LANDSCAPE SOUTH AUSTRALIA NORTHERN AND YORKE

Soil health

Measuring pH and salinity using a handheld meter

A handheld meter offers a quick way to test soil pH and salinity, helping identify acidic, alkaline, or saline conditions that affect plant health, nutrient availability, and water uptake.

A soil test can provide a lot of information about soils and the differences between paddocks. A simple and effective method to measure two important aspects of the soil - pH and salinity - can be through using a hand-held meter.

This is a quick and easy way to conduct a preliminary investigation, to allow further investigation and for monitoring ongoing changes in the soil.

pH

Soil pH is a measure used to determine the acidity or alkalinity of the soil. The scale ranges from 0 to 14; low pH values (<5.5) indicate acidic soils and high pH values (>8.0) indicate alkaline soils. A soil pH of 5.5 to 8 is optimal for crops and pastures. Values outside this range may cause plant deficiencies or toxicities. Further information can be found in the Knowing your soils South Australia handbook.

Salinity

Salinity refers to the concentration of dissolved salt in the soil. Elevated salt levels can impede plant absorption of water and nutrients from the soil. Saline soils may also cause nutrient toxicity involving elements like boron, sodium, and chloride. Additionally, high salinity can affect water quality adversely.

The handheld meter measures salinity in parts per million (ppm) or as a percent of total dissolved salts (%). These levels can be converted into other salinity units using the Measuring salinity fact sheet. Further information can be found in the Knowing your soils South Australia handbook.

KEY POINTS:

- A handheld electronic meter can be used to take a quick and easy measure of soil pH and salinity.
- Soil must be prepared in a slurry, using a ration of five parts water to one part soil.
- Measurement takes approximately 20 minutes per sample.
- Useful for conducting preliminary investigation of soil health, or for ongoing monitoring activities.

Have a go

The handheld meter can measure pH, salinity, Total Dissolved Salts (TDS), conductivity and temperature. Measuring pH and salinity will provide the most useful results for soil health analysis.

The meter measures the pH and salinity within a solution, therefore a soil slurry must be prepared where the soil is mixed with water.

When sampling soil, the top few centimetres are crucial for annuals and seeds of perennials, whereas the subsoil is more significant for established perennials. This distinction is based on the depth at which plant roots access nutrients.

A sample of the soil must be taken from the paddock. The Knowing your soils South Australia handbook provides further detail on how to take a sample.

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How to prepare a soil slurry

The soil slurry must be made in the ratio of 5 parts soil to one part distilled water (i.e. 10 g of soil with 50 mL of distilled water).

1. To make the slurry, you will need a scale, the soil sample, a clean container, a spoon, a measuring cup and 50 mL of distilled water.
2. Take the clean container, place it on the scale and press tare.
3. Weigh out 10 g of soil.
4. Add the 50 mL of distilled water to the 10 g of soil and mix thoroughly.
5. Wait at least 15 minutes for the soil to settle. This time will give more accurate results. It's normal to see some separation between the soil and water.
6. Turn on the meter and choose the parameter you want to measure, i.e. pH or salinity, by scrolling through the menu.
7. After 15 minutes, place the electrode into the centre of the sample. Record the reading once the number is stable on the screen.
8. Remove the electrode and rinse thoroughly before taking another reading.
9. Repeat the soil slurry mix and measurement on several areas of your soil for more accurate results.

Check your results

Samples can be analysed by comparing the results of pH and salinity levels.

If further information is needed to determine accurate levels, additional samples can be taken and analysed at a soil laboratory which can be organised through your local rural retailer, agronomist or directly with a laboratory. This will provide a more comprehensive understanding of the soil's overall condition.

References:

How to make a soil slurry, Instrument Choice

Measuring Salinity, Murraylands and Riverland Landscape Board

Knowing your soils South Australia handbook, Soil Science Australia

More information

Soil health toolkit

www.landscape.sa.gov.au/ny

Australian Government

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