

An innovative source of farm labour helps build productive soils

NICK KELLY is busy building a huge workforce at his Newdegate farm. But unlike most labour sources, these guys just work for food and shelter.

The workforce is, of course, the millions of soil micro-organisms and other soil life that live below ground.

A too often, under-utilised resource, soil biology can do some heavy lifting around the farm, such as preparing soil for crops and controlling pests. The only problem is, their work ethic can be a bit unpredictable, and their union reps are frustratingly quiet.

Nick is one farmer determined to make the relationship work. He spoke at Blackwood Basin Group's Building Soils Workshop recently about how he is developing a system to improve soil microbiology and profits.

Inspired by American growers like Dwayne Beck and more recently Rick Bieber, Nick is adhering to the principles of zero tillage, soil carbon, growing plants all year round and maximising diversity. To achieve most of these aims, Nick uses a second workforce, made up of a diverse mix of summer and winter active cover crops.

Cover crops can serve a variety of purposes, including nutrient cycling, weed control, increasing water infiltration and building soil carbon to hold water and nutrients. Different species serve different purposes.

One of the keys to increasing soil carbon is having plants growing for more months of the year. Summer cover crops could be a vital link to achieve this, so finding out which ones will survive a Mediterranean summer is vital.

One of the first crops recommended to Nick was White French Millet due to its water use efficiency and root bulb. Nick has trialled this and other summer crops and found that survival seems to be better in a mixed crop compared to monocultures. He is currently combining the millet with sunflowers, lablab and cowpeas.

Using warm season cover crops such as Gatton Panic, Setaria, Rhodes grass and summer active Lucerne prior to a cold season crop like wheat means that the cover crop can senesce with cooler temperatures and not require herbicide. Nick is aiming to completely fill the gap between this senescence and the next crop.

The biggest fear of using summer cover crops is the potential water deficit for winter crops. But Nick says that doesn't play out at his farm, perhaps due to the lower soil temperature and better infiltration and water holding capacity. It's a topic that deserves more research to better understand trends in soil moisture and soil temperature with different crops and how this compares to paddocks without cover crops, which may be more exposed to summer weeds.

Reducing the need for summer weed control is a major benefit of the cover crop system. The cover crops reduce weed growth by competing for leftover nitrogen, space and light. Nick says he's replacing the boom spray with an air-seeder. Instead of killing something, he is growing something in its place.

As well as reducing his annual herbicide bill, conventional fertilisers have recently been completely phased this year, replaced by legumes, cover crops and compost extracts to support biological function. The compost extraction process takes place on farm and involves washing the compost in an agitator, filtering it and then spraying the liquid into furrows at 70-80 litres per hectare. Typically, only 1kg of compost is required per hectare. Mature compost is essential, with Nick stockpiling compost brought off-farm for 12 months before extraction.

Nick is also using winter cover crop mixes like wheat, barley, oats, cereal rye, lupins, canola, peas, vetch and clover. And some of these like lupins can even be grown in summer beneath a canopy of millet.

Nick says that there are no silver bullets and that different crops are just tools that vary in effectiveness with soil type. The benefits not only include a lower cost of production, but compared to his neighbours, he also seems to have reduced the impact from frost in spring and erosion during summer storms.

Importantly, Nick said that learning what you can and can't get away with is risky and can be expensive. He warns against going "cold turkey", but says that you will never know unless you push your boundaries.

