GRID SOIL MAPPING HELPS NEW FARM DEVELOPMENT

Gaining an understanding of soil type and condition has helped father and son duo Neil and Charlie Vallance develop a newly purchased sheep property, into a cropping property in the high rainfall region of Western Victoria.

The Vallances as part of the Aberfoyle Farm business, purchased their new farm in April 2018 which retained an Australian phalaris pasture base with limited lime and fertilizer inputs. Together they set about the slow transformation from pasture to cropping and building a sustainable and increasingly profitable business. Most of the farm was sown to canola for the first time in 2021.

Picture: Charlie Vallance, Aberfoyle Farms Pty Ltd.

INITIAL MAPPING

"When we took over, we knew that the the property ranged from heavy black clay on the river flats to light sandy gravel on the hills, but we didn't really know where any of potential problem areas were. One of the first things we did was to map the whole property in 2018 for pH, phosphorus and cation exchange capacity," explained Charlie.

Kirsten Barlow from Precision Agriculture explained a grid soil map was created across the whole farm.

"It showed the soil pH to be highly variable across the property, with an average of 4.9 (CaCl), ranging from 4.2 to 5.9 (CaCl). Off the back of the sampling, variable rate spreading prescriptions were created for lime, using soil texture in each paddock to inform the lime rates, as well as gypsum, potassium, and phosphorus," she said.

One of the motivations of the Vallances, was to alleviate issues of soil acidity and poor nutrition to achieve long-term soil health improvements that ultimately lead to sustainable and consistent yields.

The grid soil mapping has shown Neil and Charlie a lot about the soil management needs of this property.

"We found that the sand needs additional K and S applied every year with the N, while the clay

FARM SNAPSHOT

Producer: Charlie & Neil Vallance, Aberfoyle Farms Pty Ltd.

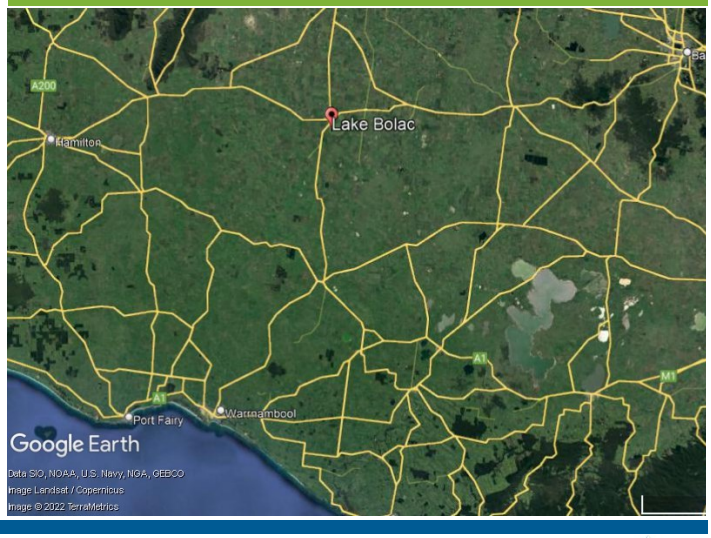
Agronomist: Craig Drum, DAgro

Location: Lake Bolac, Victoria

Annual Average Rainfall: 525mm

Soil Type: Heavy black clay on the river flats to light sandy gravel on the hills.

Enterprise: Mixed Farming



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INITIAL MAPPING

required significant gypsum. I am now able to properly manage and can address these key impediments and put gypsum on the heavy clay flats and lime, K and S on the sandy hills," said Charlie.

RE-MAPPING

The property was re-mapped in 2021 to see what changes had been made.

Charlie said, "After three years the average pH increased to 5.4 (CaCl) across the 150 hectares. Over 65% of the property is now above the initial pH target of 5.2 and 90% is above 4.8. But there was still a significant range in pH values from 4.5-6.5, but we found out why."

Kirsten explained, there were two factors contributing to the variation seen on the property. The areas of most variation have arrows pointing to them on the 2021 map.

"In the northern corner of the property there are three grids where the pH was 4.6 to 4.7 in 2021. This paddock was limed, based on the soil type in most of the paddock which was a sand. The CEC data in this corner of the paddock is consistent with the clay in the river flats, the higher CEC and heavier texture soils have a greater ability to resist pH change and require significantly higher lime rates.

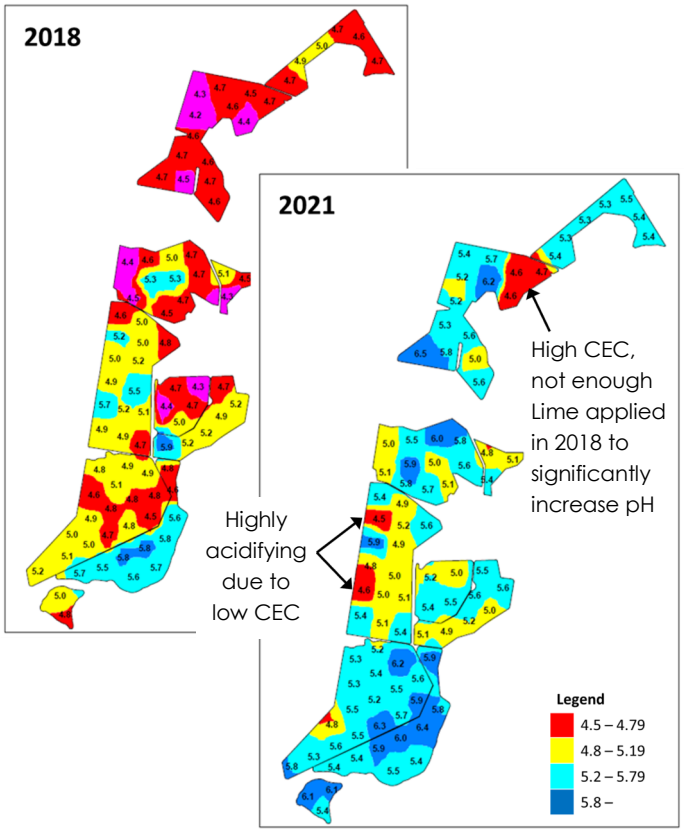
In the central paddock there are two grid points below a pH of 4.8 in the 2021 map. These grid points received minimal lime in 2018 and have continued to acidify over time. These soils have a very low CEC, less than 4.0 cmol(+)/kg) and therefore minimal ability to resist changes in soil pH."

THE NEXT STEPS

Historically the Vallances have broadcast lime in areas that are below a 5.0 pH (CaCl), prior to a canola crop, every 3-5 years. However, with the introduction of an additional break crop of Faba Beans into the system (Beans being quite pH sensitive) as well as speed tillage equipment, the Vallances aim to apply lime more frequently.

"We will use variable rate pH and CEC mapping and work towards a target pH of 5.5 initially and 6.0 in the longer-term," explains Charlie.

CEC will be used to estimate the pH buffering



The pH farm maps, in 2018 (left) and 2021 (right) showing the change in pH following variable rate lime application. Arrow points to red area with very low CEC.

THE NEXT STEPS *continued...*

capacity of the soil to generate more accurate lime rates and will further reduce the variability of pH overtime, despite highly contrasting soil types across the property

The Vallances, by retaining crop stubbles, utilising minimum till philosophies and utilising competitive perennial and annual pastures combined with their cropping, have started to improve soil structure and increase organic matter. Chook manure is also used to improve biomass growth of pastures and the Vallances intend to apply chook manure to a couple of paddocks each year to boost nutrients before they return into a cropping program.

"It will be interesting to see how consistent our yields are across paddocks this year. If they aren't, well we will probably learn something about why. Probably how our soil handles waterlogging – it's been a wet challenging year," laughs Charlie.

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