# Subsoil Amelioration Demonstration

SFS
Southern Farming Systems

## BACKGROUND

Many farmers in the High Rainfall Zone of Victoria have made great progress in addressing topsoil constraints, however crop yields have plateaued. It is believed that subsoil constraints are the reason for not achieving maximum yield potential.

Subsoil amelioration is one possible tool to achieving the next leap forward in yield maximisation and consistency. This demonstration was designed to create awareness of the practice, whilst providing a framework for farmers to use when deciding whether subsoil amelioration is the appropriate tactic for them on their farm.

## METHOD

***Step 1. Identify Soil Constraints***

An appropriate demonstration site was located through soil testing that identified the soil constraints present and where they occurred in the soil profile.

The tests identified that the subsoil at 30 cm was sodic and devoid of Organic Carbon, limiting crop production. Small soil pits, Figures 1 & 2 confirm a hostile subsoil with the presence of a bleached layer, complete with a buckshot layer, indicating a perched water table and waterlogging issues.

EM 38 soil mapping was conducted across the whole paddock to gain a better understanding of the soil issues and to determine whether a blanket amendment or variable rate application could be used.

***Step 2. Amendment***

After identifying that there is a subsoil issue that could be alleviated through subsoil amelioration a prescription blend of amendment was ordered from Van Schaik's Bio Gro. The blend consisted of a mix of urban delivered compost, animal manures, gypsum and synthetic nitrogen. Using a blended product ensured the product was consistent, properly mixed, contamination free, screened and the appropriate moisture level for the subsoil machine shown in Figure 3.

## DEMONSTRATION DETAILS

**LOCATION:** STREATHAM
**DURATION:** 1 YEAR 2023-2024 SEASON
**SOIL TYPE:** CLAY LOAM WITH A BUCKSHOT LAYER
**PREVIOUS:** WHEAT CROP 2022
**SOWN TO:** CANOLA 2023

**Figure 1.** Soil Pit Clay Loam over Buckshot over Clay.

**Figure 2.** Soil Pit Red Loam over Buckshot over Clay.

**Figure 3.** Van Shaik's Bio Gro prescription blended amendment.

***Step 3. Demonstration***

After all the planning and site selection 60 mm of rain fell just prior to 18 April, 2023 and made access by the machinery impossible to the original site. Therefore, the demonstration area in the same paddock was shifted so the machinery could traffic the paddock, however this brought the demonstration area beside a tree and fence line, which may cause some edge effect in the results shown in Figure 4. *Please note this is a demonstration not a replicated trial, please view the results with caution.

Australian Government | National Landcare Program
GRDC Grains Research & Development Corporation
AGRICULTURE VICTORIA

This project is supported by Agriculture Victoria through funding from the Australian Government's National Landcare Program and GRDC.

P: 03 5265 1666 E: office@sfs.org.au A: 23 High St, Inverleigh VIC 3321 www.sfs.org.au

# Subsoil Amelioration Demonstration

SFS
Southern Farming Systems

## TREATMENTS

The demonstration treatments:

1. Deep ripped + Amendment + Uncultivated
2. Deep ripped + Amendment + Cultivated
3. Surface applied amendment + Uncultivated
4. Surface applied amendment + Cultivated
5. Farmer Practice nil amendment (Control)

The Deep Ripping + Amendment was done with Terra Nova's 4m subsoiling machine depositing 20 t/ha of the amendment at a depth of approximately 30 cm.

The Surface applied amendment was delivered by the Terra Nova machine without the ripping tynes engaged.

The cultivation method was a scarifier run over the treatments that required cultivation.

The canola crop was sown with a tyne, knifepoint, press wheel seeder at 250 mm row spacing.

## RESULTS*

*Please note this is a demonstration not a replicated trial, please view the results with caution.

### *Plant Establishment*

Establishment & plant biomass cuts were taken on 9 September, 2023. The biomass cut's showed that both the subsoiled and surface applied treatments had promoted an increase in crop biomass when compared to the farmer practice. Visual observations also showed a significant increase in crop biomass and root development shown in Figure 5.

Figure 6 shows the average plant establishment for each treatment, the process of deep ripping had a detrimental effect on crop establishment, but the ability of canola to compensate with extra growth and biomass overcame this initial obstacle. All treatments had an establishment at the lower end the acceptable the level of 30 to 40 plants/m² for Canola.

**Figure 5.** Subsoiled Canola plant (left) vs Farmer Practice (right)

**Figure 4.** Terra Nova's 4m Subsoiling Machine first run with amendment.

## RESULTS*

*Please note this is a demonstration not a replicated trial, please view the results with caution.

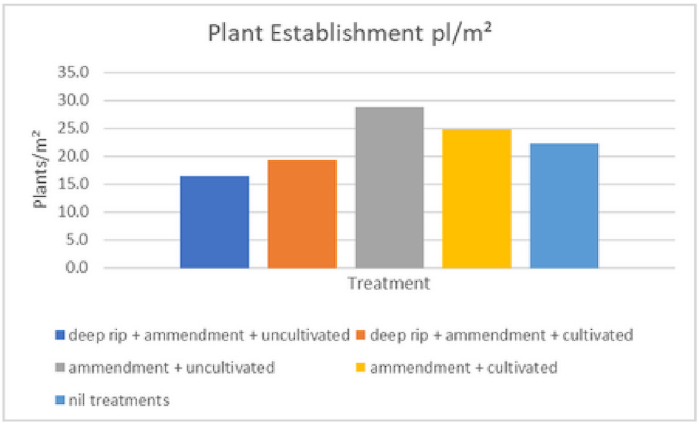


**Figure 6.** Average plant establishment numbers per treatment*

### *Yield Results**

All treatments yielded higher than the farmer practice. The highest yielding treatment was the surface applied amendment cultivated, this is plausible as the plants could easily access the extra nutrient in the amendment. Both subsoiled with amendment yielded very similar whether there was cultivation or not. To see the full effect of subsoil amelioration you need to view results over several seasons.

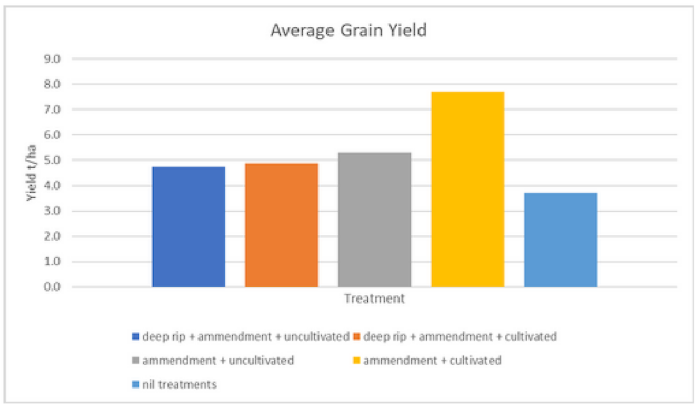


**Figure 7.** Average grain yield per treatment*

P: 03 5265 1666 E: office@sfs.org.au A: 23 High St, Inverleigh VIC 3321 www.sfs.org.au