Case study: Productive multi-species pasture at Marananga

LANDHOLDER: Matt Neldner

LOCATION: Marananga, SA

ANNUAL RAINFALL: 475 mm

FARM SIZE: 170 ha

ENTERPRISES: Vineyard, sheep, cropping

In 2021 Matt Neldner sowed half a paddock to a multi-species pasture and the other half to a conventional ryegrass-based pasture. In 2023 the pastures were monitored, which was highlighted by the increased grazing of the multi-species.

Background

Matt runs a diverse farming operation which includes 500 Dohne ewes that graze dedicated pasture paddocks, vineyards, and crop stubbles. He aims to continually improve the productivity of his feedbase and at a BIGG Soil Health Workshop in 2021 learnt about the benefits of growing and grazing multi-species pastures. This inspired him to compare two different pasture types in the one paddock.

Pasture comparison

In June 2021 Matt sowed half of a 5ha paddock with a multi-species pasture and the other half with a more conventional ryegrass-based pasture. Both pasture types were sown with a disc seeder including the same rate of fertiliser (DAP at 100kg/ha).

The **multi-species** section was sown at 43kg/ha and included four plant families:

1. Grass: ryegrass blend (five varieties at 20kg/ha)
2. Legume: clover blend (four varieties at 8kg/ha)
3. Brassica: tillage radish (at 5kg/ha)
4. Herb: plantain (at 5kg/ha) and chicory (at 5kg/ha)

The **ryegrass**-based section was sown at 55kg/ha and included two plant families:

1. Grass: ryegrass blend (five varieties at 20kg/ha)
2. Legume: vetch (at 35kg/ha)

Key messages

- An extra 1300kg DM/ha was grazed during June-October on the multi-species vs ryegrass pasture, including increased production in December (through utilising late November rainfall)
- Multi-species had higher crude protein than the ryegrass pasture when tested in spring

Seed costs for the multi-species pasture were $383/ha and the ryegrass-based pasture, $80/ha.

In 2021 the paddock was lightly grazed by Matt's sheep (to allow good plant establishment and seed set) and in 2022 it was rotationally grazed.



Figure 1: Matt Neldner with the plate meter used to assess pasture production

Pasture productivity and quality

Between June-October 2023 the multi-species and ryegrass pasture sections of the paddock were separately assessed for dry matter production (before and after sheep grazing) with a plate meter (Figure 1). The paddock was grazed three times between this period with stock having access to the whole paddock when grazing.

At each of the three grazing's, the stock preferentially grazed the multi-species over the ryegrass section, and across the three grazing's an extra 1300kg DM/ha was consumed on the multi-species. In addition, out-of-season rainfall in late November increased production (predominantly from the chicory and clover components) of the multi-species into December.

To measure feed quality, samples from each pasture type were collected on 13/9/23 and 11/10/23. At both dates, metabolisable energy (energy content in the feed) was the same for each pasture type. However, crude protein was considerably higher (by an average of 5% across both dates) for the multi-species versus the ryegrass (Table 1).

The higher protein may partially explain the increased utilisation of the multi-species pasture. For example, at the third grazing (in October), Matt's weaner lambs grazed an extra 900kg DM/ha of the multi-species compared to the ryegrass. Given lambs are young and growing, they require high levels of protein in their diet.

Table 1: Effect of pasture type on crude protein and metabolisable energy in spring

	13/9/23		11/10/23	
	Crude protein (%)	**Metabolisable energy (MJ/kg DM)**	**Crude protein (%)**	**Metabolisable energy (MJ/kg DM)**
Multi-species	26.0	12.1	14.5	10.2
Ryegrass	20.4	12.2	9.9	10.2

It is generally recognised that increased species diversity also improves feed utilisation, compared to a predominately monoculture feedbase. In September, the composition of the multi-species pasture was 50% ryegrass, 30% clover, 10% chicory, 5% plantain and 5% dock (Figure 2). In comparison, the ryegrass-based pasture was 95% ryegrass and 5% barley grass (Figure 3).



Figure 2: Mixed-species pasture section of Matt's paddock on 13/9/23



Figure 3: Ryegrass-based pasture section of Matt's paddock on 13/9/23

Future pasture plans

This paddock demonstration highlighted the increased utilisation of the multi-species pasture during the June-October 2023 period. Although the seed costs of the multi-species were high ($383/ha), Matt believes the upfront cost is offset by the ongoing productivity benefits compared to a more conventional pasture (*NB upcoming work will be conducted by BIGG to model the costs/benefits of resowing local pastures*).

In future, Matt plans to renovate his other pasture paddocks with multi-species. Apart from chicory he would like to include additional perennials such as phalaris and lucerne in the mix. The perennial component would further extend feed production through utilising out-of-season rainfall.

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