

Regenerative Agriculture Program mixed species demonstration case study: Damien Elson, Cleve district

A mixed species pasture grows better feed than a single species pasture, and improves feed value and dry matter quantity dramatically.



Background

Damien accessed a Regenerative Agriculture Program small grant for a mixed species demonstration site from the Eyre Peninsula Landscape Board in 2020.

The overall aim was to increase soil organic carbon, reduce soil erosion risk in drought years, increase grazing production and reduce weed pressure in the cereal phase on poorer performing areas of the farm.

Damien runs an 1800 ha mixed farming enterprise with cereals, legumes, canola and sheep on a farm in the Cleve district, with his wife Cassie.



Location of Damien's farm near Cleve, Eyre Peninsula South Australia

The mixed species demonstration so far

For his demonstration project, Damien decided to focus on a drought affected area of the farm. He allocated 20 ha to the demonstration, which he divided for grazing using electric fencing. For winter 2020, the mixed species treatments compared legumes vs no legume in the mix, against a self-sown pasture. The site was grazed and terminated to prevent grass seed set, and then sown to the summer 2020 species (Table 1).

"The seasonal conditions leading up to the winter planting were far from ideal, however, in the week leading up to my planned (preferred) sowing date we received 7 mm of rain, but the wind was relentless. This led to us adding wheat and barley to Treatment 2 to give some extra cover while the tillage radish and brassica grew. Throughout the last few weeks of June I noticed a quite distinct

difference in colour and health of Treatment 2, which I have assumed is the result of the lack of nitrogen or nitrogen fixing plants. This has concreted my idea that all the mixes at this particular site need a legume incorporated into it. The mix with legumes created a massive 374 kg/ha more than the treatment without.

The trial has proved overwhelmingly, the benefit of planting a mixed species cover crop, preferably with a legume, to be grazed heavily for short periods and then allowed to re-grow.

At the time of dry matter sampling the control plot was unable to be measured due to the lack of growth due to drought conditions, yet Treatment 1 was giving us 2.75 t/ha of dry feed! Although not measured, a crop of single species wheat next door had a biomass of around half of the amount of T1!

Although the rainfall seemed sufficient there was still a massive moisture stress problem from late October onwards. Our early establishment was quite impressive, however, the rain didn't continue for many weeks and through the months of November to January we struggled to get enough growth on the trial to keep a good record of the dry matter and grazing capacity. The plants did surprise us in their ability to keep hanging on after prolonged dry periods. The standout plants were millet and sorghum. These both seemed to sit around underneath the ground and magically re-appear after only a few mm of rain."

Table 1: Damien's mixed species demonstration site treatments in winter and summer 2020.

Timing	Treatments	Species
Winter 2020	Control	Plants consist of mainly ryegrass and barley grass with some small mustard and turnip
	T1	Wheat, barley, vetch, lentil, forage brassica, tillage radish
	T2	Wheat, barley, forage brassica, tillage radish
Summer 2020	T1	Chomper sorghum 5 kg/ha, sunflower 2.5 kg/ha, Rebound millet 2 kg/ha, tillage radish 2 kg/ha



Damien using a 'refractometer' for sugar content or "BRIX" measurement. You need to measure at a consistent time of the day in consistent conditions e.g. sunny, to get comparable readings over time. Damien is of the understanding that a hazy line on the refractometer is showing more complex elements such as boron and calcium being present in the sample, which is positive.

Things I have learned

- Need to repeat practices over time to be able to see patterns
- Difficult to get concrete data that something is working
- There's lots of variation each year and within seasons
- Weeds are a dominant issue to address
- Mixed species grows the best feed, improves feed value and dry matter dramatically.
- Fenced off the area using a RAPPA electric fencing system – "bloody saviour", "gold", for intensive grazing.
- Have learnt to adjust sowing rate over time (started with same rates for each species for ease of maths, but tillage radish for example is invasive early, so has adjusted rate much lower to 200 g/ha).
- Structural diversity is important to compete with weeds (tall vs prostrate providing shading and soil cover).

What's working?

Vetch, but even better to add more species, then grass free eventually. Don't worry too much about soil temperatures for different varieties – soils are usually warmer than you think or it doesn't matter so much.

What's not working?

"FAIL= first attempt in learning". Any mistakes or stuff ups always happen in the most visible locations!

Where to next?

- Replicate winter trials
- More intensive grazing
- Teaching others

Some recommended reading

- Jon Stika's "A Soil Owner's Manual: How to Restore and Maintain Soil Health".
- Gabe Brown's "Dirt to Soil, One Family's Journey into Regenerative Agriculture".
- Nicole Masters "For the love of soil".
- Numerous podcasts relating to the topic.

Words of advice

- There are 3 free things – rain, CO₂, sunlight.
- Increased biology=increased cover=increased grazing.
- Observe what's growing locally, work with nature.
- Observation skills cost nothing
- Trying to move away from more reactive farming – be proactive, grow what we want, not just a paddock of ryegrass.



Summer 2020 mixed species pasture

Issues to overcome

- Soil moisture for following cash crops?? Need more research around this issue.
- Drought – good establishment but lack of rainfall, keeping it growing to provide bulk sheep feed is hard.

How do you manage chemicals, particularly residues in your system?

- Running a mainly low input system, so less risk with herbicide residues.
- Avoid sowing into residuals, be mindful, check with your agronomist.
- Keep good chemical and production records.
- Pre-emergent herbicides can work in the system.
- Sowing a cover crop into a clean paddock at the start makes a difference.
- Prepare ahead for clean paddocks (can be hard to do because usually keep as much growing as possible for sheep feed).

How do you manage grazing?

Use the RAPPA system, makes life much easier.

Do you use fertiliser?

Not on paddocks sown for feed.

What's good about being involved in the Regenerative Agriculture demonstrations?

The program has given me a spotlight in the direction that our family has always looked towards with some interest. This being our soil health and stock management on a small to medium sized scale while limiting inputs and maximising returns, whether from sheep or cash crops. Integrating the two is possible and can be beneficial to our environment if managed in a regenerative mindset.

What's not so good about it?

As farmers we are traditionally not keen on spending time at a desk. This appears as my one and only thing that's not my favourite pastime, however, to quantify what we have seen in field and share with others also comes as a positive.

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More information

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