



Soil pH Variability Mapping

Farm Host: Wiehl Family, Woogenellup

Philip Honey, Smart Farms Co-ordinator, SCF

With soil acidity becoming an ever-increasing soil constraint in the Great Southern and many farmers applying consistent liming applications over the years, the question often gets raised; are we applying enough lime, or are there areas within a paddock where I should be applying potentially more or less lime?

The use of more intensive sampling strategies (like gridded sampling) is often the best way to determine what variation exists within a paddock, but this often comes at a higher laboratory analysis cost, along with a more intensive labour requirement. The use of “on-the-go” sampling strategies helps create the opportunity to sample at a higher intensity than gridded sampling and gives you more data with lower laboratory fees. However, this comes with the cost of physically purchasing or hiring a machine.

The SCF On-The-Go pH project is investigating different sampling approaches to build a better understanding of soil acidity across paddocks, and the various tools available to help monitor soil acidity changes over time. A soil acidity demonstration site has been developed at Martin & Tammy Wiehl’s property, in Woogenellup.

PH TESTING STRATEGIES TRIALLED

The NLP3 on-the-go soil pH testing program is testing three broad-based ‘soil sampling strategies’ for measuring soil-pH and mapping the variation between them to develop a potential variable rate lime map. The strategies tested include:

1. Farmer/Industry Practice – a couple of soil sample points taken in each paddock with soil samples sent to the laboratory, to give a blanket variable rate lime approach.
2. Grid Sampling – taking one soil sample in each 100m x 100m grid, sending the sample to the laboratory, to be analysed to create a gridded soil pH map that can be utilised in a variable rate liming application.
3. On-the-Go sampling – utilising a specialised pH sampling machine where soil pH readings are taken in the paddock, on-the-go by the Veris machine. Some soil samples are still physically taken & analysed externally to verify the machine’s readings and to calibrate the pH maps to be comparable to physical soil test results (pH in CaCl₂).

HOW DOES THE VERIS SYSTEM WORK?

The Veris system comprises of a dual pH sampling probe setup, a disc setup to measure the soil electrical conductivity, and depending on the trailer setup, potentially also a sensor to read organic matter content. All these sensors wirelessly connect to a laptop inside the car which records the readings.

The Veris setup trialled by SCF had all three sensors mounted on the trailer and was towed by a 4wd vehicle across the paddock in 35 metre swaths. Soil electrical conductivity and organic matter was consistently recorded as the machine traversed the paddock, whilst pH readings were taken approximately every 90 metres, equating to approximately 3 soil pH test points per hectare. To undertake the soil pH readings, the trailer was stopped, the dual pH sensor probes were automatically sprayed with water to clean the sensor, then the probes were automatically inserted into the ground, with the soil pH reading taken. Soil pH readings are averaged between the two probes, with data discarded if the variation between the two probes is too large. The probes are rinsed once again, before driving down to the next sample spot.

The data is then processed in the cloud once the whole process is complete, with soil laboratory tests taken and analysed at known reference points to create a pH map of the field. This data can then be utilised in variable rate map creation for lime applications or utilised as a scouting tool to help identify priority sampling points.

NEXT STEPS:

SCF will be analysing the pH maps and gridded soil sample results to develop pH maps for each sampling strategy, and comparing the variation recorded between techniques. Stay tuned for the upcoming Trials Review booklet next year and future demonstration events to see the machine in action.

PROJECT ACKNOWLEDGEMENTS:

This project is supported by Stirlings to Coast Farmers, through funding from the Australian Government’s National Landcare Program.

