch stubs, the bark will retain the whorl pattern for many years. Don’t worry about this bark pattern as it belies the truth and clearwood is actually being laid down under the bark.

Radiata pine is prone to reshoooting through the development of epicormic or adventitious shoots. These are small branches that develop from stem needles. In unpruned woodlots they die and fall off, but pruning or wide spaced planting allows light to reach the stem, stimulating their growth. Their continued growth will result in degrade of the pruned log. Rub off young epicormics with a gloved hand. Stubborn shoots can be removed by sliding a piano wire loop up and down the stem or by using carefully directed applications of Paraquat® herbicide on the stem.

Eucalypts and associated species like spotted gum are generally self pruning with lighter branch development than other species. Therefore they require less of a commitment to pruning.

Resist the temptation to form prune eucalypts in the first 12 months unless the trees reach 1.5 m in height. For example spotted gum will grow like a bush for 12-18 months before shooting away. Form pruning during this “bushy” stage will slow growth unnecessarily.

Keep stock away from sugar gums as the fresh new tips are high in cyano-genetic glycosides that can kill stock.

Blackwood’s inherent variability in form requires considerable effort in form pruning to make sure there are enough trees from which to select final crop trees.

Local experience suggests that pruning should not be undertaken from November to March, as the pruning wound provides a suitable site for borer attack of the tree.

For river oak a regime similar to blackwood can be used. However river oak is generally of better form. This allows a lower initial stocking rate of 800 trees/ha and reduces your commitment to form pruning.

Radiata pine

Age (years)	Regime
0	Plant 650–1000/ha
1-3	Form prune
4-6	Thin to approx 500 trees/ha, and prune to 2.5 m, form prune to 6 m
6-7	Thin to approx 400–450 trees/ha and prune to 4 m
7-9	Thin to 250–350 final crop trees and prune to 6 m

Eucalypts and associated species

Age (Years)	Regime
0	Plant 800 – 1100/ha
1-3	Form prune
4	Prune 300 potential final crop trees to 2.5 m, and form prune to 6 m, thin to waste leaving 600 trees/ha
5-6	Prune 200 potential final crop trees to 4 m, and form prune to 6 m, thin to waste leaving 450 trees/ha
8	Prune 150 final crop trees to 6m, thin to waste leaving 300 trees/ha
10	Thin to final crop of 150 trees/ha pruned to 6 m, thinned trees removed as firewood, posts

Blackwood

Age (Years)	Regime
0	Blackwood is a contrary crop, even though specially selected seed is utilised it will require a high initial stocking, allowing for a cull ratio of up to 6:1. Thus 1000-1600 trees/ha should be planted to provide sufficient “good form” trees to allow for an even distribution of final crop trees
1-3	Form prune, including removal of all branches greater than 2.5 cm in diameter.
3-8	Clearwood prune to at least 4 m, retaining 50% of tree crown at each operation; thin to waste over the period to a final pruned tree stocking of 150 trees/ha.

River oak is liable to develop multiple leaders so form pruning to maintain one leader is required. Branches are persistent (no self pruning character) but do not normally develop excessively within the early years.

Cypress pine requires a greater commitment to pruning because it is inherently heavily branched and no more than 20% of the canopy should be removed in any one operation.

Cows in calf should be kept away from fresh prunings as ingestion of the fresh foliage may cause spontaneous abortion.

Cypress pines (*Cupressus macrocarpa* and *lusitanica*)

Age (Years)	Regime
0	Plant 1100 trees/ha
1-3	Form prune as required annually
4-5	Select and prune 400 trees/ha, removing any branches greater than 2-3 cm in diameter. Form prune to 6 m
6-7	Thin to waste, leaving 700 trees/ha; clearwood prune 350 trees/ha to 2.5 m, form prune remainder of canopy to 6 m
8-9	Prune 300 trees/ha to 4 m
10-12	Thin to 300 trees/ha, and prune to 6 m

For further information:

- FFN 1/98 Introduction to farm forestry in the Adelaide Hills and Fleurieu Peninsula*
- FFN 2/98 Farm Forestry: Frequent questions and common myths*
- FFN 3/98 Farm Forestry: Establishment Guidelines*
- FFN 4/98 Woodlots and Wide-Spaced Agroforests*
- FFN 5/98 Timberbelts*
- FFN 7/98 Firewood Growing in the Adelaide Hills and Fleurieu Peninsula*
- FFN 8/98 Farm Forestry Species for the Adelaide Hills and Fleurieu Peninsula*
- FFN 9/98 Protecting your forest plantation from fire*

Enquire as to more recent publications

Farm Forestry, Harvesting and Marketing– Guidelines for pine plantations in the Adelaide Hills and Fleurieu Peninsula, David Hanna Forestry SA 1998

Farmtree\$ for the Mount Lofty Ranges: A Regional Agroforestry Handbook by Peter Bulman, Primary Industries and Resources SA 1995.

FS Land Capability in the Mt Lofty Ranges

All available from PIRSA offices, State Tree Centre, State Flora outlets, Mount Lofty Ranges Catchment Resource Centre (Mount Barker) and community landcare resource centres.

Environmental management guidelines for plantation forestry in SA, 1997

Mt Lofty Ranges Farm Forestry Industry Plan 1997

Primary Industries and Resources SA

Farm Forestry Development Officer: Martyn England (08) 8556 4848

State Flora

Leader, Economic Revegetation Group: Peter Bulman (08) 8539 2117

Forestry SA

Forestry Development Officer Eastwood Office: John Pratt (08) 8303 9900

Disclaimer

Use of the information/advice in the Farm Forestry Notes is at your own risk. Primary Industries and Resources SA and its employees do not warrant or make any representation regarding the use or results of the use of the information contained herein as regards to its correctness, accuracy, reliability, currency or otherwise. The entire risk as to the results from the implementation of the information/advice which has been given to you is assured by you. All liability or responsibility to any person using the information/advice is expressly disclaimed by Primary Industries and Resources SA and its employees.