



Farming for Soil Health

A Case Study with Gavin Broun



Gavin Broun farms with his dad, Winston, on a farm west of Latham in the mid-west of WA. They are no strangers to trying something different and have a history of thinking outside the box. Gavin's grandfather experimented with Keyline Ploughing when it was first introduced, and was also a pioneer in the district of introducing clovers to his farming operation.

Gavin has been working to improve his soil biology for several years now. It began around 8 years ago through experimenting with compost amendments. This initially began with brewing compost tea, but they found this to be a logistical nightmare, trying to brew compost tea at the same time as seeding. This led to adapting and switching to using compost extract instead. The Broun's also have a sizeable worm farm set up on their property, and incorporate worm leachate into their farming too.

The farm is 100% cropping, with no livestock in their system since 1997. In recent years they have moved to a stripper front harvest set up. This may tie up more Nitrogen and Carbon in the stubbles initially, but eventually as the stubble biomass breaks down, it will be released and cycled through the system. To aid with this, their crop rotation is wheat, lupins, canola, to give a double break that also helps to break down the stubble. Gavin switched to disc seeding in 2022 and has a Boss seeder, on 7 1/2" spacing's. He has fully committed to the change, and sold off their tyne gear. It is still too early to see how this affects the stubble break down, but is something they will be observing closely. Gavin believes the disc seeder will help to get good contact of the stubble with the soil when seeding, which will help it to break down, and release its nutrients.



The Broun's use 100% liquid fertilisers in their cropping program.

They buy compost locally from Jorobi Compost in Dalwallinu. They have purchased an Aeromaster system (see left) to make the compost extract. The process to make one batch of compost extract takes 40-45 minutes. 75kg of compost is added to 3000 litres of water. They have found the resulting extract to be quite stable. One of the best indicators of whether an older batch is still ok to use, is the smell, if it smells good it's good to go! For more information about the extraction process check out:

<https://midwestbiosystems.com/product/aeromaster-te-250-te-500/>

The Broun's also process urea on the farm to make a melted urea. Gavin finds this has a number of advantages, one of which being it is very stable and doesn't volatilise, which can give significant savings of Nitrogen. It can be sprayed at any time of the season, so is less dependent on the rain (i.e. to not burn the

crops). Urea is up to 40% cheaper to buy than Flexi-N, and using this process they are able to get the same quantity of Nitrogen. The melted urea can be made during a quieter time on the farm, generally in March, and then stored until needed. It is injected on top of the seed at seeding. To produce it requires a ratio of 1kg urea:1 litre of water. Another advantage Gavin has found, is the melted urea seems to be less corrosive on the seeding gear. They do see some crystallisation around the nozzles, but this is easy to clean off. Gavin also uses liquid Potassium and liquid Phosphorous

The Broun's worm farm is a relatively simple set up, in a series of IBC containers. The worms are fed with organic waste from multiple sources, including kitchen scraps. They have set up an automatic irrigation system. Excess worm leachate is collected and can be stored until needed. The biology in the worm leachate is in a semi-dormant phase, which means it is still of benefit if they are dry seeding. The worm juice is applied at seeding at a rate of 5l/ha, and they have also found some benefit if using it as a foliar spray.

Other Observations

Gavin has observed that his soil has improved and become more friable over the years. In turn this has led to less wear on the gear, and a decreased fuel consumption.

He has also noticed less disease in his crops (with the exception of their canola crops). They have not needed to apply a fungicide for 6 years. They have also reduced their use of insecticides, and take a cautious approach, only applying them when they really feel it is necessary, and after weighing up the cost: benefit ratio.

Gavin has also noticed better root mass and root development in his crops, with bigger heads and stronger grain.

Using biology to change the weed/plant structure, is not a quick fix. You may find after 4 or 5 years you may hit a wall, but keep persevering.

Other things that the Broun's have trialled include using plants to address soil compaction, which he tried on some salt-flat loamy country, they now have a seedbank of tillage radish, turnip and mustard.

Around 5 years ago Gavin tried a summer cover crop, but then didn't get the rain. If he was to do this again he would wait for it to rain first before committing to planting to reduce the risk of failure.

Gavin has undertaken some plant tissue testing, and found that not many deficiencies show up. They have also undertaken some baseline soil carbon testing, and were not surprised to find that they had very low Carbon levels.

Future Opportunities

Gavin takes advantage of any opportunities to learn, as well as doing a lot of reading and experimenting with their own trials on the farm, he enjoys listening to and learning from other farmers. In 2019 he travelled to Victoria after harvest, to have a look around at what some of the farmers are doing over there, which gave him a lot of ideas to think about. This partly inspired him to switch to a strip and disc system. Another idea he found interesting was the companion cropping. In Victoria they were using wheat, vetch and tillage radish, spraying out the vetch at flowering and seeing an improved yield response. Gavin feels their system would need tweaking to fit the conditions here. Managing the weed potential is one of the biggest challenges. For example you would need to be thinking about ensuring the



The Worm Farm Set up

crops have different flowering times, and when you would be able to spray certain crops out.

One more idea Gavin has brewing is to look at manipulating the worm leachate which so far they haven't experimented with. It is possible to manipulate the leachate product depending on what is fed into the system and this could allow the leachate product to be more flexible and potentially targeted to address particular issues. For example, they could add rock phosphate to the worm farms, and the resulting leachate will have a different composition.

Thankyou!

Thanks to Gavin and Winston for sharing their practices so openly to allow others to learn from them.



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For further information about this case study please contact: landcarecoordinator@yarrarracatchment.org.au