

How do I manage soil-borne root diseases in sub-clover pastures?

The issue: Soil-borne root diseases impact the productivity and persistence of sub-clover pastures across southern Australia.

The impact: Less than optimal pasture production limits animal growth rates and wastes inputs, including nutrients and water.

The opportunity: Managing root disease through a range of practical interventions could significantly boost pasture production and persistence.

There are four main pathogens of concern relating to root diseases: **Pythium, Phytophthora, Aphanomyces and Rhizoctonia.**

MLA-funded research has highlighted a range of practical options to minimise the impact and boost the productivity of sub-clover pastures.

While no silver bullet was identified, management practices, such as an adequate fertiliser program, rotational grazing, cultivation, and in some situations, fungicide seed treatments when reseeded support rapid root growth through the soil profile, are most likely to lower widespread incidence of the disease.

In the longer term, field trials have confirmed that identifying resistant and field-tolerant sub-clover varieties has the potential to boost productivity up to five-fold from current levels. Identification of sub-clover varieties with field tolerance to soil-borne pathogen complex remains an urgent priority for research.

How do I know if my sub-clover is affected?

Symptoms of root disease can appear as:

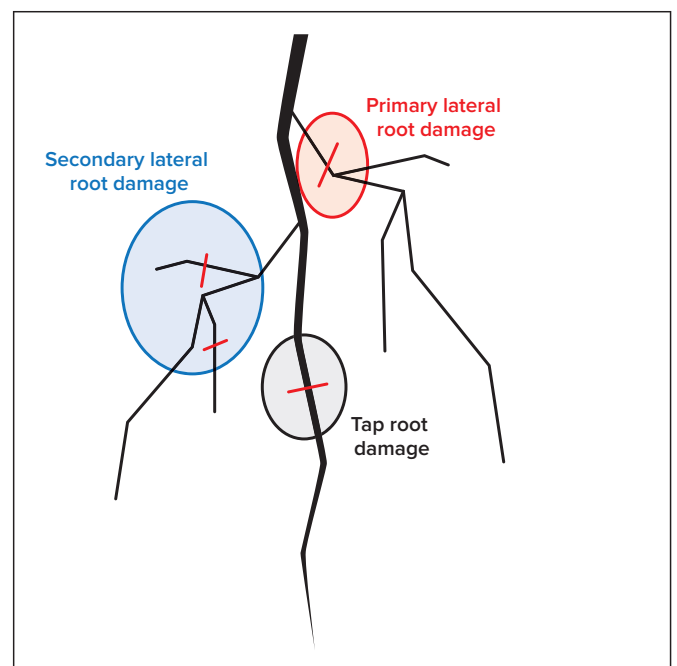
- stunted plants
- poor or patchy germination
- sudden die-off for no apparent reason
- little or no presence of sub-clovers.

Soil moisture, type, temperature and nutrition determine disease severity and impact depending on the prevailing pathogens. Sub-clovers are most susceptible to root disease during autumn and winter. While the disease also occurs in spring, plants are generally healthier and actively growing so the impact may be lower.

Access to rapid diagnosis through the PREDICTA® B test from SARDI is now available. PREDICTA® B results can help establish the main pathogens present and support strategic management decisions.

Pathogens are expressed under different environmental conditions (e.g. Phytophthora is favoured by warm, wet soils, Rhizoctonia is favoured by cold conditions and dry soils).

Figure 1. Types of root damage



Taking control

The most cost-effective on-farm management approaches developed from the research include:

- cultivating soil to reduce pathogens and subsequent root disease impact on productivity for several years
- ensuring adequate soil and plant nutrition through strategic fertiliser management, to enable better root and shoot growth even when disease is severe
- choosing field-tolerant varieties which perform well locally
- sowing a mixture of sub-clovers as an insurance policy
- using rotational grazing which allows more plant growth and, in turn, improves root development, even where disease is severe.

The paddock test

A three-year MLA Producer Research Site project by the MacKillop Farm Management Group Inc in SA determined the best disease control was provided by good pasture establishment practices including:

- best practice weed control prior to sowing
- cultivating an even seed bed
- applying Apron® fungicide as a seed dressing
- choosing varieties which are either new and bred with tolerance, or varieties long grown in the region and, thereby, with good field tolerance to disease.

More information

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- Visit the [Barossa Improved Grazing Group](#) and [Mackillop Farm Management Group](#) websites to investigate their findings.
- For more information on soil fertility go to mla.com.au/research-and-development/reports/2017/managing-soil-borne-root-disease-in-sub-clover-pastures/
- For more information on the PREDICTA® B soil test go to: pir.sa.gov.au/research/services/molecular_diagnostics/predicta_b

On trial

SA-based Barossa Improved Grazing Group ran a three-year MLA Producer Research Site project to evaluate strategies to reduce root disease impact and improve sub-clover winter productivity. Treatments included fungicides, inoculants and fertilisers. It found:

- no response in dry matter production in Clare and Trikkala varieties following application of registered fungicides
- no response in dry matter production or root nodulation from the application of inoculant when regenerating pastures
- significant response in dry matter production in winter/early spring (from 28 to 112%) to the application of phosphorous fertilisers at sites with marginal soil phosphorus levels.

The findings also suggest Clare and Trikkala can continue to perform well even if root disease is present.



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