



Local Land
Services



National
Landcare
Program



Soil Monitoring of Acid Soils Project 2020

Project Background

The aim of the 'Soil Monitoring of Acid Soils Project', funded by Murray Local Land Services, was to monitor changes in soil pH and fertility over time at selected sites across the Murray region and consider the management practices that have influenced these changes. The project was a follow on from the 2017 'Sub Clover Nodule Health Project' that collected baseline soil data and assessed the nodulation status of pasture legumes from 40 sites sampled in September 2017. In March 2020, 31 of these sites were resampled to monitor changes in soil properties. Paddock management information such as production outputs and liming and fertiliser inputs was collected from landholders to gauge the effect that these factors may have on soil pH and fertility status. The nodulation status of legumes was not assessed in this project, due to the unfavourable seasonal conditions in 2019.

Key Findings

- In most cases, current liming practices are not addressing the current acidification rate.
- 45% of paddocks have severely acidic ($\text{pH}_{\text{Ca}} < 4.5$) subsurface layers (5 – 20 cm). This has increased from 26% of the same 31 sites in 2017.
- Only 7% of paddocks have $\text{pH}_{\text{Ca}} > 5.0$ in the subsurface layers (5 – 20 cm). This has declined from 16% of the same sites in 2017.
- 86% of paddocks that have been limed in the last 5 years have pH_{Ca} levels above 5.0 in the surface but are moderately ($\text{pH}_{\text{Ca}} 4.5\text{-}5.0$) to severely acidic ($\text{pH}_{\text{Ca}} < 4.5$) in the subsurface layers below 5 cm.
- Recent research on soils on the NSW Southern Slopes suggest acidic surface and subsurface soils should be limed to increase pH_{Ca} to a target of 5.5 of the surface 0 – 10 cm layer. This will provide sufficient lime to raise pH in the surface soil and allow for excess lime to leach into deeper subsurface layers and slowly increase pH at depth.
- It is expected that sub clover nodulation health is also declining with acidifying soils.
- Soil phosphorus levels were above critical values (>30 mg/kg P) in 74% of the paddocks, an increase of 3% since 2017 sampling. The majority of these paddocks have received between 100 and 200 kg/ha of super, MAP, or DAP every year.
- Organic carbon (OC) for all sites averaged 2.3% and ranged between 1.4% and 3.7%. Average OC was 1.8% in the <600 mm rainfall zone, 2.4% in the 600 – 800 mm zone and 3.2% in the >800 mm zone. Compared to 2017, OC has decreased slightly in the <600 mm rainfall zone from 2.0% to 1.8%, and increased in the higher rainfall zones, although not significantly.
- Soil testing should be conducted around the same time of year in order to monitor changes in soil properties. This is necessary to minimise the natural variability that can occur between seasons in soil pH and exchangeable aluminium values.
- When monitoring trends in soil pH, sampling intervals of 5 cm to a depth of 20 cm are recommended. NSW DPI recommend using a 25 mm diam. core tube to collect the core and cut and bulk the core into 5 cm intervals. A video providing detailed instructions on accurate soil sampling will be available on the HLN website in the near future.
- Regular soil testing is important to make sure inputs are matched to requirements and that investment in one type of input is not wasted because the other is still a constraint on production.

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