FARM FORESTRY NOTE 3/98

Farm Forestry in the Adelaide Hills/Fleurieu Peninsula

FARM FORESTRY — ESTABLISHMENT GUIDELINES FOR THE ADELAIDE HILLS AND FLEURIEU PENINSULA

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This is one in a series of Farm Forestry Notes about Farm Forestry in the Adelaide Hills and Fleurieu Peninsula. If you are considering becoming involved in farm forestry, you should read other Farm Forestry Notes in the series which discuss importannt factors that may influence your actions.

If you want to succeed in farm forestry you must start off right. Because trees are a long–term crop, even a small mistake at the beginning will have serious effects on your long term profitability.

Getting plantings off uniformly to a flying start will minimise the *rotation length* — the time from planting to harvest and hence the wait for financial returns. The guidelines in this fact sheet will help you establish your farm forestry projects successfully and efficiently.

Planting tubestock vs direct seeding

Although direct seeding can be cheap and effective, you will find that seedlings are a better option for most farm forest developments.

This is because successful, profitable forestry relies on developing a uniform, evenly spaced stand, allowing trees to grow at optimal rates and simplifying stand

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management (silviculture). Direct seeding is less reliable and will result in highly variable spacing compared with planting seedlings.

Although you could thin a direct–seeded area the following season and fill the gaps with seedlings, any initial cost savings are likely to be lost by your thinning and refilling costs.

In addition, the useful gains from tree breeding and seed improvement programs are only available by using planting stock. The high cost of genetically superior seed of selected provenances will prohibit direct seeding, as will the use of clonal material (cuttings).

This does not mean there is no place for direct seeding on your property at all. It is perfect for conservation plantings to create a natural-looking, randomly-distributed planting of local species. A local understorey direct seeded among a timber overstorey of planted seedlings is an appropriate mix for a multi–purpose timber–conservation planting.

You may also find direct seeding appropriate for establishing less intensive ventures such as:

- large firewood woodlots
- wide–spaced plantings on steep or rocky country (by hand)
- broombush
- fodder plantations of tagasaste.

(For advice on the comparative advantages of woodlots, timber belts and wide–spaced plantings, see Farm Forestry notes 4/98 and 5/98).

Genetics and tree selection

Tree selection and breeding programs have markedly improved growth rates and tree form (stem straightness and branching habit) particularly in radiata pines. This means you can plant fewer seedlings yet still be confident of ending up with an adequate number and even distribution of quality final crop trees.

Where possible you should take advantage of any genetic improvements available. Don't be tempted by the false economy of using cheaper standard nursery material if high–quality genetic material is available. You will find the extra initial investment in superior genetic material is more than offset by the need for fewer plants, increased productivity and reduced expenditure on fertilising, pruning and thinning.

Planting stock

Farm forestry seedlings are available in:

Kwikpots — in trays of 64 or 42 seedlings.

Species: include Sydney blue gum, Tasmanian blue gum, blackwood, black wattle, flooded gum, river oak and spotted gum.

Cost: depends on numbers but generally 25¢ – 39¢ per seedling.

Tubes — in boxes of 36 or 60 seedlings.

Species: include Cypress pine (*Cupressus macrocarpa* and *C lusitanica*).

Cost: 60¢ – 75¢ per seedling.

Open–rooted seedlings — in bundles of 100–200.

Species: radiata pine

Cost: depends on numbers, usually 19¢ – 35¢ per seedling

Speedlings — in trays of 100–128

Species: typically tagasaste and saltbush species.

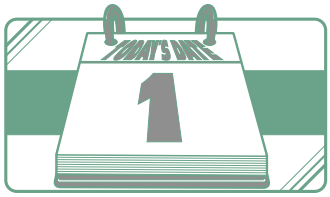
Cost: 12¢ – 20¢ each

Cuttings

Species: radiata pine

Cost: about 28¢ each as open rooted or up to 55¢ each in root trainer trays

Planting time



In most areas of the region late winter–early spring plantings are preferable *except for radiata pine*. Planting too soon increases the risk of frost damage and root disease in cold waterlogged conditions and makes it more difficult to achieve good spring weed control.

Wet areas are best left to dry out sufficiently in mid–September to early October before attempting to plant. Mounding is recommended for wet areas and will allow you to plant earlier (see section on *Mounding).*

Radiata pine is best planted early — mid-June through to the end of July.

Autumn plantings in dry ridge areas can be successful but you will find it hard to achieve good weed control through to the end of spring. Ridge areas are therefore best planted mid-July to mid-August.

In general you should complete the majority of plantings by mid-September.

If you have less than 500 mm rainfall, autumn-winter planting is desirable as long as sufficient rain has fallen and the site is not prone to frost or waterlogging.

The best cautionary advice is always to:

- watch the season
- react appropriately (early for a dry season and later for a wet season)
- pull out the crystal ball and plant when rain is forecast!

Site preparation

You must prepare your site properly to achieve high survival and rapid growth of your trees. It makes the subsequent planting job fast and easy, and removes weed competition which in turns avoids the need for summer watering.

Ripping

In most of the region's soils, deep ripping enables:

- fast initial root growth
- higher survival rates
- improved moisture penetration
- easy planting in a friable soil
- correct spacing between rows.

Ripping to the correct depth at the right time of the year will usually require a bulldozer or large 4WD tractor.

Ripping should be:

- 450–750 mm deep.
- intermittent on erodible soils (lift the tyne clear of the ground periodically to break the line and prevent water flowing along the ripline).
- done when the subsoil is dry to ensure shattering of the soil. It is best undertaken either in late spring *the year before planting*, or summer–early autumn prior to planting. If you rip damp or wet soil you will slice the soil; this will restrict root development to a channel along the ripline; the resulting poor lateral root development will increase the risk of wind throw.
- on the contour on sloping sites — but *only* if the tyne is lifted to give an intermittent ripline and the catchment area above the prepared area is small, reducing the volume of runoff into the ripline and the risk of erosion.
- perpendicular to the contour on steep slopes. This minimises erosion and reduces the catchment area and hence the amount of water likely to flow into each rip line. You must avoid any concentration of water flow into rip lines.

Ripping should not lay back the soil surface to create an open channel or gutter; if you see this, your ripping is probably too shallow.

If you must rip late, roll either side of the rip line with a concrete roller at least 60 cm wide (or with the tracks of a bulldozer). Then at planting time firm the planting spot to minimise air pockets. Another option is to use a scraping device or "minimounder" to backfill the ripline.

Never roll directly over the rip line with tractor tyres as this will compact the soil, cause gutters and may lead to erosion.

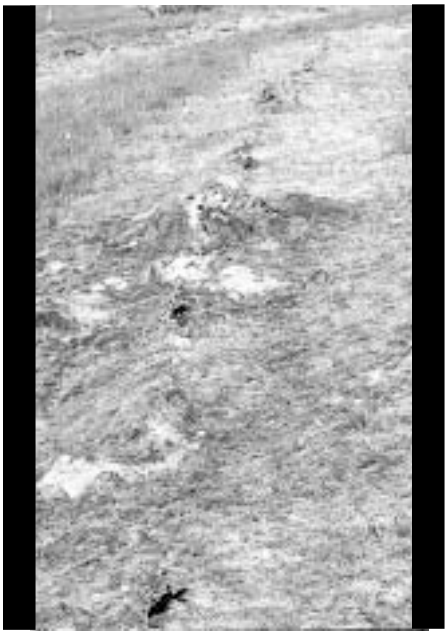
Mounding

Mounding provides a raised planting microsite which improves drainage and aeration of saline and waterlogged sites. You should always mound soils that are imperfectly drained — that is, soils that usually reach saturation point in early autumn/winter or remain saturated for three months or more.

The concentration of topsoil in the mound and the release of nutrients associated with cultivation combine to boost initial plant growth.

Mounding may sometimes assist with weed control as weed seeds are buried with the topsoil in the mound. You will still need to use herbicides to control the "left-over" weeds and prevent further weed growth.

Ideally you should mound in spring the year before planting to ensure vegetative matter in the mounds breaks down sufficiently. If you have not done this, the area should be grazed heavily before mounding to reduce the vegetative bulk that will otherwise cause air pockets in the mound. In areas with heavy grass development (*eg* old stands of phalaris) consider slashing and ploughing or rotary–hoeing the site prior to mounding.



Moisture conservation

Weeds use soil moisture and nutrients that would otherwise be available to your seedlings or young trees.

Eliminate weeds, plant well at the right time, witness the growth response and forget about summer watering for ever!

This means maintaining a weed–free bare–soil:

- before planting
- through the first spring and summer
- throughout the second year.

Herbicides are pivotal for weed control in farm forestry. Weed control without herbicides (for example, by repeated cultivation) is:

- inefficient (high labour commitment)
- not as effective
- causes soil structure to decline
- increases the risk of erosion.

Note: using mowers, slashers or brush cutters is almost totally ineffective because while they remove above-ground growth the weed roots still rob the trees of moisture and nutrients.

Weed-a-metre

While we appreciate that environmentally-conscious people wish to reduce herbicide use, we suggest that you look at their role in forestry developments in perspective. You will only need to use herbicides for the first 12-month establishment phase, unlike horticultural or floricultural enterprises which rely on the continual use of herbicides and pesticides.

Herbicide application

You have the choice of three methods of herbicide application, whether using liquid or the more recently developed granular compounds.

- manual spot spraying with a knapsack, spray–gun or weed-a- metre
- strip spraying — manually with a knapsack, or more commonly, with a small boom spray on a vehicle
- broadacre spraying with a wide boom on a vehicle or by helicopter.

The most appropriate method to use depends on a range of site and design factors. The table (top of next page) summarises recommendations for a range of situations.

Method	Wide spaced	Woodlot	Timberbelt	Very sandy	High risk of soil erosion	Very steep	Very wet	Not tranversable in a vehicle	Traversable in a vehicle
Spot	✓		✓	✓	✓	✓	✓	✓	
Strip	✓	✓	✓	✓	✓		✓	✓	✓
Broadacre Vechicle		✓	✓						✓
Broadacre Aerial		✓				✓		✓	✓

Herbicides before planting

Use knockdown herbicides to make the area weed free before planting. See the table below for recommendations.

Herbicides after planting

Weeds will quickly reinvade the site after planting. If you spray selected residual herbicides over your seedlings you will keep your site weed free and save hours of weeding or watering.

The best weed control achieves weed free conditions (bare earth) for as long as possible through spring and into summer. Follow–up spraying in autumn will continue this into the second year.

A typical strategy for pines

Before planting herbicide	Planting time	After planting herbicide	Second year herbicide
Roundup®*@ L/ha +Goal® @100 ml/ha + Altrazine @ 9 L/ha	mid–June–late July	No activity	Vorox®@ 2 L/ha + 2.5 @Atrazine @ 9 L/ha in June

A typical non-pine strategy

Before planting herbicide	Planting time	After planting herbicide	Second year herbicide
Roundup®*@ 2.5 L/ha + Goal® @ 100 ml/ha mid– June to late July	August–September (dry sites–early wet sites–late	Simazine*** @ 2–4 L/ha (sandy soils @ 2 L/ha heavy soils @ 4 L/ha) fortnight after planting or after a good soaking rain to bed the seedlings in but before any germination of weeds occurs. Oust® is showing promise but has yet to be trialled locally, (use before planting only)	Simazine** @ 2–4 L/ha at break of season before weeds germinate selective herbicides (grass, etc) as necessary, always consult expert advice before applying

* Roundup® Biactive is a new formulation which has improved environmental and operator features. It has the same active ingredient as ordinary Roundup® and is used at the same rates as Roundup®. Roundup Biactive® has substantially lower aquatic toxicity and lower skin and eye irritation potential.

** Macspred Pty Ltd have developed a granule formulation for use over eucalypts that will provide knockdown and residual weed control.

*** This is not a registered use and therefore you should seek specific advice for your site from someone with local experience in regard to rate and timing of application and other precautionary actions, before attempting any spraying operation.

Second year weed control

Significant growth responses can be obtained from second year weed control. In pine plantings it is essential to remove competition because of their relatively slow early growth rates. Overspraying is easily done with the appropriate selective knockdown and residual herbicides.

With non–pine species second year weed control is limited to specific selective knockdown (mostly grass) and residual herbicides. A new granular compound called Eucmix® is available for use on a limited range of eucalypts for second year weed control. This formulation provides knockdown and residual weed control

Liquid herbicides are best applied with a boom spray in the autumn but by spring the trees should be too high to overspray with a boom, so you will need either to spray by hand or use side jets on a 4WD motorbike.

	Mode of action	Herbicide	Pines	Others
Before planting weed control				
Knockdown (foliar uptake)	applied to leaves and moves through the plant (including the root system)	Glyphosate	✔	✔
		Amitrole	✔	
Knockdown (contact)	applied to leaves and burns/desiccates only acts on leaves it contacts; will not kill perennial weeds	Sprayseed® (paraquat/diquat)	✔	✔
		Goal®		✔
Soil residual	provides pre–emergent control (as 'sterilant') on weed-free soils (also post emergent weed control for some herbicides)	Vorox® (also provides knockdown)	✔	
		Oust®	✔	✔
		Simazine	✔	✔
		Velpar®	✔	
After planting weed control				
Soil residual	applied to moist bare soil and taken up by the roots	Simazine		✔
		Atrazine	✔	
	Can be oversprayed (there is no foliar uptake)	Velpar® (also provides knockdown)	✔	
Second year weed control				
Knockdowns	use of selective herbicides that can be used in specific situations.	Fusilade® for grass control	✔	✔
	(Seek specific advice on low rates of selected broadleaf herbicides for pines and others)	Amitrole	✔	
Soil residual	apply to moist bare soil to keep the site weed free	Atrazine	✔	
		Simazine		✔
		Surflan®		✔
		Vorox® (incl. knockdown)	✔	
		Velpar® (incl. knockdown)	✔	

Herbicides for problem weeds

	Weeds	Herbicide	Comments
Before planting			
	Sorrel	Ester– 2,4D; Dicamba; Alley®	14 day withholding period
	Blackberry	Brush–off®, Trounce®, Cut-out®, Velpar®, Garlon®, Grazon®, Access®	apply December to March
	Bracken	Brush-off®,Trounce®, Cut-out®	apply when actively growing
	Reeds	Glyphosate and Pulse®	apply spring and summer
After planting			
	Kikuyu, couch grass and other persistent grasses	Fusilade®	knockdown grass control, can overspray trees
	Thistles	Lontrel®	knockdown with care and very low rates, can overspray trees

Before you spray, seek advice on the latest herbicides, application rates and double check your specific weed control program. You can get advice from sources such as Primary Industries and Resources SA, local suppliers, contractors, consultants or your local Animal and Plant Control Board. If in doubt, seek a second opinion.

Make sure you:

- read and heed the label
- protect yourself by using safety equipment
- calibrate your spray equipment correctly
- use the correct rate, including additives
- do not cause off–target damage
- leave buffer zones around waterways

Herbicide registration involves the development of stringent codes of use to ensure environmental, biological, animal and human safety. Therefore, read and follow the label directions to prevent off–target damage!

Planting tools

In this region, hand tools are generally preferred to machine planting– survival and efficiency are often greater. Planting tools such as the *Pottiputki* (see illustration) or

Hamilton Tree Planter require a fine soil tilth to be effective and are suited to cultivated soils or those which are sandy or loam. Planting spades and mattocks are better for heavier clay soils, small-scale plantings and open-rooted planting stock.

Planting technique

The actual planting operation is not difficult. High mortality rates and disappointing early growth rates are usually the result of poor preparation of seedlings and poor planting technique.

Remember these key tips for successful planting:

- when you get your seedlings you must put them in a clean site where they are protected from frost and where they can be watered — and keep them well watered!
- before planting give the trees a good water to ensure the potting mix is saturated. (You should also consider a dose of liquid fertiliser to help with the shock of transplanting.)
- if possible have a bath or bin of water in the field so you can dunk the seedling tray immediately before planting, which will ensure the potting mix is at field capacity when you plant the seedling
- always plant into moist soil and ensure good soil–to–root contact by removing air pockets. This will mean that you won't have to worry about watering the seedling in
- make sure the stem of the tree is buried 2–3 cm. This places the root ball slightly deeper and provides a buffer to prevent the root ball drying out. It also provides a safety margin from any possible leaching of residual herbicides applied after planting
- if your planned planting day is unseasonably warm or there is drying wind consider waiting until conditions are cooler and less drying. The best time to plant is when rain is forecast!

Contract planting

You can plant yourself or engage planting contractors. Naturally, contract planting costs are cheaper for "easy going" sites. Putting extra effort and cost into ensuring a well prepared site will be compensated for by the savings in planting costs. On the other hand, you will pay more per hectare for sites that have:

- shallow rocky or heavy soils
- steep slopes
- weedy sites
- difficult vehicular access
- a small area.

A general starting point for negotiating the cost of planting is half the cost of the seedlings.

Fertilising

In most situations trees respond to fertiliser. However, if you plant your trees on an ex–pasture site with a reasonable history of fertiliser application you will probably find the growth response invoked by additional fertiliser will not warrant the added expense.

Typical fertilisers for forests are based on superphosphate and trace elements, diammonium phosphate or specially prepared “Forest mixes”.

Initially it is best to place the fertiliser by hand adjacent to the tree but downhill of the tree to avoid a sudden overdose. When the trees have a closed canopy and fully occupy the site, broadacre fertilising by tractor or air is the most beneficial.

You must ensure good weed control otherwise the weeds may benefit more than your trees!

Pests and diseases

You can keep most pests and diseases at bay by maintaining the trees in a stress–free state. In young stands this includes freedom from weed competition; in older stands periodic thinning to release trees from competition.

The likelihood of insect attack is difficult to predict and varies with seasonal conditions.

In all but severe infestations, you can probably leave the trees to fend for themselves — assisted by beneficial birds and insects.

The following table presents some of the more commonly encountered pests but you should remember that sometimes the importance of the pest depends on where the trees are grown. For example eucalypt leaf beetles are a major problem in Tasmania and although they occur in our area they are not a problem (yet). Similarly if species are grown in conditions they are not well adapted to the trees are more susceptible to attack, for example susceptibility to borer attack of forestry species grown in low rainfall areas.

Most likely pests to look for on the key forestry species

✓✓✓ Commonly found ✓✓ Rarely a problem ✓ Found on tree but not a problem	Autumn Gum Moth	Gum Leaf Skeletoniser	Cup moths	Sawflies	Leaf Blister Sawflies	Eucalypt Leaf Beetle Chrysomelids	Christmas Beetle	Eucalypt Weevils	Lace & Basket Lerps	Psyllids & Lerps	Gumtree Scale	Emperor Gum Moth Larvae	Borers	Wingless Grasshoppers	Sirex Wasp	IPS	Fireblight beetle	Cypress Canker
Radiata pine														✓✓	✓✓	✓✓		
Spotted gum		✓✓	✓	✓	✓✓	✓		✓				✓	✓✓	✓✓✓				
Sydney blue gum	✓✓	✓✓	✓✓	✓	✓✓	✓			✓✓	✓	✓	✓✓	✓✓	✓✓				
Tassie blue gum	✓✓✓	✓✓	✓	✓✓✓	✓✓		✓	✓	✓	✓✓	✓✓	✓	✓✓✓	✓✓✓				
Flooded gum	✓✓	✓✓	✓	✓✓	✓✓	✓	✓✓		✓	✓	✓	✓	✓✓✓	✓✓				
Sugar gum		✓	✓	✓	✓	✓			✓	✓	✓	✓	✓✓	✓✓				
Blackwood											✓✓		✓✓✓	✓✓				
Black wattle							✓				✓✓		✓✓✓	✓✓			✓✓✓	
River oak																		
Cypress pine														✓				✓✓

Vermin

The most prevalent pests of plantings are hares, rabbits and kangaroos. Blackwoods and casuarinas are particularly palatable and susceptible to browsing damage.

Each pest causes a different type of damage:

- rabbits eat plants back to ground level
- hares "snip off" young trees with a clean 45 degree angle cut and usually drop the top nearby
- kangaroos tend to graze back the tree tops heavily, in some cases leaving the stem though casuarinas are normally eaten to ground level.

Counter-measures

Individual tree guards are expensive and are generally not cost–effective.

Eradicate rabbits and hares before planting and watch for subsequent damage. Hares are territorial and control will only last until another animal moves into the vacant territory.

Kangaroo–proof electric fencing can be erected but the cost is prohibitive in most instances. Generally kangaroos are not a problem if you avoid blackwoods and casuarinas and plant less palatable pine and eucalypt species.

Galahs are occasionally a problem but little can be done to control them.

Indicative establishment costs		
Site preparation	Ripping or mounding	$150/ha
Pre–planting weed control	Knockdown	$40–80/ha
Plant stock	Depends on species	$180–$600/ha
Planting	Depends on site, conditions, area, quality of site preparation	Do–it–yourself or $80–$300/ha
Post-plant weed control	Soil residual sterilant	$40–80/ha
Insect Control	if required	$60/ha
Fertiliser	if required	$80–300/ha

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 4/98	*Woodlots and Wide-Spaced Agroforests*
FFN 5/98	*Timberbelts*
FFN 6/98	*Pruning guidelines for farm forestry*
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

Insect Pests of Eucalypts on Farmland and in Plantations in SE Australia CSIRO 1996.

Insects, Diseases and Deficiencies associated with Eucalypts in South Australia 1996 Charlma Phillips, Primary Industries and Resources SA.

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

Nurseries

These nurseries are known to currently supply farm forestry seedlings. Check the Yellow Pages for other nurseries.

State Flora

Murray Bridge	(08) 8539 2111
Belair	(08) 8278 7777

Mount Barker Woodlots Nursery (08) 8391 1971

Tetratheca Nurseries (08) 8538 5071

Virginia Nursery	(08) 8380 9560
	(08) 8380 9899