

Pasture Recovery From Fire

Labertouche Field Day - 20 March 2009.

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The severity of the impact on burnt pastures after the 7 February fires will depend on how hot the fire was in any paddock or part of the farm. This is referred to as the 'intensity' of the fire and commonly fits into the following three categories:

- **'Cool to moderate burn'** - most dead plant material burnt, some seed and perennial grasses and clovers survive unburnt. There is often a small residue (like short stubble) of singed but unburnt pasture remaining.
- **'Hot burn'** - all dead plant material, many seeds, young and weaker perennial grasses destroyed. The topsoil usually appears charred and bare.
- **'Very hot burn'** - the soil has virtually been sterilised. All plant material and seed has been destroyed because the fire burnt into the top organic matter layer of the soil.

Generally 'cool to moderately' burnt areas are seen where there was little dry grass cover before the fire, including paddocks where stock have preferentially grazed out large areas during a previous rotation.

'Hot' burns occur where there is heavy plant cover such as lightly grazed pastures. The 'very hot' burns occur on soils where there is a thick root mat, also in areas adjacent to bush, shelter belts, under hay bales. An example occurred at Drouin West, a damaged pipe ran stock water across a paddock adjacent to some burnt out bush, for the first 20 metres out no plant recovery evident, beyond that distance there was good early recovery from both ryegrass and clover.

CSIRO research has found that temperatures in the soil surface are in the range of 50 -150 ° C in a cool burn area, and 100- 250° C in a hot burn. Soil temperature below 15mm deep is usually not changed by more than 10° C, and will return to its original temperature within five minutes. These figures suggest that plants that bury their seed or that have growing points below the surface should be able to survive the effects of fire.

Interestingly on 7 February the soil temperature at Warragul reached 33.6° C in the top 10cm of soil on an unburnt area. Commonly soil temperatures at that time of the year reach 22-24 ° C.

Fire impact on local pasture species:

The likely effects on pasture species by fire will also depend on soil fertility, pasture species and when the autumn break and its follow up rains occur.

Annual grass species generally have little seed in the soil, for example barley grass seed is usually on the soil surface or very close. While there were significant areas of barley grass in the region in late 2008, it's likely that the fire will cause a significant reduction in the presence of this species this year.

Deep rooted plants such as cocksfoot and perennial ryegrasses provided they have well established root systems will have a good survival chance in a 'cool to moderate' burn area. Couch grass, paspalum and kikuyu have also survived

Subterranean clover is an annual plant that buries its seed. This process will help reduce the damage to the seed. It's likely pastures that have had clover in the past will have this species return (the seed survives 10-12 years in the soil). However clover burr (with the seed still inside) was collected from the surface of pasture at Labertouche North after the fire and has only shown 5% germination, despite the seed appearing to be in good condition.

White clover with its surface stolons (or runners) is likely to be destroyed in all but a very 'cool burn'. Strawberry clover should survive slightly better than white clover. Like sub clover you may find buried seed will germinate and establish well because of a lack of competition.

In the case of weeds those with deep root systems such as flat weeds (dandelion, ribweed) and docks are likely to survive and were observed making a recovery 10 days after the fire. The seed of annual weeds such as capeweed, erodium and thistles will be destroyed if lying on the surface. However because of their seed bank in the soil they can be expected to recover and be very prominent due to a lack of competition from the desirable productive pasture species. Weeds such as bracken, blackberry, have shown recovery 4-5 weeks after the fire.

After the fires two small pasture areas were watered regularly to see what species would recover. An older pasture similar to that found on dairy runoff blocks/beef properties is showing new tillers on old Victorian perennial ryegrass, cocksfoot, couch, paspalum and kikuyu, plus weeds recovering. On a dairy pasture resown two years ago there are signs that modern perennial ryegrasses and the clover are showing some recovery in the drill rows.

However it is expected that both these and areas on other properties will need oversowing to fill in large gaps of bareground.

Fire impact on plant nutrients:

In relation to soil fertility some farmers have asked if there is any benefit from nutrients in the ash or at least what's left of it. Unfortunately there is little benefit likely.

In the case of nitrogen it's likely that the level in pastures will be reduced because the organic matter close to the surface has been burnt. During the recovery phase pastures on burnt areas will show a pale green or yellowing in

leaves which is a typical nitrogen deficiency. This will be seen in late autumn and winter this year.

Nitrogen is the major nutrient required by plants (4% of plant tissue is nitrogen). This is the key nutrient to maximise plant growth and needs to have plenty of funds allocated to it this year. Two good rules of thumb are:

- a) If there is sufficient moisture in the soil for plant growth, nitrogen can be applied.
- b) Pastures utilise nitrogen at the rate of approximately one kilogram nitrogen/ha/day.

Phosphorus is also a critical element (for both existing pastures and resowing). The fire will not have had an impact on phosphorous availability in our local soil types.

Phosphorus has a particularly important role in developing the root system - the more active and larger the plant's root system is the greater the opportunity for that plant to explore for nutrients in the soil. Unless your soil test values for phosphorus are very high you should be committing some of your nutrient budget to a maintenance application of phosphorus (early) this year.

It's likely that blends containing nitrogen and phosphorus form a major part of the topdressing program this year - particularly in dairy pastures.

Potassium (potash) can be expected to be more available for a very short time. Plant material in the pasture prior to the fire contains 2% potassium. This benefit is likely to be very minimal because so much of the burnt areas have had the ash swept away by the winds during the fire.

It can be expected that pastures with a good fertiliser history will recover faster.

Remember there will be no merit in spending scare dollars on unproven sprays, growth promotants, by-products etc which 'might' help you. This is not a time for doing a farm 'suck it and see' trial.

Resowing pastures:

Avoid harrowing burnt out pastures, this will damage the crowns of any perennial plants trying to recover as well as exposing weed seeds such as capeweed, erodium and thistle etc already mentioned.

When resowing pastures cultivation should not be necessary. Preferably oversow or direct drill, creating the least soil disturbance possible. Don't bury the seed.

Don't harrow after sowing, however rolling the surface could be a benefit if you're sowing into dry ground. The new pasture seed should establish well because of the lack of competition, preferably sow with some fertiliser or at least topdress the new pasture soon after the plants have established.

On most farms greatest productivity will come from sowing a ryegrass back into the pasture because it will produce more drymatter production, better recovery after grazing, and silage/hay yields.

- Annual ryegrass, giving quick feed at a low cost for the seed, but only lasting until December this year.
- Short term ryegrasses, which will last 1-3 years depending on summer rainfall and grazing pressure in late summer.
- Perennial ryegrass, that will be slower to get established but provide a longer-term pasture. Older pastures would have contained high endophyte varieties, resowing now gives an opportunity to sow the new nil or low endophyte varieties that can provide animal health benefits.

Note: If summer growing species like couch grass are invading the area to be sown, spray these out now, however allow three weeks at least before resowing to ensure there is no active chemical in the target plant that will kill out the establishing plants

The heat of the fire should not have effected soil acidity-alkalinity, therefore if the soil didn't need lime before the fire it should be still satisfactory.

Broadleaf weed control will almost certainly be necessary at a rate to kill the weeds, rather than a spray-graze routine using low spray rates and hard grazing with stock.

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