

What is a weed?

Weeds in tree plantations are native plants, introduced wild plants, or cultivated plants which have a detrimental effect on tree growth. The one thing they have in common is that they are not wanted in the plantation. Plantations on farms are generally established on ex-pasture or native forest sites. The weeds found in plantations grown on these two site types may differ somewhat and the methods of control are often completely different. On ex-pasture sites weeds include pasture grasses, thistles, sorrel, and flat weeds, and in neglected areas, gorse, blackberry, bracken fern and woody weeds. Gorse, blackberry and bracken fern may prove difficult to control. On ex-native forest sites weeds often include woody understory species, wattle, native grasses and introduced weeds which blow in from adjacent cultivated paddocks.

Why are weeds a problem?

Weeds are a problem because they can compete with trees for water, nutrients and light. By their nature, most weed species are aggressive at occupying a site. If additional nutrients are applied using fertilisers, or water is applied by irrigation, weeds will generally benefit from these much more than the trees. Weeds can also contribute to increased frost damage, browsing susceptibility, fungal diseases and insect attack in young tree seedlings.

Why control weeds?

Weeds affect the growth of the tree and hence the profitability of plantations. By reducing growth they also reduce the effectiveness of the shelterbelts or amenity plantings around roads, reserves, creeks, homes and the many other situations in which trees are planted. Weed control is necessary to protect investments and future profits from tree plantings and to maximise other benefits from trees.

Weed Control Strategy

Completely removing difficult to control or highly competitive weeds prior to tree planting, provide:

- A weed free environment in the immediate vicinity of the tree for the first year; and
- Allow for further control of weeds in the second and subsequent years, if necessary.

The aim of a good weed control strategy is to allow the planted trees to grow as quickly as possible so they can occupy the site.

Methods of weed control

Non-chemical

Non-chemical weed control can meet the objectives of the weed control strategy. Cultivation, slashing, burning and grazing are non-chemical methods of weed control. These methods usually provide a short term solution but require very careful implementation and monitoring to be successful. In most farming situations they are of limited use.

Mulching with appropriate materials is an effective form of weed control provided weeds have been suppressed initially. Fresh manure should not be applied directly to plantations. Cultivation can be used to remove any woody weeds which are difficult to control by other means. After cultivation the spectrum of weeds will often change, with invasion of pioneer species such as fireweed, thistles and grasses. In ex-forest sites, dormant seed of native understory species will often be stimulated by cultivation and a bare site after cultivation in autumn can become a mass of weeds in the following spring. You need to be aware of this and plan a second cultivation after the spring flush before these weed plants go to seed. Beware, excessive cultivation can lead to soil erosion and compaction.

Burning has often been used to control bracken or gorse. The result, however, is rarely successful. Fire encourages seed germination and sprouting from underground rhizomes in the next growing season giving rise to a greater spectrum and higher density of weeds than existed before the site was burnt.

Slashing controls weed height but has little effect on competition for water and nutrients. So while a slashed area may look good, the weeds may still be competing vigorously with the tree seedlings. Slashing is more appropriate for access and to reduce fire risk in older plantations.

Grazing is appropriate prior to chemical weed control in grassy areas as it will reduce the amount of chemical required. Well managed grazing can be used to control pasture weeds in strips between tree rows in plantations once the trees are well established. However, grazing requires careful management in tree plantations. Animals should never be allowed to graze when soils are wet as their feet will damage surface roots of the trees and cause compaction and ponding, leading to anaerobic conditions which could kill the tree. Animals should also be watched carefully to ensure that they are not eating trees or causing physical damage by rubbing against them. For example, cattle often rub against trees and can push them over or damage the stems and sheep have been known to strip bark off young trees at certain times of the year.

Chemical

A well planned chemical weed control regime will meet all the objectives of the weed control strategy at the lowest cost. Agricultural chemicals can be divided into three main categories depending on their mode of action:

- **Translocated or systemic chemicals** are absorbed by the plant foliage and translocated throughout the plant. They are sometimes referred to as knockdown herbicides. Common chemicals in this group include glyphosate and metsulfuron which are non-selective, and haloxyfop which is selective. These chemicals are always applied as a liquid formulation, i.e., sprayed onto foliage.
- **Root-absorbed chemicals** require moist soil to work effectively and can remain active in the ground for long periods. They are often referred to as residual herbicides. Common chemicals in this group include atrazine, simazine and hexazinone. Sulfmeturon is partially residual while dichlobenyl is purely knockdown (i.e., acts immediately and is non-residual). These chemicals are usually applied directly to the ground either as liquid

formulations or as dry granules. They can often be applied safely over the top of young trees soon after planting provided careful attention is paid to applying correct concentrations. However, repeated applications of atrazine can reduce the growth of *E. nitens*. Similarly metsulfuron can have a severe impact on eucalypts if applied post-planting. As both these herbicides are residual, the effects can be long-lived.

- **Germination inhibitors** kill seedlings as they germinate and usually remain active for 3 to 6 months. Residual herbicides, such as those above, are used for this purpose along with sulfmeturon. These chemicals work best if they are applied to bare soil while it is moist so that the active ingredient can bind to the soil particles in the top few centimetres of soil.

It is very important to use the right chemical for the job at hand. Try to minimise the use of chemicals as much as possible. Seek professional advice before embarking on a weed control strategy.

Table 1: Herbicides registered for forestry use in Tasmania

Active Ingredient	Mode of action	Uses
Amitrole	Foliar absorbed and translocated	Knockdown grasses and broadleaf weeds.
Atrazine	Root absorbed	Residual control of grasses and some broadleaf weeds in pine and eucalypt plantations. Best use as germination inhibitor.
Clorpyralid	Foliar absorbed and translocated	Knockdown of wattle and some brush species. Can be sprayed over eucalypt at low rates.
Dichlobenyl	Root absorbed	Spring or early Summer control of grasses and some annuals. Post planting grass control in eucalypts.
Glyphosate	Foliar absorbed and translocated	Knockdown of grasses and broadleaf weeds and some brush species.
Haloxyfop	Foliar absorbed and translocated	Post planting grass control in eucalypt plantations.
Hexazinone	Root absorbed, some foliar absorption in liquid form	Knockdown and residual control of grasses, broadleaf and woody weeds in pine plantations. Foliar absorbed and translocated.
Metsulfuron methyl	Foliar absorbed and translocated	Knockdown of bracken, gorse and brush weeds prior to planting. Damages young eucalypts so withholding period required before planting.
Picloram	Foliar absorbed and translocated	Knockdown and residual effect with woody weeds. Tordon used for stem injection.
Simazine	Root absorbed	Residual control of grasses and broadleaf weeds in pine and eucalypt plantations.

Sulfmeturon methyl	Root absorbed	On its own, primarily used as a germination inhibitor. See below for combination with Terbacil.
Terbacil	Root absorbed	Usually used in granule form for grass control in >1 year old eucalypt plantations.
Triclopyr	Foliar absorbed and translocated	Knockdown and residual control of woody weeds.

Remember the label is a legal document and must be followed when using any agricultural chemical. It is illegal to use a chemical for a purpose which is not described on the label. In addition you must adhere to the relevant Chemicals Acts and Regulations.

Some hints for good weed control in new plantations:

- On ex-pasture sites concentrate weed control on cultivated strips approximately 1m wide. Leave the area between the strips undisturbed as much as possible. This will aid in erosion control, hinder invasion of problem weeds and will provide grazing fodder as the trees grow.
- If you intend cultivating the whole plantation area, the first application of herbicide may be before cultivation and therefore may need to be broadcast.
- Spray bracken areas in autumn prior to the first frosts. Leave undisturbed for at least 4 weeks but preferably until the following spring. If re-sprouting occurs in the following spring, slash, allow a new canopy to develop and then spray again. Avoid burning if possible.
- Cultivate soil in strips to be planted to achieve a fine tilth. Cloddy soils or turf sods will make weed control difficult.
- Apply residual herbicide to bare ground to achieve longer term control. If these residual chemicals are used as knockdown herbicides, the length of control period will be reduced.
- Eucalypts are especially sensitive to grass competition. The minimum weed control in young eucalypt plantations should be a weed-free strip of 1m in width which should be maintained until the tree canopy suppresses weed growth.
- In first year pine plantations weed control may only be necessary as a 1m diameter spot around the seedling. Strip application should be made in the second year or where grasses are particularly aggressive in the first year.
- Examine native forest sites prior to clearing to anticipate the weed spectrum that will germinate in spring. Remember, wattle seed can lay dormant in the soil for up to a hundred years and will germinate like a wheat field after soil disturbance and burning. Be prepared to deal with this prior to plantation establishment.
- When using translocated or systemic herbicides always try to apply them before the

weed species goes to seed.

- Always anticipate weed problems and deal with them before it is too late.

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