



## FACT SHEET

A guide for land owners and managers in the Mount Lofty Ranges

For further information please go to our website:  
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# Testing soils, plants and animals for health

There are diagnostic tools to monitor the nutrient status of soils and plants.

Soil and plant testing is recommended to maximise returns through higher production and quality products and to reduce any negative impact on the environment.

Soil testing measures the balance of nutrients and is a useful guide to determine whether soil improvement processes are required.

Through the production of wool, meat, grain and vegetables, nutrients are removed from the soil. The “nutrient

bank” can be severely depleted if these nutrients are not replaced.

As the needs of soils and enterprises vary, land managers should seek out specific and specialist information from advisors, veterinarians and suppliers.

### WHAT MAKES UP SOIL?

Soil consists of three constituents, which affect plant growth. These properties are:

- Physical (texture and structure)
- Chemical (mineral particles)
- Biological (living organisms)



Above: When establishing pasture, take care to avoid land degradation.



Nutrient	Occurrence of Deficiency	
	Horticulture	Grazing /Cropping
<b>Major Nutrients</b>		
Nitrogen	Widespread	Widespread
Potassium	Common	Common on hay
Phosphorous	Widespread	Widespread
Sulphur	Common	Common
Calcium	Occasional	Only on acid soils
Magnesium	Occasional	Rare
<b>Trace Elements</b>		
Sodium	Unknown	Unknown
Chlorine	Unknown	Unknown
Boron	Occasional	Unknown
Iron	Rare	Unknown
Manganese	Occasional	Rare
Zinc	Occasional	Rare
Copper	Occasional	Occasional
Molybdenum	Occasional	Occasional

**Table 1:** Plant Nutrient Deficiencies in the Mount Lofty Ranges.

## SOIL PROPERTIES

### PHYSICAL

Physical properties and processes of soil affect soil fertility by altering water movement through soil, root penetration of soil and waterlogging. Physical properties important to soil fertility include:

- Soil structure
- Soil texture
- Water repellence

### BIOLOGICAL

A variety of soil organisms live in the soil, including bacteria, fungi, nematodes, earthworms and insects. These organisms perform a number of vital processes in soil.

Soil organisms undertake many actions which improve soil fertility. These include enhancing the cycling of nutrients, converting nutrients from one form to another and assisting plants to uptake nutrients from soil.

### CHEMICAL

The availability of elements for plant uptake. Some elements in the soil are nutrients and are essential for plant growth while others may be toxic to plants.

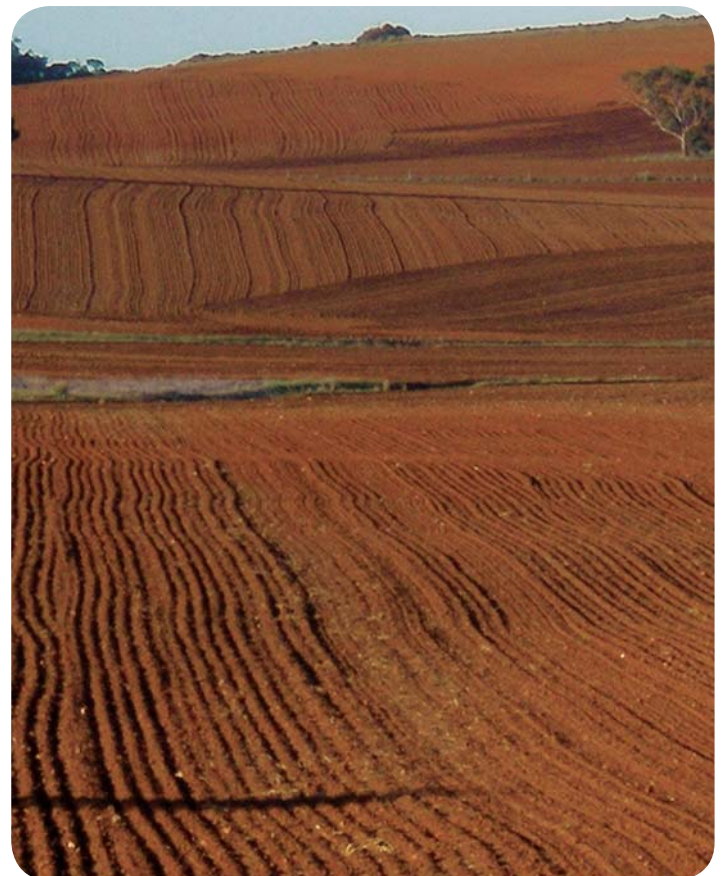
The availability of elements for plant uptake is affected by soil pH and reactions of these elements with soil particles and organic matter.

By testing the physical, biological and chemical properties of the soil a landowner can:

- Determine the fertility of the soil
- Determine if soil ameliorants are required
- Monitor soil pH
- Monitor changes over time

Many factors can influence soil test results. To build up a soil history, test soils at the same time each year. This will allow a comparison of results. Check with your local agronomist as to the best time to collect soil samples in your area. It is also recommended that you send your samples to the same laboratory, as results can vary between testing methodologies. When collecting samples from the paddock, collect enough for a good representation as soils can vary across one paddock.

As well as the availability of nutrients in soil, soil pH level influences the availability of nutrients to the plants. The pH level determines whether the soil is acidic or alkaline. The lower the pH, the higher the soil acidity. Low pH soils can decrease plant growth due to a reduction in the availability of nutrients to the plant and the amount of nutrients held in the soil.



**Above:** Soil testing is an excellent tool for identifying limitations to achieving best results from your soils.





*Above: Results from soil tests are only as good as the samples taken.*

Soils in the Mount Lofty Ranges are generally acidic and if the pH level is too low (less than 5.5 measured in water) then aluminium or manganese toxicity can occur, affecting the health of plants.

Aluminium becomes increasingly soluble as the soil pH decreases below 5.0, reacting with root cell wall materials and cell membranes, affecting growth. Magnesium is essential

for plant growth, however in acidic soils solution magnesium levels can result in the plant absorbing more magnesium than required.

Soil tests are available to assist in determining the condition of your soil. These tests can ensure that appropriate applications of fertilizer are made and indicate if corrective actions are required.

Instructions on how to collect soil samples are provided with soil testing kits. Soil testing services are available. Check with your local Natural Resources Management (NRM) Centre.

### TISSUE TESTS

Tissue testing involves the analysis of plant tissue to determine whether or not the plant has sufficient nutrients available for optimum growth and production at the time of sampling.

Plant analysis is useful to determine whether fodder/pasture is meeting the nutritional requirements of livestock. Various testing options are available. Contact your local NRM Centre for further information.

Comprehensive details on the results are sent back to the land managers, along with 'fact sheets' providing guidelines for correcting deficiencies.

It is recommended that you consult with your local adviser, fertilizer company representative, or private consultant for further advice based on local experience.

Contact your local NRM Centre for further information.



*Above: Soil is an important asset, changes can occur without being noticed.*



## BLOOD TESTING

Soil and plant tissue tests (including pasture tissue testing) will provide a guide to the health of your soil, however it will not identify the mineral intake of livestock.

The lack of certain nutrients and trace elements can affect the health of livestock. A visual assessment of stock health is not necessarily accurate.

While analysis of animal tissue is the best method of testing for mineral concentration, it is more practical for blood, urine and faeces to be sampled.

Details about the testing are available from your local NRM Centre.

## FAECAL EGG COUNTING (FEC)

Monitoring the worm egg levels in sheep faeces is an important part of preventing worm damage. Faecal egg counting 6-8 weeks after the initial summer drench allows a land manager to determine whether or not a second summer drench is required.

Worm test samples can now be conveniently sent for testing through the mail.

For further information about testing soils, plants and animals contact your local NRM Centre.



*Above: Faecal egg counting.*



*Above: Practicing good animal husbandry is essential for healthy livestock.*