

Patchy crop performance could point to soil acidification

GRAIN growers generally see applying lime as a task for late summer, but planning a more effective liming program can begin during the growing season.

Much of South Australia's productive farmland is either already acidic or is likely to become acidic in the next decade, according to Primary Industries and Regions SA-Rural Solutions SA Principal Consultant Brian Hughes.

Brian is managing the collaborative project 'New Knowledge and Practices to Address Topsoil and Subsurface Acidity Under Minimum Tillage Cropping Systems of South Australia' with investment from the Grains Research and Development Corporation (GRDC).

He says assessing the poor performance of acid-sensitive crops such as faba beans and lentils is an effective way of mapping areas to target for soil pH testing in summer.

The assessment can be as simple as looking over the paddock and recording areas of poor growth, or as advanced as mapping biomass with drone or satellite imagery.

"We've seen a close correlation between areas of poor growth indicated by satellite images of lentils and faba beans and acid soils," Brian said.

"Most crops will perform poorly if they encounter acid soil, but, pulses are especially sensitive and the symptoms are easier to see compared to cereals.

"Lentils and faba beans are very sensitive to acid soils, showing poor shoot and root growth, yellowing foliage, and



A good soil testing method is to dig two or three holes in each zone within the paddock so there is a clean face through the soil profile to the clay layer, then test the soil pH vertically down that face with a pH indicator kit.



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nodulation failure. Symptoms in the crop look similar to drought stress or nitrogen deficiency. But, those often occur across the whole paddock, whereas soil acidification is typically patchy.”

Soil test in depth layers after harvest

Once suspect areas of the paddock have been identified, usually from crop inspections, Brian said growers should test the pH down the soil profile in those zones after harvest. This is because acidity is often stratified in the 5–15 cm soil layer, especially if the paddock has already been limed before.

Traditional sampling of the 0–10 cm surface soil may not detect this acidity layer but it can still provide an indication of where pH might be low.

“We now recommend growers test their soil pH in layers starting with zero to five centimetres, then 5–10, and 10–15 or 10–20 centimetres,” Brian said.

“Testing from 20–30 centimetres may also be useful in deeper, often sandier soils.”

A good approach is to dig two or three holes in each zone within the paddock so there is a clean face through the soil profile to the clay layer, then test the soil pH vertically down that face with a pH indicator kit. Alternatively, soil cores can be taken with a Dig Stick soil probe (Spurr Probe) and tested to the appropriate depth.

These tests should be repeated in each zone where the in-season crop assessment indicated possible acidity issues. Growers should also test a zone of good growth from each paddock to confirm that the soil pH is better in those areas.

Soil pH indicator kits

Brian said simple soil pH indicator kits available from most hardware stores are adequate for detecting acidic layers in the subsoil. Acidic soils will turn the kit’s indicator powder light green or yellow.

“If testing with a field kit highlights an acidity problem, it is worth following up with laboratory tests to accurately measure the acidity,” he said.

“Soil samples should be carefully collected from each depth level and submitted in clearly labelled zip-lock bags. An agronomist can help with the correct sampling procedure.”

Laboratories will measure the pH in a calcium chloride solution, which is the industry standard and is a more stable method than pH measured in water.

If the pH measured in calcium chloride is below 5.0 in the top 10 cm or below 4.8 below 10 cm, acidity will be limiting the growth of most crops and lime is required to lift the pH. Liming programs must aim to increase the soil pH to 5.5 or more in the surface and 5.0 in the sub-surface to ensure acidity does not limit crop growth for number of years.

Brian added that remediation of subsoil acidity with lime is typically a slow process, especially in no-till farming systems.

“Even high-quality, finely ground lime can take years to move through the soil profile unless it is physically incorporated down into the acid layer,” he said.

“Lime topdressed on the soil surface without incorporation moves about one centimetre into the soil each year under ideal conditions. Growers need to consider the implications of strategic tillage versus the benefits of correcting the sub-surface layer with lime.

“It is very important to detect and treat soil acidification early because it will slowly reduce the productivity of your crops and your profits without you noticing.”

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Winter canola – graze, grain or graze ‘n’ grain?

With approximately 100,000ha of Australia’s canola crop now sown to winter canola types, the most common question from growers and advisors is ‘what is the best way for me to use this product in my farming operation?’

Twenty per cent of the annual area is generally sown in spring from late September to early November, and 80% in the autumn during February and March.

Some high-rainfall zone areas of the Western Districts of Victoria and southeast South Australia mostly sow winter types in autumn for grain only. The goal here is more effective early plant establishment, weed control and top-end yield targets, which range from 3.5 to 6t/ha. This equates to gross returns of approximately \$2000 to \$3500/ha.

In the southern areas of Western Australia and central areas of New South Wales, most growers are using winter canola types only for sheep or cattle grazing. Here, these are part of an overall annual grazing program that complements winter cereals and pastures, achieving gross returns of up to \$2500/ha.

Growers in areas of southern NSW, the Riverina, Central and Southern Tablelands and Highlands, as well as some regions of Victoria and South Australia are achieving impressive dual-income streams from managing their winter canola crops with both grazing and grain uses in mind.

Some of these growers are taking advantage of the vernalisation requirement of winter types and grazing up to 120DSE/ha. Weight gains of 70g to 512g/day are being realised, amounting to grazing returns of up to \$2000/ha. Furthermore, once these paddocks are locked up in July or August and then taken through to harvest, grain yields of up to 2.5t/ha have provided an additional income of up to \$1500/ha.

If you are considering sowing winter canola for the first time, think about your proposed purpose and factors such as: when you would like to plant, grazing intervals, weed control options with the in-built Clearfield technology, nutritional requirements and harvest management. Of course, should you like any advice at all, please feel free to get in touch with me directly.

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