Agriculture WESTERN AUSTRALIA

Farm Forestry Advisory Service

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

TreeNote

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Weed control in eucalypts and pines

in the greater than 450 mm rainfall zone of Western Australia

Introduction

Weeds compete with trees for moisture, light and nutrients. Therefore, effective weed control is essential for the survival and growth of young trees.

This TreeNote describes commonly used mechanical and chemical methods for controlling weeds.

Mechanical methods to control weeds before planting

Cultivation

Cultivation gives only short-term weed control, and can change the weed spectrum for the worse. When used alone it rarely gives adequate weed control for tree establishment, especially against deep-rooted perennial weeds such as sorrel, kikuyu and couch grass. For best effect, use cultivation as late as possible before planting, and combine with herbicide treatments.

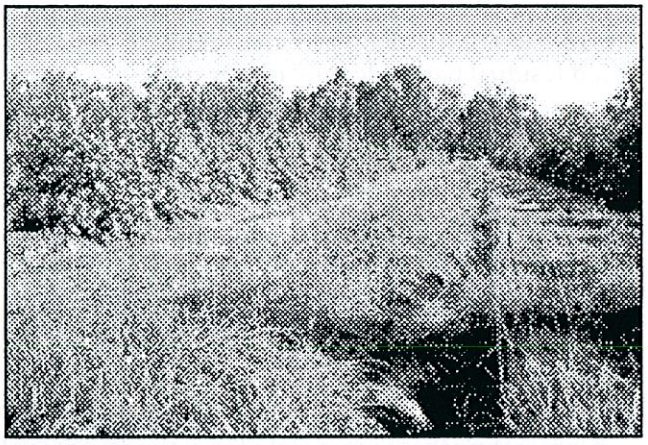
Scalping (or furrowlining)

Scalping (or furrowlining) removes a strip of topsoil and its resident weed seeds, leaving a weed-free strip for tree planting. Possible disadvantages include:

- Risk of erosion, especially on very light sands. Minimise water erosion by aligning the rows on or near the contour, and leave regular gaps of undisturbed soil to minimise wind erosion.
- Increased risk of tree death from waterlogging in high rainfall areas.
- Weeds may re-establish from seeds blown onto the scalped strips.
- Trees may need fertilising because the topsoil (rich in organic matter and nutrients) is pushed aside.
- If herbicide is used as well, the risk of damage to the trees is increased because the organic matter in the topsoil is removed. Lower application rates may be needed.

Grazing

Heavy grazing reduces pasture bulk and seed load, reducing the amount of knockdown herbicide needed before planting. Allow the pasture to freshen up before spraying.



Effects of weed spraying: healthy blue gums (left) where weeds sprayed, whereas no trees survived in row not sprayed (centre and right).

Mulch

In sensitive environments, mulch is an alternative to chemicals or cultivation. However, the cost of buying and installing mulch can double establishment costs.

Chemical treatments

Herbicides are used widely in forestry to control weeds, mostly at establishment. Pre-planting weed control is especially critical for eucalypts because options for later overspraying are limited and expensive (other than for grasses).

To control weeds and avoid damage to tree seedlings, use the appropriate herbicide for each situation, at the right time and at the correct rate.

Permits may be needed!

Many chemicals used in farm forestry are not registered for forestry use. For 'off-label' use, obtain a permit from the National Registration Authority. Contact Chris Sharpe, Senior Chemicals Adviser in Agriculture Western Australia's Chemical Services Section for advice on permits. Phone (08) 9368 3815, fax (08) 9474 2408. Permits can take up to three months to obtain.

Knockdown and residual herbicides

Knockdown herbicides such as glyphosate and amitrole kill existing weeds, but don't stop new weeds from germinating and growing. *Residual herbicides* such as atrazine and simazine work in the soil to prevent the germination of new weeds.

Some residual herbicides also have a knockdown effect. For example, hexazinone is also a general knockdown, sulfometuron methyl becomes a general knockdown at higher rates, oxyfluorfen is a knockdown for specific weeds, and atrazine is an effective knockdown for newly emerged weeds.

To kill existing weeds, and keep tree planting sites free of new weeds for a long period, mixtures of knockdown and residual herbicides are usually used.

Pasture topping

Pasture topping can make weed control easier by reducing the seed set of annual weeds in the previous spring. Spray the weeds at flowering with a broad-scale application of glyphosate at a low rate. Higher rates (as per label) can be used to kill the weeds at this stage if desired.

Perennial weeds

Spray perennial weeds *before* soil preparation to avoid incorporating these weeds into the mounds (especially kikuyu, couch, sorrel, and dock). The best time to spray is between spring and late autumn, when perennial weeds are actively growing with healthy foliage. Spray at least 21 days before cultivation to allow sufficient translocation of the chemical throughout the plant.

Broad scale spraying is preferable, but on light soils minimise erosion by spraying in strips.

Broad scale spray or strip spray?

Except for perennial weeds, strip or spot spraying is preferred over broadscale spraying because less herbicide is needed per hectare and there is less risk of erosion, insect attack and movement of herbicide from the site.

Spray strips at least 1.5 m wide with a boom spray, or spray spots at least 1.5 m in diameter where trees will be planted.

When to spray

Pasture topping – in spring, the year before tree planting.

Perennial weeds - in summer or autumn, *before* soil preparation.

Annual weeds - in the late autumn or early winter, *after* soil preparation, shortly before planting.

Post-planting weed control - in late winter or early spring.

Second year weed control – in May or June. Later applications are less effective.

Application rates

Herbicide application rates vary with the type of soil (heavy or organically rich soils need higher rates), the weed species and stage of development (large plants need higher rates), and the susceptibility of the tree species to the herbicide. Application rates must comply with the label, or the permit (for off-label use). **Consult a farm forestry adviser to discuss suitable spray rates (see last page).**

Application tips

1. Knockdown herbicides work best on healthy weeds, especially after rain has stimulated their growth. They are less effective on unhealthy weeds, especially if nitrogen deficient.
2. Dense weeds must be removed by heavy grazing, cultivation or knockdown herbicide before applying residual herbicides. Only apply residual herbicides to bare soil, or soil with a very light plant cover (maintain some plant cover on erosion-prone soils).
3. Residual herbicides work best if applied to moist soil.
4. Only a residual herbicide is needed if the pre-planting application is done after soil preparation, but before weed emergence.
5. After residual herbicides are applied, allow 50 mm of rain and at least two weeks before planting eucalypts, or 25 mm of rain and at least one week before planting pines.
6. Residual herbicides are safest (but their active life is less) on heavy soils, acid soils, and soils with high organic matter. On other soils they are more likely to damage the trees, so reduce application rates accordingly. For example, sulfometuron methyl is safe at low pH because it is adsorbed by clay particles in the soil, but at high pH the same application rate may damage trees because the chemical is more mobile.
7. In high rainfall areas, residual chemicals are effective for one to three months depending on soil conditions. Spray wetter sites later in the season (early to mid July) to ensure that residual activity remains throughout the season. Some sites may need a follow-up application in spring if herbicide was applied in May-June. However, note that some residual chemicals have annual application limits (for example, atrazine is limited to 4.5 kg/ha/year on sandy soils, and 8.0 kg/ha/year on heavier soils).
8. Residual herbicides pose a risk to the environment if applied to waterlogged soils.
9. Residual herbicides don't work well on cloddy soils because the chemical is poorly distributed. Plough before mounding to break up the clods.
10. After soil preparation (scalping or mounding), allow the soil to consolidate before applying residual herbicides. If applied to freshly cultivated soil, they may leach rapidly and be less effective. Many mound ploughs used to prepare sites for tree planting are fitted with a roller to help consolidate the mounds.

Mound shape

Flat-topped (or very slightly dished) mounds are better than round-topped mounds because the soil receives a uniform rate of chemical application, and less of it

washes down the sides. Flattened mounds are also easier to walk along when planting.

A suitable roller is drum shaped (or slightly barrel shaped), with raised edges on the rim to consolidate the edge of the mound.

Granular herbicides

Some granular herbicides (Velmac G® and Forest Mix®) are registered for use in pine plantations, while others are registered for post-planting use in eucalypts.

The advantages of granular herbicides include lighter weight when spreading, no spray drift, and no uptake by foliage. For best results apply granules to moist soil, ahead of penetrating rain.

Economics of second year weed control

Second year weed control usually increases tree growth, but is only economic if the extra growth offsets the cost of the operation, or if needed to ensure the trees' survival. It is most likely to be profitable for trees that have grown poorly in the first year, on sites with prolific weeds. Spraying is probably not justified in tree stands with high growth rates. Careful grazing with sheep is a cheap and effective way to control weeds in rapidly growing blue gums.

Herbicides for major weed types

The following tables list herbicides for different weed types. Grasses compete most strongly with trees, followed by perennial broadleaved weeds, then annual broadleaved weeds.

Pre-planting – herbicides applied before tree seedlings are planted.

Post planting – sprayed over the top of the trees during the first growing season.

Second year weed control – sprayed under the trees and between rows during the following winter.

Beware!

1. *The herbicides listed below have been used successfully for weed control in eucalypts and pines. However, they may not be suitable for other tree types. For example, sulfometuron methyl is damaging to legumes such as Acacias.*
2. *Hexazinone is used in pines. Do not use it near crops of eucalypts or other members of the Myrtaceae family as they are highly susceptible to it.*
3. *Chemicals marked Ⓟ are not registered for the use described, and require a permit from the National Registration Authority.*

Table 1. Control of annual grasses (e.g. ryegrass, barley grass)

	residual herbicides	knockdown herbicides
Pre-planting	Ⓟ simazine (e.g. Gesatop®) Ⓟ atrazine (e.g. Gesaprim®) (registered for pines) hexazinone (e.g. Velpar®) PINES ONLY	glyphosate (e.g. Roundup®) amitrole (e.g. TL Plus®) Ⓟ paraquat (e.g. Gramoxone®) Ⓟ paraquat+diquat (e.g. Sprayseed®)
Post-planting	Ⓟ simazine (e.g. Gesatop®) Ⓟ atrazine (e.g. Gesaprim®) hexazinone (e.g. Velpar®) PINES ONLY	fluazifop (e.g. Fusilade®) haloxyfop (e.g. Verdict®) clethodim (e.g. Select®)

Note: Sprayseed® controls both annual grasses and annual broadleaved weeds.

Table 2. Control of perennial grasses (e.g. couch, kikuyu)

	residual herbicides	knockdown herbicides
Pre-planting	Ⓟ simazine (e.g. Gesatop®) Ⓟ atrazine (e.g. Gesaprim®) Ⓟ sulfometuron methyl (e.g. Oust®) + glyphosate (e.g. Roundup®)	glyphosate (e.g. Roundup®) Ⓟ sulfometuron methyl (e.g. Oust®) + glyphosate (e.g. Roundup®)
Post-planting		fluazifop (e.g. Fusilade®) - kikuyu only

Table 3. Control of annual broadleaved weeds (e.g. capeweed, clover)

	residual herbicides	knockdown herbicides
Pre-planting	Ⓟ atrazine (e.g. Gesaprim®) Ⓟ simazine (e.g. Gesatop®) hexazinone (e.g. Velpar®) PINES ONLY	glyphosate (e.g. Roundup®) amitrole (e.g. TL Plus®) 2,4 D amine (e.g. Farmco D-500®) Ⓟ diquat (e.g. Reglone®) Ⓟ paraquat+diquat (e.g. Sprayseed®) Ⓟ metsulfuron-methyl (e.g. Ally®)
Post-planting	Ⓟ atrazine (e.g. Gesaprim®) Ⓟ simazine (e.g. Gesatop®) oxyfluorfen (e.g. Goal CT®) hexazinone (e.g. Velpar®) PINES ONLY	Ⓟ clopyralid (e.g. Lontrel®) (controls capeweed, registered for pines) Ⓟ metosulam (e.g. Eclipse®) oxyfluorfen (e.g. Goal CT®) hexazinone (e.g. Velpar®) PINES ONLY

Table 4. Control of perennial broadleaved weeds (e.g. dock, sorrel)

	residual herbicides	knockdown herbicides
Pre-planting	Ⓟ atrazine (e.g. Gesaprim®) Ⓟ simazine (e.g. Gesatop®) Ⓟ oxyfluorfen (e.g. Goal CT®) hexazinone (e.g. Velpar®) PINES ONLY	Ⓟ metsulfuron-methyl (e.g. Ally®) Ⓟ sulfometuron-methyl (e.g. Oust®) glyphosate (e.g. Roundup®) hexazinone (e.g. Velpar®) PINES ONLY
Post-planting	simazine (e.g. Gesatop®) - reduced rate oxyfluorfen (e.g. Goal CT®) hexazinone (e.g. Velpar®) PINES ONLY	Ⓟ oxyfluorfen (e.g. Goal CT®) - for dock hexazinone (e.g. Velpar®) PINES ONLY

Table 5. Second year weed control

	residual herbicides	knockdown herbicides
Eucalypts	Ⓟ simazine (e.g. Gesatop®)	amitrole (e.g. TL Plus®) Ⓟ sulfometuron-methyl (e.g. Oust®)
Pines	Ⓟ atrazine (e.g. Gesaprim®) hexazinone (e.g. Velpar®)	amitrole (e.g. TL Plus®) hexazinone (e.g. Velpar®) Ⓟ sulfometuron-methyl (e.g. Oust®)

Important notes

- Use application rates specified on the label, or on your permit for off-label use.
- Follow label recommendations for safe handling and environmental care.
- If using 2,4 D, notify neighbours before spraying.
- Don't spray if wind is above 15 km/hour, unless using shrouded equipment.
- Use low drift nozzles where practicable.
- Avoid damage to aquatic plants and animals - don't spray near waterways.
- Training in chemical application (mandatory for commercial operators) is available through Farmcare Australia. Phone/fax Terry O'Beirne 08 9341 5325 or course coordinator Rick Madin and Associates: phone (08) 9647 1060, fax (08) 9647 1096).
- Guidelines for weed control are contained in the Code of Practice for Timber Plantations in Western Australia (released July 1997), available from CALM and Australian Forest Growers.

Contacts for further advice

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