SoilCQuest 2031

Down Under Covers
We've got you covered

Soil Carbon Trial

INTERCROPPING WITH BIOFERTILISERS

SoilCQuest 2031 is undertaking a small plot trial in collaboration with Grant Sims from Down Under Covers, on the Sims farm at Pine Grove, Victoria.

Established in April 2022 and running over four growing seasons, the trial is exploring the effects of intercropping combinations. In year one this is canola & vetch and canola & faba beans, compared to a monoculture crop.
The effect of differing fertiliser regimes will also be assessed, with a more biological-based fertiliser regime of Bio Fert, Guano and VermiCast compared to local standards of MAP.
Throughout the trial the effects on soil health will be explored with a focus soil organic carbon.
A comprehensive financial analysis of the different combinations will also be undertaken.

What we want to find out

- Does intercropping increase soil carbon and health compared to a monoculture crop over a 4-year rotation?
- Does biological fertiliser increase soil carbon and health compared to synthetic fertiliser over a 4-year rotation?
- What are the economic and production outcomes of intercropped canola vs monoculture canola over a 4-year rotation?

Intercropping involves growing two or more crops in the same field in the same season.

While it's well understood that intercropping results in higher yields from less land, there's limited research on the potential for intercropping to increase soil carbon sequestration.

For more information download the free **Grain Intercropping Grower Guide** from www.soilcquest.org.au/climate-resilient-soils-network

Trial Treatments

For each growing season the trial has six treatments, two intercropping combinations, two fertiliser regimes and two monoculture controls.

The intercropping combinations will change each growing season to best replicate the rotation in the adjoining paddock.

This will provide practical and economic information on how intercropping can be incorporated into a normal rotation.

Biofertilisers contain microorganisms that promote plant growth when they are applied to either the seed, plant or soil. They do this by increasing the supply of nutrients, increasing root biomass or root area and increasing the nutrient uptake capacity of the plant.

Biofertilisers combined with synthetic or organic fertilisers may also have many beneficial outcomes. Given the rapidly increasing price of synthetic fertilisers, using biological fertilisers to reduce the amount of synthetics required may become more attractive in the future.

TRIAL TREATMENTS

ID	Treatment Description (Year 1)	Seedling Rate	Fertilisation - sowing	Fertilisation Rate	In season Fertilisation
T1	Canola + Vetch	C: 2kg/ha V: 5kg/ha	Bio Fert (BF) Guano VermiCast (VC)	BF: Liquid Inject Guano: 40kg/ha VC: 2kg/ha	Foliars: Same as adjacent paddock Granular ammonium sulphate: 65kg/ha (season dependent) UREA: 2/3 applications of 20kg/ha
T2	Canola + Faba Beans	C: 2kg/ha FB: 20kg/ha	Bio Fert Guano VermiCast	BF: Liquid Inject Guano: 40kg/ha VC: 2kg/ha	Foliars: Same as adjacent paddock Granular ammonium sulphate: 65kg/ha (season dep.) UREA: 2/3 applications of 20kg/ha
T3	Canola	C: 2kg/ha	Bio Fert Guano VermiCast	BF: Liquid Inject Guano: 40kg/ha VC: 2kg/ha	Foliars: Same as adjacent paddock Granular ammonium sulphate: 65kg/ha (season dep.) UREA: 2/3 applications of 20kg/ha
T4	Canola + Vetch	C: 2kg/ha V: 5kg/ha	MAP	MAP: 70kg/ha	UREA: 2 applications (pre rain) of 150kg/ha (season dep.)
T5	Canola + Faba Beans	C: 2kg/ha FB: 20kg/ha	MAP	MAP: 70kg/ha	UREA: 2 applications (pre rain) of 150kg/ha (season dep.)
T6	Canola	C: 2kg/ha	MAP	MAP: 70kg/ha	UREA: 2 applications (pre rain) of 150kg/ha (season dep.)

For each treatment there are five replicate plots 1.38 m wide x 12 metres long. Seed supplied by Down Under Covers.

What we will measure

Soils

- Total organic carbon, carbon fractions
- Total nitrogen, ammonium and nitrate
- Phosphorus
- Soil chemical and physical properties
- Soil microbial community

Plants

- Establishment
- Grain yield
- Land equivalent ratio (LER)
- Weed and pest pressure
- In-season tissue test

Financial analysis

- Input costs
- Income
- Profit/ha

A **financial analysis** of canola/arrowleaf clover intercropping in Manildra, Central West NSW has shown higher profit than sole canola crops. This analysis is in the **Grain Intercropping Grower Guide** at www.soilcquest.org.au/climate-resilient-soils-network

This Pine Grove trial will build on these Manildra findings.

Contact information
Daniela Carnovale
Agricultural Carbon Researcher
daniela@soilcquest.org.au
www.soilcquest.org.au