

Monitoring your soil pH

Re-Lime
Time to Lime

Monitoring

Increasing acidity (decline in pH) leads to losses in production. Tracking changes in the soil pH profile requires samples to be collected from the same location over time.

Catchment level monitoring conducted by the Avon Catchment Council Soil Acidity Project at Gabby Quoi Quoi demonstrates that monitoring can identify on-going acidification or increases in soil pH associated with lime use.

It is estimated that two thirds of the wheatbelt is affected by soil acidity. Widespread soil sampling in this project has revealed that 80% of topsoils and 60% of subsurface soils in the Avon River Basin are below regional targets*.

Monitoring soil pH at the farm paddock level enables farmers to develop liming programs most appropriate to their individual situations.

Soil testing

Samples should be taken at 0–10 cm, 10–20 cm and 20–30 cm to determine a soil pH profile. The extra information gained from sampling to depth is extremely valuable for management decisions because severe subsurface acidity may underlie topsoils with an optimal pH. In this instance, additional lime will be required to treat subsurface acidity.

Ideally, soil samples should be taken in summer, when most soils are hot and dry with minimal biological activity. In WA, it is standard to measure pH using one part soil to five parts 0.01 M CaCl₂.

It is critical that soil sampling takes paddock variability into consideration so that growers can target lime inputs to maximise economic return. For example, soils differ in their capacity to resist pH change (buffering). Better buffered soils are slower to acidify, but require more lime to lift pH when they do acidify. Clays are generally better buffered than loams, which in turn are better buffered than sands.

Samples need to be properly located (GPS) to allow comparable repeat sampling. Sampling should be repeated every 3–4 years to detect changes and allow adjustment of liming practices.

The best option is to use a specialised soil-sampling contractor and seek expert advice for individual requirements.

Management

Effective management of soil acidity requires knowledge of the soil profile (and how it is changing over time), acid inputs (e.g. nitrogen fertiliser), alkali exports (type of produce), lime inputs, and the soil's buffering capacity.

The Avon Catchment Council target soil pH values of 5.5 in the topsoil and 4.8 in the subsurface for the Avon River Basin are a good guide for all agricultural regions in WA. Maintaining pH above 5.5 in the topsoil ensures sufficient alkalinity to move down and treat subsurface acidity.



Kit Leake (right), farmer and member of the Kellerberrin Demonstration Group, and Joel Andrew of Precision SoilTech discuss soil samples collected for monitoring fertility and changes in soil pH.

"I have soil sampled in the past but not subsurface depths. Increased grain prices start to change the economics of soil management practices such as liming and deep ripping, especially if we get responses to these treatments in dry years like 2007," Kit said.

Soil testing—the 1st step in best practice management of soil acidity

- Sample soil at 0–10 cm, 10–20 cm and 20–30 cm
- Take paddock variability into account
- GPS locate samples
- Re-sample every 3–4 years
- Apply lime to keep topsoil pH above 5.5 and subsurface pH at 4.8



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The Avon Catchment Council has set a target pH_{CaCl₂} of 5.5 for topsoils and 4.8 for subsurface soils in the Avon River Basin by 2020.

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