

A simple guide to perennial pasture establishment

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Pasture establishment or renovation is an expensive process that requires considerable planning and preparation to gain the maximum benefit. Preparation for pasture establishment needs to begin at least one full year before the seed is actually sown.

Things to consider before you decide to renovate the paddock:

1. Which part of my property will respond best to pasture improvement? Consideration should be given to soil fertility, acidity, terrain and pasture composition. The size of the paddock in relation to the budget available should also be considered. Whole farm planning will help to identify sites that are most likely to produce the best results for the cost and effort.
2. Can my pasture be improved without the need for resowing? Effective weed control, fertiliser, rotational grazing and spelling the paddock over spring and summer are all methods of decreasing competition and increasing the growth and persistence of either introduced or native perennial grasses without the need for resowing.
3. Is the timing right? Can I afford to have the paddock out of production for a full year? Careful planning is required to ensure that winter production of other paddocks is high enough to carry the stock through the winter without the use of the newly sown paddock. Other considerations include getting the soil fertility and weed control right before sowing the new pasture.

Paddock preparation:

Soil:

Before establishing a new pasture, it is essential that a soil test be taken well before the sowing date to allow time for correcting soil fertility problems. Phosphorus, potassium, sulphur, soil pH, aluminium, sodium and electrical conductivity (ECe) levels need to be examined and addressed prior to sowing.

Table 1 shows desired soil nutrient levels for sheep and beef production. Optimum soil phosphorus levels do not need to be reached prior to sowing. However, for soils with an Olsen P level of less than 12 mg/kg, capital phosphorus applications (20 – 30 kg/ha) will be required at sowing and in the following years to build fertility and gain maximum return on investment of the new pasture. It is recommended that phosphorus fertiliser is applied at sowing, even in highly fertile soils, to maximise

germination and rapid growth. Suitable capital and maintenance fertiliser application rates for your pasture can be obtained by taking a soil test and contacting the Department of Primary Industries.

Table 1: Desired soil nutrient levels (0-10cm depth) for pastures grazed by beef and sheep

Nutrient	Optimum level	Suitable fertiliser
Phosphorus (Olsen P)	12 – 20 mg/kg	Super phosphate or diammonium phosphate
Sulphur	9-12 mg/kg	Super phosphate
Potassium (Skene K)	160-300 mg/kg (depending on soil type)	Potash
Aluminium (CaCl)	< 8 mg/kg or 3% CEC (Grass pastures) < 2 mg/kg or 1% CEC (Lucerne)	Lime
PH (CaCl)	> 4.8 (Grass pastures) > 5.3 (Lucerne)	Lime
Sodium	> 6% CEC	Gypsum or lime
Electrical conductivity (ECe)	Sub clover < 2 dS/m Per ryegrass < 4.5 dS/m Phalaris < 6 dS/m Balansa clover < 8 dS/m Strawberry clover <10 dS/m Tall Fescue < 10 dS/m Tall wheat grass < 25 dS/m Puccinellia < 25 dS/m	Choose suitable species based on level of salinity.

Potassium fertilisers and nitrogen in the form of urea or diammonium phosphate (DAP) should not be applied at sowing as these fertilisers will damage the seed and reduce germination. Potassium deficiencies can reduce clover germination and should be corrected in the year before sowing. Nitrogen can be applied as urea after germination (or as monoammonium phosphate (MAP) prior to sowing) to increase plant growth rate and vigour.

Soil pH and aluminium levels are particularly important when sowing phalaris and lucerne pastures. Phalaris and lucerne are very sensitive (particularly in the establishment phase) to high aluminium levels that are associated with soil acidity. High aluminium levels (above 8 mg/kg CaCl₂) in the topsoil (within the top 10cm) can be corrected with the application of lime. Where subsoil (20–40cm) aluminium levels are high (above 5 mg/kg CaCl₂), phalaris and lucerne should not be sown. Landmaster phalaris was developed to tolerate higher aluminium levels in the soil, and can be considered where aluminium is a problem. Alternatively, cocksfoot could be used in these situations.

Weeds:

The following spray programs may be considered (**please read the label of the chemical and adhere to withholding periods, safety directions and correct rates**):

Reducing competition from existing weeds is one of the most crucial steps to successful pasture establishment. The first step is to identify which weeds are present and then follow a well-planned control program.

Autumn/winter year 1 (this step can be done in the second year only if you are planning spring sowing):

Alternative 1: Spray graze for broadleaf weeds (Paterson's curse, capeweed, thistles, dock, wild radish, wild turnip).

- Allow germination of weeds after the autumn break.
- Spray with a recommended light dose of a [recommended broadleaf herbicide 6-8 weeks after the germination when weeds are rapidly growing (before it gets too cold but after clover has been allowed to develop 3 leaves to minimise clover damage).
- Crash-graze the paddock (preferably with sheep) as per the recommendations of the chemical used as well as following the withholding period recommendations of the chemical.
- Remove stock from the paddock and allow for recovery of the grasses.

Note: Nitrate poisoning may occur when grazing large amounts of capeweed or Paterson's curse. It may be necessary to make hay available in these circumstances.

Alternative 2: Winter fodder crop

- Spray with a knockdown herbicide just after the autumn break.
- Direct drill with a winter fodder crop such as grazing varieties of triticale, oats or wheat. The purpose of the fodder crop is to crowd weeds in preparation for sowing a perennial species in one or two seasons time. The fast establishment and vigorous growth of the crop allows for good winter feed production in the first season of growth.
- In this option, a knockdown herbicide is used to spray out any weeds or re-emerging crop after the autumn break in year 2. This is followed by an autumn sowing of a perennial species. Broadleaf weeds may need to be controlled after establishment.

Winter or Spring year 1 – control of annual grasses (barley grass, silver grass, annual ryegrass, brome grass, capeweed, sorrel, bent grass, fog grass):

Annual grasses can be controlled using either winter cleaning, spray topping, or by sowing a summer fodder crop.

Winter clean:

- This is the most effective control method for silver grass. Spray with simazine between mid-May to mid-June or mid-August to mid-September. The latter window will have less impact on farm feed supply.
- Keep stock off the paddock for the recommended withholding period.

Spray top:

- This method is used to prevent the seed-set and re-invasion of annual grasses.
- Heavily graze paddock evenly in early spring to allow for simultaneous seedhead emergence of annual grasses.
- From heading to the milky dough stage (for annual ryegrass, apply at flowering), spray with a sub-lethal dose of glyphosate.
- Grazing will help to prevent any further emergence of seedheads.

Summer fodder crop:

- Sowing a summer fodder crop such as millet, rape or turnips is a good way to control weeds and provides extra summer feed. It is particularly useful in areas with extended seasons, or where irrigation is available.
- Heavily graze the paddock to remove any excess herbage until mid-spring
- Spray with a knockdown rate of glyphosate (see section on pre-sowing knockdown spray). It may be necessary to include an insecticide for red legged earthmite at this stage.
- Cultivate the paddock and sow at 10-15 mm depth with 20-30 kg/ha phosphorus.
- The seed can be sown with up to 15 kg/ha nitrogen. For maximum growth, apply a further 20-25 kg/ha nitrogen after emergence.
- Graze fodder crop heavily before the autumn break to remove residual crop before sowing.
- Summer fodder crops can be followed either by a permanent pasture, an annual pasture or a winter fodder crop.

Year 2

Autumn (for autumn-sown pastures)

Spring (for spring-sown pastures):

Pre-sowing knockdown spray:

- Graze the paddock heavily to remove excess herbage.
- Spray with a knockdown rate of glyphosate after the germination of weeds in autumn (autumn sowing) or at the start of spring (spring sowing) prior to sowing the new pasture.
- A second spray (up to two weeks after the first spray) may be required prior to sowing to control any re-emerging weeds, particularly if a weed control program has not been carried out in the year prior to sowing.

Post-sowing weed control:

Monitor the pasture after germination and control broadleaf weeds where necessary. Note that clover plants should have 3 leaves before a broadleaf herbicide is used.

Note: European Standard Index (for export stock) is often greater than the withholding period of some herbicides.

Pests:

Red legged earth mites (RLEM) can do significant damage to new pastures in the first 3 months after sowing. Control of RLEM can be achieved by spraying with a recommended pesticide. It is important to closely monitor the new pasture to quickly get on top of a RLEM problem.

Seed harvesting ants can significantly reduce the seed germination rate. Coating the seed with an insecticide can prevent seed removal.

Monitoring the pasture after sowing

It is good practice to monitor your new pasture closely for anything that doesn't seem quite right. Problem signs may include leaf decolouration, insect attack, poor patches, weed invasion etc. Seek assistance if you are concerned.

Choosing a species:

Choosing the right species to suit your soil type, soil fertility, rainfall and season length is a very important step towards successful pasture establishment and persistence. In general, the most commonly sown perennial pasture species are phalaris, cocksfoot, perennial ryegrass and tall fescue. A clover species should be sown with the perennial grass to provide adequate nitrogen and increase the feed value of the pasture. Sub clover is most commonly sown in areas where there is minimal summer rainfall. Perennial clovers such as strawberry clover or white clover can be sown in areas where the season is extended and significant summer rainfall occurs, or where pastures are irrigated.

Phalaris and cocksfoot are most suitable for the majority of areas where rainfall is less than 700mm and/or the season is short with minimal summer rainfall. Cocksfoot has lower winter production than phalaris, but will grow better than phalaris in shallow, low fertility, high acid soils.

Phalaris varieties vary in their level of winter production and acid soil tolerance. In general, the older semi winter dormant varieties such as Australian phalaris have very low winter production, but good persistence under set stocking and low fertility conditions. More recent winter active varieties such as Holdfast or Landmaster have good winter production, but require rotational grazing for good persistence.

Recent releases of winter-active tall fescue varieties show promising attributes for persistence, palatability and early autumn production.

Perennial ryegrass has good autumn and winter production and grows well where rainfall is above 700mm. There are large differences in the levels of autumn and winter production between old and new varieties of perennial ryegrass. The inclusion of novel endophytes has also increased persistence and eliminated the risk of ryegrass staggers in some new varieties.

All species will grow better on their own than when sown in competition with other species. However, phalaris can be successfully sown with cocksfoot or tall fescue. Ryegrass is fast to establish and will inhibit germination of phalaris, cocksfoot and tall fescue if they are sown together.

Sowing technique:

Cultivation and direct drilling are the most successful methods of establishing perennial pastures. Cultivation will allow more seeds to germinate, but will also encourage germination of weeds. Cultivation should only be considered where the paddock is very uneven or if lime needs to be incorporated into the soil. Direct drilling into a weed-free environment will allow less seeds to germinate but there will be less competition from weeds. Direct drilling also prevents disturbance of the soil, therefore reducing the risk of erosion. Seed should not be sown deeper than 10mm.

Management in the first year after sowing:

After the pasture has germinated, wait until you can pull the grass without the roots coming out before you put any stock on. Monitor and control weeds and pests as they arise. A short, light grazing for a period in early spring will encourage tillering. Phalaris should be allowed to run to head in its first year to allow for root development and help with persistence.

Once you have invested in a new pasture, it is essential that you manage it. Rotational grazing is necessary for all perennial grasses to maintain persistence. Fertiliser is also important to obtain maximum growth and return on capital investment.

Images of pasture recovery after fire with different burn intensities on perennial-based pastures



Cool-moderate burn – pasture is charred, but not completely blackened. Recent rains have initiated recovery of perennials.



Close-up view of perennial plant effected by a hot burn. All dead material is burnt, perennial plant is blackened.



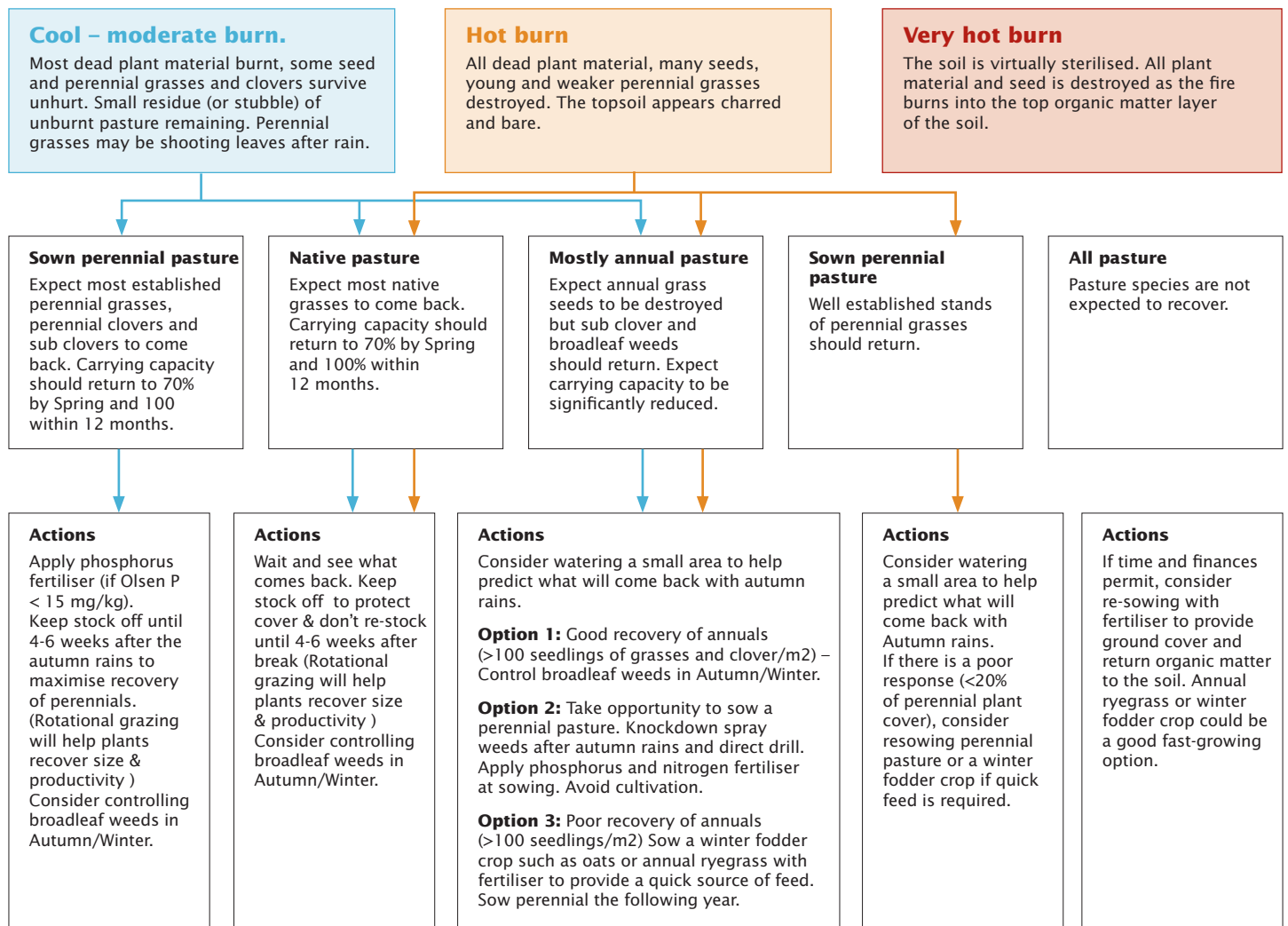
Perennial plant recovering from a hot burn.



Very hot burn – no plant material visible, earth has a blackened, charred appearance.

Decision Flow Chart For Pasture Recovery After Fire

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