



South West
NRM



Case Study

Chasing the 'triple-crown'
regenerative grazing system

A paddock with mixed species annual pastures about to be grazed by ewes and lambs in early August 2020.

Introduction

Manjimup farmers Jake Ryan and his father Gary are chasing the 'triple-crown' of farming: profitability, product quality and land stewardship.

To achieve it they are creating a more efficient system with improved grazing management, species diversity including legumes, and biological stimulation.

"At the end of the day we want to increase profitability," Jake said during a farm visit in 2021. "Costs are going up and up, so any way we can reduce costs will help. But we also want to look after the soil, produce more nutrient-dense vegetables and grow more pasture."

Farm Details:

- Soil type: Gravelly loam
- Phosphorus Buffering Index: Very high (up to 900).
- Slopes: 2-12%
- Annual average rainfall: recent ~700 mm, long-term 1,000 mm
- Soil Organic Carbon: 5.0-6.5%
- Soil pH in CaCl₂: ~6

The 200-hectare family farm comprises approximately 25 hectares of vegetables (cabbage, broccoli, cauliflower and kale), which are planted using the strip till method following a cover crop, in rotation with perennial and annual pasture mixes and summer forage crops grown over more than 100 hectares.

The pasture supports 1,000 sheep (merinos and first cross merinos), 40 cows and 4,500 pasture-raised laying hens.

The main tools used by the Ryans are:

- Diverse mixes of perennial and annual pastures and summer crops;
- Intense rotational grazing that utilises more pasture and leaves enough biomass behind to optimise regrowth; and
- A comprehensive foliar-based nutrition system supplemented by biological stimulants and combined with conventional practices such as liming and tissue testing.

Results include more pasture growth, a healthy flock and a reduction in nitrogen and phosphorus use.



Jake Ryan during red cabbage harvest in March 2021.

Perennial pastures

The Ryans establish their perennial mix and annual mixes separately.

"We found that perennials are not very competitive at all, especially when they're young," Jake said. "So, to get them established we separate them from annuals, although some volunteer sub clover and capeweed germinates with them."

After planting their first mix in 2019, they planted about 25 hectares in 2020, which will stay in place for four years until the next vegetable rotation in 2024.

"Beely ryegrass is our favourite perennial. It produces a lot of bulk. That is mixed with cocksfoot, phalaris, chicory, plantain, red and white clover and lucerne."

Perennials are established after a vegetable rotation early in autumn where irrigation is still set up.

"We generally seed in the first week of March. Any later and it's starting to get too cold."

"We irrigate them about 4-5 times to get them going unless it rains. That way we get that massive early growth when temperatures are still warm and then it's good for the whole season."

Early establishment of perennials makes a big difference to production, as Gary explained.

"One paddock sown in March 2020 was grazed three times by early August and grew well. By comparison, perennials seeded in May were still short in August and hadn't been grazed at all. You don't get enough production out of it. They like warmth and moisture."

The perennials are all winter active to avoid the impacts of frost.



If irrigation wasn't available, Jake says he would establish them in September with plenty of moisture going into some warmer weather.

"That's how we used to do it in the past (prior to 2019) where we didn't do vegetables, but it was always monocultures – cocksfoot, phalaris or perennial ryegrass, never mixed."

Jake says a pre-requisite for perennials is to have the paddock free of weeds, and while he doesn't like using it, he thinks the benefits of good establishment outweigh any negative effects from 'double-knock' herbicides strategies such as glyphosate followed by paraquat/diquat.

In some cases, cropping the paddock the year before to enable better weed management, or selecting paddocks with least weeds may be warranted ([See local Case Study](#)).

Annuals

While perennials yield more at either end of the season, Jake says the annuals have comparatively higher yields over the cooler and wetter months. The Ryan's annual mix consists of Moby barley, Williams oats, Wicher ryegrass, crimson clover, arrowleaf clover, balansa clover, Persian clover, and medic.

"The annuals are all dry-seeded to try and beat the first rains (and associated weed germination) so the weeds don't get an advantage. In 2020 we started seeding in March and finished in early April."

In addition to seeding annual paddocks, perennial paddocks established in previous years are oversown with the annual mix.

"A problem with perennials is they grow in clumps and you get a lot of bare patches in between, so we over-seed to bulk it up. We use a direct drill, double disc opener and seed straight into stubble or residue."

The annual mix is sown each year over about 100 hectares of the farm.

"I definitely think seeding the farm is worth the money because of the amount of extra stock you can run. You get more diversity and bulk."

Ten to 15 hectares of the farm is also sown to oats and barley for seed.



Jake rolling up a two-wire mobile fence after moving stock.

Summer crops

In addition to the winter active crops and pastures, the Ryans also sow 10–15 hectares to a summer forage mix.

"The summer of 2016 was our first summer crop, which was just sunflower and maize. Now we've added sorghum, millet, Super Sweet Sudan, buckwheat, lab lab, cowpeas and linseed."

Some of these crops are grown dryland after hay and silage paddocks have been cut, although the family plans to discontinue hay and concentrate on silage which can be cut earlier, allowing summer crops to be drilled in by September when there is still adequate moisture in the ground.

"We also grow some irrigated summer crops after vegetables where we still have irrigation set up. We irrigate for germination and then it grows off the leftover moisture."

"We're having good success with the summer crops which cut back on our feed costs and we don't need to cut as much silage or feed as many oats."

Grazing Management

Prior to 2019, the Ryans rotated stock between paddocks for most of the year, staying in paddocks for two or four days depending on the paddock size. However, in 2019 they purchased Rappa™ mechanised electric fencing to split paddocks into strips and increase stock density and pasture utilisation. The smaller strips, which are isolated by two wires each side, mean stock are now moved three times per week, including during lambing.

"When we move them (within a paddock), we put a Rappa fence up to isolate the next section of pasture and drop the fence bordering that section to let them in (moving it out of their way). We then just call the sheep and most will walk through."

"Then we just push the last couple through leaving anything that's just lambed. When we put the back fence up, we don't electrify it so lambs can jump through as they please."

While many farmers avoid rotating ewes during lambing to avoid the risk of mis-mothering, the Ryans haven't had any significant issues and had a lambing percentage of 138% in 2019.

To get the ewes to respect the fence, Jake started with 4–5 wires and a lot of voltage before reducing the number of wires down to two.

Jake rates grazing management as probably the most important change he has made.

"Once we changed grazing management, we really saw an impact. We found that as long as you don't graze more than 50%, the pasture grows back a lot quicker. So, by taking less we've ended up growing more grass. If it still has its solar panels it doesn't have to pull energy out of its roots to grow new shoots."

The sequence of grazing after annuals have stopped growing is to graze perennials and then set-stock in sacrificial paddocks for the rest of the summer where they graze cereal stubbles, old veggie crops and are fed hay and silage. Set-stocking at this time is necessary while they are busy with vegetables.

"Then in March or around the break of season we start grazing the summer crops. When they are finished we go to the perennials, and after they've been grazed the annuals are ready."



Inputs

A major benefit of the system is that nitrogen fertiliser is now a thing of the past.

"We haven't used nitrogen for two years now, even on vegetables. We used to put 100 kg per fortnight on vegetables 4-5 years ago. We initially dropped that down to spraying 20-40 litres per week, then to nothing in 2019."

Most of the pasture nutrition is now foliar-based, except for maintenance phosphorus which is still granular. Foliar sprays are based on tissue testing and/or small test plots where Jake will apply individual macro- or micro-nutrients to see if there is a response. Paddocks are also soil tested every five years before a vegetable rotation.

Jake and Gary also use biological stimulants on vegetables and pasture, including fulvic or humic acid, kelp and fish hydrolysate.

"We try to rotate between them to feed everything."

"The choice between humic and fulvic often comes down to what else we want in the spray mix. Humic can't be mixed with a lot of things. You don't want to mix it with anything too acidic or you'll get a bit of fallout in the tank. So, fulvic is the one we go for most of the time, and they both seem to have the same nutrient uptake effect."

Paddocks receive 3.5-4 tonnes of both lime and dolomite during the four-year pasture rotation. However, organic amendments such as composts aren't used. Instead, they rely on cover crops combined with good grazing management, and perhaps aided by fulvic/humic acid, to supply soil biology with a source of carbon and energy. However, organic amendments are something they may trial in the future.

Likewise, inoculating seeds with soil biology is currently limited, but is another area that may be investigated further.

"We inoculate legume seeds with rhizobia for nitrogen fixation, but we don't use mycorrhizal inoculants. We might start trialling some other beneficial microbes, but I'm sure most of them live in the soil anyway and become more active once you get the system going. I think if you can get a green plant growing for much of the year, you're three quarters of the way there."

In terms of chemicals, Jake says they still use them on vegetables but not on pastures.

"You still need them, especially in intensive horticulture systems where you've got a monoculture combined with higher intensity and machine harvest. That environment doesn't make it easy to control pests. So, we use a few chemicals to control weeds and even insects, especially because buyers want vegetables to be insect-free. However, we are very interested in learning how to promote beneficial insects around the farm."

"On the other hand, I don't think you need chemicals on pastures. A few weeds add diversity, and if you've got an insect issue then you've got a nutritional issue, which you can address with foliar applications of different nutrients."

"We did residue testing on all our vegetables and they had undetectable traces of any chemical. So, I think we've got the system working to the point where any chemicals we do put out get broken down reasonably quickly."



A cauliflower crop planted using the strip till method after a cover crop.