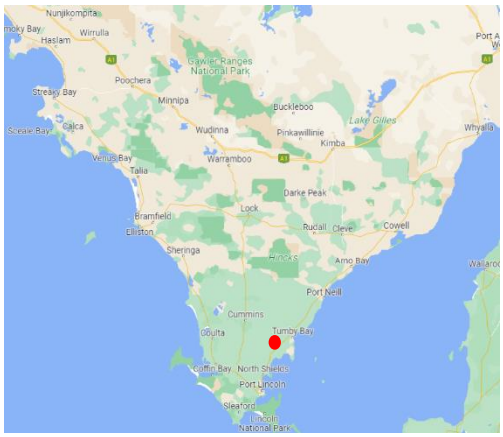
Regenerative Agriculture Program mixed species demonstration case study: Colman, Tumby Bay

Key messages

- While it would not be possible to harvest grain crops on this land, mixed species cover crops can be used to provide a high value grazing and forage resource.
- Addressing soil fertility constraints and likely pests gives the site a greater chance of success.
- The combination of a sown cereal, legume and brassica can achieve multiple benefits of increased soil cover, nitrogen fixation, feed reserve, nutrient cycling and increased water infiltration.
- The use of a multi-species approach can result in a pasture that is more resilient than the sum of its parts.

Background

- Peter Colman farms around 1500 ha with his stepfather Geoff Kroemer on the Tumby Bay flats and Tumby foothills. The flats are characterised by heavy clays with limestone outcrops while the hills have sandy loams with granite boulders and outcrops, and steep slopes with a significant portion of the hillslopes traditionally not considered for growing crops and suitable only for low input grazing, with little investment in water and fencing infrastructure.
- Annual average rainfall ranges from 340 mm on the Tumby flats and up to 400 mm in the Tumby foothills.
- Enterprise mix: crops of wheat, barley, faba bean and recently canola, with 1100 self-replacing merino ewes.
- Peter undertook a Lifetime Ewe course in 2021, which sparked interest in growing more pasture and getting more production off his higher rainfall but non-arable land.



Location of Peter Colman's farm near Tumby Bay, Eyre Peninsula.

Why did they try mixed species pastures?

- To investigate increasing production, particularly on the high rainfall yet marginal high slopes of their property.
- To improve water infiltration and reduce runoff on high slopes and mostly bare hillslopes.
- To improve the look of the current bare hillslopes which are devoid of trees and vegetation.
- To increase biodiversity and biological activity in this neglected resource.

How did they do?

Even though access to the site with machinery was challenging, Peter applied a strategic insecticide in spring 2020 to disrupt the lifecycle of Red legged earth mite, which can put pressure on pastures in areas not normally cultivated. For both summer and winter species plantings, Peter also applied 90 kg/ha of DAP fertiliser with the seed.

While this might seem to be a significant investment because the land in question likely never had a sown crop on it, all measures of soil phosphorus were extremely low (Cowell P at 16 ppm). As a result, Peter thought it was a worthwhile investment given he didn't have any additional application costs for the fertiliser, and the test indicated that the land would respond to the addition.

In October 2020, Peter sowed a mix of Rebound millet (5 kg/ha), Ebony cow pea (6 kg/ha) and Hunter forage brassica (2 kg/ha). However, only the Rebound millet and a trace of the forage brassica were successful, both of which were managed by grazing ewes. Following a lack of autumn rainfall, the pasture was allowed to dry off naturally, leading to an improved surface cover going into winter 2021.

In winter 2021, they experimented on the same land type with another mix. The winter mix consisted of tillage radish (5 kg/ha), faba beans (30 kg/ha), Compass barley (45 kg/ha) and woolly pod vetch (15 kg/ha).

While Peter grazed his summer species planting, for this winter mix he excluded grazing but sowed an adjacent parcel of land to evaluate what would happen if grazing had occurred.

What worked?

There were very large differences in biomass production on the site, compared to the control, both on the summer species mix but also the winter species mix.

Peter found that by grazing the winter mix, he was still able to maintain 25% of the biomass of the non-grazed site which was around 5-6 t/ha. The two legume species (vetch and faba bean) nodulated, so they were able to add nitrogen in what was a nitrogen limited environment.

The winter cover crop was allowed to die off naturally and set seed, resulting in tillage radish germinating through the summer months following rains (January 2022), which the sheep were happy to graze. The tillage radish also appeared to handle the insect pressure better than the Hunter forage brassica while also leaving behind the little holes to catch rainfall.

What didn't work or what would you do differently?

Peter hopes to continue to use covers into the future, but will probably concentrate on only using millet over the summer with possibly sunflowers or tillage radish. The summer legumes were on the whole disappointing. He was happy with the combination of barley, tillage radish and vetch, but might not bother with faba beans in the future. The area Peter has been utilising for cover crops has a high amount of rock and has access problems, but if he can work through those, this system looks like it can be of real benefit for utilising his 'low productivity' rocky slopes.

Above: The root hole left by a mature radish plant, February 2022.

What have you seen or read that you would be excited to try?

Peter is keen to try this approach further into the future to both expand his feed resource for his sheep enterprise. If this progresses further, he will probably try and optimise his sheep operation to better utilise the new feed resource. Peter is interested in disc seeders particularly where they would be better able to deal with surface rock.

What do you think about the roles a multi-species/regenerative agriculture approach can have in the environments we have on EP?

Peter has seen that a multi-species approach has worked on his steep land, and thinks there is scope to try this elsewhere. While traditionally steep and rocky land was seen as having lower value, because of recent high land and livestock prices, Peter sees a good fit both on the production side, but also in terms of having good management practices in place.

Acknowledgements

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