



Brendon Haeusler – Growing your own Nitrogen

A Case Study

Nitrogen is an essential nutrient for plant growth, but price fluctuations and significant price increases have caused farmers to look more seriously at alternative options to reduce their reliance on expensive fertilisers. Planting legumes such as vetch that can fix Nitrogen in the soil, is paying off for at least one farmer in the Yarra Yarra Catchment.

Brendon Haeusler, runs a mixed farming enterprise of cropping and sheep, just East of Carnamah, in the Mid-West of Western Australia. In 2019, Brendon introduced Timok vetch into his farming system as a multipurpose crop with a number of benefits:

1. To fix Nitrogen in his soil and reduce his reliance on synthetic fertilisers.
2. To provide high quality grazing and fodder for his sheep, with high protein levels.
3. As part of his overall efforts to improve the soil health of his farm, to bring associated benefits such as increased soil carbon, increased soil biology, improved soil structure, all helping to increase water holding capacity.

The Story So Far

Brendon runs a three-year crop rotation consisting of legume, wheat, wheat. The legume phase was more traditionally lupins, but Brendon has shifted to a mixture of lupins and vetch over the last 4 years.

In 2019, Brendon planted around 200 hectares of vetch for grazing, and a further 20 hectares to bulk up his seed. From 2020 onwards, Brendon has planted about 400 hectares for sheep pasture each year. The paddocks earmarked for grazing are also typically sown with some oats. One exception being after using Intervix to tackle barley grass, the residual effect led Brendon to use barley rather than oats to go in the mix the following year. The oats are a good choice to combine with the vetch break crop as they don't provide a food source for cereal nematodes. Brendon does not include canola in his crop rotation, partly for this reason.



Brendon has also sown 10 hectares in 2023 specifically for a mixed hay crop of oats and vetch, which will not be grazed. He has observed that his sheep seem to do very well on this hay mix. Vetch is sown for seed every other year. All of the 2023 wheat crops have been planted onto either vetch or lupin stubbles, or are in the second year of wheat rotation.

Seed preparation and sowing:

Wheat seeds are prepared with NutriSoil® (a biological stimulant made from Vermicast) and Troforte microbes. The microbes come as a powder which Brendon mixes with the liquid NutriSoil® and this mix is applied to the seeds as they go up the auger.

Seed Vetch, September 2022

The vetch and lupin seeds are also given a coating of Nutrisoil® plus a rhizobium inoculant. All up the seed is coated at a rate of 10litres/tonne of seed (comprised of 5 litres of Nutrisoil:5 litres of water), which does not appear to cause any difficulties with seeding.

Brendon has been using Nutrisoil® for the last 6 years and has seen very high rates of nodulation in the roots of the vetch and the lupins. Initially Brendon experimented with using Nutrisoil® as a foliar spray, but found the cost of this at broadacre scale prohibitive.

For the 2023 season, all crops have received 60kg of compound fertiliser/hectare. Brendon uses Troforte cropping blend, which provides 6 units of N. The wheat on its second year of cereal rotation has also been given an additional 40kg/ha of urea.

The Challenges

As with any adaptations to a farming system, there are lessons to be learned along the way, and tweaks to the process to make things run more smoothly. Harvesting the vetch has been one of the biggest challenges. In their first year, they used steel pick up fingers, on a Macton belt front. This worked fine in the first year, but didn't work at all in the second year, with the plant material clogging up the system. This led to Brendon sourcing and purchasing a Smale Pea Plucker, which he has mounted onto an old John Deere tin front comb, and this has worked much better (see below).

Brendon hasn't used insecticides or fungicides on his property for many years now as he wants to keep the beneficial bugs and soil fungi he has in his system. Instead, he has had success using molasses for the bugs, which he has found to be a good option for controlling mites (including Red Legged Earth Mite), aphids and Lucerne flea, while not affecting the beneficial insects such as parasitic wasps, ladybirds, spiders etc. Excitingly, there are some plans in the pipeline for GRDC to carry out some trial work with Brendon looking at the effectiveness of molasses for pest control.

Vetch is very susceptible to Native Budworm (*Heliothis grub*), which can decimate the pods, and will need to be controlled if you are growing a seed crop. For controlling this budworm and other grubs, Brendon uses DiPel. This is a biological insecticide, also known as BT or *Bacillus thuringiensis*. This is a highly selective bacterium that only kills certain insects, in particular stages of their growth, while remaining harmless to many of the beneficials. It is a relatively expensive control option, but it has proven very effective for Brendon.

Vetch seed is relatively expensive (around \$3000/Tonne, with a seeding rate of 20-40kg/ha). Harvesting also provides its own challenges, so bulking up your seed is not always straightforward. Brendon has addressed this with the purchase of the Pea Plucker, but this is another potential investment to consider.



Smale Pea Plucker

Vetch needs some warmth in the soil to germinate, so you need to commit early in the season if you are going to grow it. Brendon makes use of double boots on his seeding bar, allowing him to put the vetch deeper and the oats shallower, when planting the pasture paddocks.

Observations

The best (highest yielding) cereal crops seem to grow on the vetch seed stubbles, which Brendon puts down to the paddocks being cleaner. In 2022, which was a record breaking year in the area, Brendon found that the best wheat yields (3.8t/ha) were grown on the lupin stubble, and the vetch seed stubble. The average yield for wheat on the pasture vetch stubbles was just over 3t/ha. The lowest yields (1.8t/ha) were the wheat in the second year cereal rotation. Brendon felt he would have got a higher yield if he had fed it, but the cost of fertiliser in 2022 was so expensive he decided against it.

Proteins were high across all the cereals grown on the vetch stubbles, with all the wheat graded as ANW1. In comparison the wheat on wheat cereals were graded as ANW2.



Wheat crop in 2022, grown on 2021 Vetch Stubbles

Brendon has found that the vetch seed will germinate from surprisingly deep, up to 3" down, which can help if the soil moisture levels are lower, and Brendon adjusts his seeding depth depending on the soil moisture profile.

Brendon rates the grazing value of his vetch pastures highly, and believes they provide at least double the value of volunteer annual pastures. Pasture paddocks are sprayed out before the vetch sets seed, as part of the management for the following cereal crop.

What do the numbers tell us?

This year Brendon has undertaken soil sampling, prior to seeding, and tissue testing mid-season to get a better picture of the Nitrogen story in his soil, and to see the levels in the crops as the season has progressed. The soil tests following vetch showed the highest Nitrogen was available in the seed vetch areas, where 27 units of Nitrogen were available in early April prior to seeding. These soil tests were taken after only 18mm of rain since harvest, and Brendon expects that more will become available with additional moisture as the stubbles break down.

The tissue tests showed the highest N levels in the wheat fed with additional urea, as was expected, but no crops showed an N deficiency. The tissue tests were also useful in highlighting some zinc deficiencies.

An in depth analysis has been provided by agronomist Ken Bailey in a separate report, which looks at the results and their explanations. (Report available)

Where to from here?

This year, Brendon specifically planted a vetch and oat mix to cut for hay. His sheep love it, but he would like to know how it stacks up in terms of palatability, protein and digestibility, and is considering testing the hay this year.

Brendon is also interested in integrating Biserula clover into the mix. This is semi-hard seeded, so once established, it will stick around in the system. The plan would be to grow some initially to bulk up the seed (planting wheat on the stubbles the following year), and then start incorporating it with the vetch mix.

Brendon has also been thinking about adding an Imi-tolerant oat into his mix, to help with weed control.

Thankyou!

Thanks to Brendon and family for sharing their practices so openly to allow others to learn from them.



Plenty of interest from other farmers in learning about the benefits & challenges in a broadacre system

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