

Healthy subsoils produce more red meat

THE MLA funded Producer Demonstration Site (PDS) project called 'Healthy subsoils produce more red meat' held a second workshop on May 31 in Mansfield, North East Victoria.

Attendees included members of the Goulburn Grasslands Society (GSSA) branch as well as the Alexandra and Mansfield, and Yarra Valley Best Wool Best Lamb (BWBL) farmer groups along with a number of interested producers who travelled from different parts of the state to attend.

This project is a collaborative effort between the GSSA and BWBL groups, Agridome Consultancy, LaTrobe University, Melbourne Polytechnic, Charles Sturt University and several other private companies including Terra Nova Ag, Agriprove, Incitec Pivot, CSBP and Soilkee.

Coordinated by Dr Matt Mahoney of Agridome Consultancy Pty Ltd this project will demonstrate proven techniques used in the cropping sector and apply to the high rainfall pasture grazing systems of this North Central to North Eastern region of Victoria.

"The subsoil under high rainfall pasture is the focus of the project and a hugely important part of our farming systems," said Dr Mahoney.

"But they are often overlooked.

"From 10 to 80 per cent of plant nutrition and water is derived from the subsoil.

"Over four million hectares of farmland in Victoria alone are estimated to be affected by some type of subsoil constraint.

"However, the subsoil is generally given little attention in usual soil testing practices on most grazing enterprises."

The recent workshop followed on from a seminar held earlier in 2022 at Yarck where by the project was introduced to the wider producer audience.

The initial soil testing results from producer properties located in the region from Coldstream to Merrijig were presented.

The focus of the second workshop in Mansfield was on the methodology to address the constraints identi-

Agridome Consultancy

DR Matt Mahoney from Agridome Consultancy offers expert independent and practical agronomic and livestock advice.

His aim is to build on the efficiency and sustainability of pasture grazing farm enterprises, whether dairy, beef, sheep/goat, horse, alpaca or other.

Dr Mahoney has worked with small and large scale land managers in South Eastern Australia and New Zealand.

His expertise includes soil and plant tissue testing and plant nutrition advice, beef and sheep industry recognised training packages and farmer group facilitation, farm planning, and general animal health advice.



producers supplying a large supermarket chain with carbon-footprint assessed beef for the supermarket's carbon neutral beef range.

Mark presented his property's carbon footprint for his beef production side of his business, and showed how a large proportion of the emissions came from methane production from his beef herd.

While the carbon footprint assessment was focused on the greenhouse gas emissions, it was discussed that these emissions would need to be offset with carbon capture somewhere and could be done by increasing soil carbon using the methods demonstrated in this MLA PDS project.

"The overall message on the day was that the prescription approach to subsoil constraint amelioration represents the most cost effective option at each demonstration site," said Dr Mahoney.

"When determining the approach, producers will consider the limiting factors of the subsoil affecting pasture growth.

"A combination of amelioration methods will then be prescribed - for example combinations of lime application and different incorporation methods and blending with the organic material amendment.

"This will be compared to a 'usual practice' area alongside to act as a control."

Another workshop is planned for the project and is expected to be held either late this year or early 2023.

If you would like more information on this project, please contact Dr Matt Mahoney from Agridome Consultancy e:matt.agridome@gmail.com or phone 0438 209 707.

fied by the soil tests of the core producer properties involved in the project.

On every site soil was sampled and analysed for both physical and chemical constraints, and subsoil constraints thought to be limiting to pasture production were identified.

Soil acidity and aluminium toxicity were found to be the most common across nearly every site.

This was followed closely by nutrient deficiencies of the major nutrients, phosphorus, potassium and sulphur, whereby nutrient concentrations decreased with depth.

Physical constraints such as dense mottled clay layers evident of waterlogging were also identified.

Soil salinity was not identified as an issue, however, one site was slightly sodic.

The range of the constraints found at the producer sites means that there will be no one-treatment-fixes-all approach that can be used to ameliorate all of the sites.

Rather a prescription approach is required to address each property's individual constraints.

At the most recent workshop attendees heard from presenters who are experts in their respective fields, addressing the amelioration of the core producer sites.

Gary Clark and Peter Sale from LaTrobe University presented on the impressive results obtained by subsoil manuring.

"This is the deep placement at 300 to 400 millimetres depth of 15 tonnes per hectare of organic nutrient rich

amendment into the subsoil," said Dr Mahoney.

"Terra Nova Ag have designed equipment to place organic amendments in a band at depth in the soil.

"This organic amendment was usually poultry litter but could be composted green waste.

"Attendees at the workshop were introduced to the equipment used to deliver the material to depth and shown some of the results achieved when the right amendment was applied at depth.

"It demonstrated how a prescription approach was required to amend different subsoils depending on the soil chemical and physical characteristics," said Dr Mahoney.

"Gary Clark then showed how this had a long lasting effect on crop response far beyond that of deep ripping alone.

"The soil structure had improved hugely, with soil aggregation vastly improved and visually apparent at depth from the subsoil manuring treatment areas.

"Gary also explained that this amelioration technique enabled plant roots to penetrate deeper into the clay soil - which was previously too impenetrable for root growth - and allowed the crop plant to access a larger volume of soil to extract soil water.

"It was this extra soil water that would explain the dramatic increases in yields that were recorded every year after the treatment, and still significantly above the control four years later," said Dr Mahoney.

Peter Sale from Latrobe

University said that the extra soil water in the subsoil was like tapping into extra rainfall.

With Mr Sale attributing each extra millimetre of subsoil water with producing between 30 and 60 kilograms of extra grain per hectare.

"However, this requires a good reliable rainfall to ensure there was plenty of soil water available in the subsoil for crop growth," he said.

"This sometimes can be a problem in the relatively low rainfall cropping regions."

Peter went on to highlight to the attendees that in high rainfall pasture systems receiving >700mm rainfall annually, that subsoil moisture will be much more reliable every year.

"However, the species sown and subsequent grazing management would need to change in order for this to occur," he added.

"If done correctly, this has the potential to dramatically improve pasture production and season length especially in drier years, which would be extremely valuable to producers."

Another approach was presented on the Soilkee machine developed by Neils Olsen.

With many years of successful soil regeneration, Neils presented the results he was achieving using the unique Soilkee machine in combination with rigorous rooting annual cover crop species.

Neils claimed the results were largely due to the tillage of only 15 per cent of the soil to seven centimetre depth,

incorporating plant material and driving microbial growth which fed the plant roots and ameliorated the soil from the top down.

This Soilkee method was also able to make the less available nutrients available for root uptake and plant growth and subsequently increase soil carbon to levels previously thought to be impossible.

One of the highlights for the day was delivered by Jason Condon from Charles Sturt University, Wagga Wagga.

Jason presented results he had recorded from experiments ameliorating acidic soils with lime and explained how we have been aiming far too low for our optimum soil pH target when calculating lime rate recommendations.

The results showed that proper incorporation of the lime was also very important for the lime to work effectively.

Jason showed that when lime was not working correctly, legume crops did not perform at their potential as they were unable to form fully functioning nitrogen fixing nodules.

Jason also discussed the error in only looking at 10 centimetre increments when soil testing as the results could be misleading.

He recommended soil testing in five centimetre increments instead and that a target pH of 5.5 in calcium chloride should also be adopted.

To round out the day, Mark Ritchie, one of the project's core producers, gave a presentation on his journey being involved with a small group of

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