

FODDER FOR THE FUTURE – RIVERINE PLAINS BOORHAMAN DEMONSTRATION SITE

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KEY POINTS

If growing a mixed fodder legume/cereal, preparation is key as weed control is limited during the season.

Only a small amount of cereal is needed to help the legume stand up. Too much will compete and choke the legume out.

Sowing time depends on when it fits into the individual farmer's operation. The seasonal break can have an impact, as can the finishing of the season.

Within a dairy system pure cereal hay or silage can be used as a feed with supplements added. Mixed species hay or silage needs to be grown with the buyers nutritional needs known.

Project Background

The Fodder for the Future project is designed to assist agricultural communities adapt to a water limited future. The use of fodder in dairying systems has become an increasingly important component of the industry across the Southern Murray Darling Basin (MDB) for both dairy businesses and grain producers. This project will highlight the value of 'closed loop' fodder production systems, which involve the transfer of high-quality fodder between businesses within the Southern MDB, whilst retaining the value of

production locally. The project will also aim to increase the knowledge and skills of dairy farmers who are increasingly growing fodder to support their overall feedbase systems.

The project's intent is to be a cross-sectoral collaboration to support the development of complementary farming systems that optimise the use of both irrigated and dryland forages across the Southern MDB by:

- Increasing the quality and yield of fodder produced on both dairy, hay and grain farms and;
- Brokering long term relationships between dairy and hay producers to increase risk management options, diversification of income and resilience in business management.

Riverine Plains together with Birchip Cropping Group, Irrigated Cropping Council, Melbourne University, Southern Growers and Agriculture Victoria are working with Murray Dairy to deliver the project by:

- Establishing six demonstration sites which will provide farmers and service providers an opportunity to look at economic and biophysical performance of different cereals and under a range of climatic and market conditions in Murray region. This includes wheat, barley, oats, triticale, vetch, sorghum and maize, comparing the suitability of varieties within each species for fodder

production.

- Working directly with 400 – 500 farmers and service providers to deliver a range of communication and engagement activities, extension resources, workshops and other activities centered around a number of demonstration sites across the region, with further dissemination of learnings into the broader community and wider southern MDB.

Aim

To demonstrate the impact of sowing date, sowing rate and cutting time on quality and yield of fodder at Boorhaman, North East Vic.

Site Description

The demonstration occurred in a 4ha paddock, that had previously been sown to a clover-based pasture. The paddock acted as a small feed paddock for sheep, with very little history of fertiliser or liming. There were 4 plots, two at 220m x 50m and two at 280 x 50m. The plots took up most of the paddock and the surrounds were planted with the early sown plots at the same rate as plot 1.

Demonstration Details

A demonstration site was sown to oats/vetch with two sowing times. The site had two sowing dates, with two sowing rates in each (Table 1). The sowing dates were 16/04/2021 and 14/05/2021. This allowed differences in growth stage to be seen. In 2021 the site had 718mm of rainfall with 354mm during the growing season (May – October).

Table 1: Species and variety with target sowing rates

Species	Variety	Sowing Rate (plants/m2)	Sowing Rate (kg/ha)
Oats/Vetch	Brusher/Volga	18/26	10/25
Oats/Vetch	Brusher/Volga	67/33	37/31

Table 2: Key indicators from the soil test results taken in two locations

Sample Name	pH (1:5 Water)	pH (1:5 CaCl2)	EC* (dS/m)	Nitrate Nitrogen (mg/kg)	Phosphorus (Colwell) (mg/kg)	PBI [^]	Organic Carbon (W&B) (%)	Soil Colour	Soil Texture
FFF1	5.4	4.5	1.2	36.0	20	73	1.8	Brown	Clay Loam
FFF2	5.5	4.6	1.1	33.0	22	87	2.1	Brown	Clay Loam

*Electrical Conductivity (Sat. Ext.) [^]Phosphorus Buffering Index (PBI-Col)

Results

Soil Samples

Prior to sowing, a soil sample with full chemical analysis was taken from two locations in the demonstration site (Table 2). One at each sowing time's plot.

Emergence

Plants counts were completed, counting oats and vetch in 0.5m2 sections in each plot (Table 3). These were measured on 21 June 2021.

Yield

From taking harvest dry matter cuts, we can predict the yield per plot. Table 4 indicates the silage and harvest yields.

Nutrition

For each plot the silage and hay sample were ground and sent for analysis. Table 5 displays a selection of nutritional results. The samples contained oats only as there was not enough vetch for analysis. *TDN – Total digestible nutrients.

Observations and Discussion

The soil testing showed pH values less than 5, close to 4.5 which means it's acidic. Pulses do not like acid soils, and this would have made it tough for the vetch to get established. Oats are more tolerant to soil acidity so would have been much less likely to be limited at these levels. The organic carbon levels (1.8 and 2.4 per cent) are standard in this region for a dryland pasture paddock.

Due to delay in confirmation of the trial, the site preparation was not ideal. Spraying was not possible prior to sowing so weeds caused significant issue. In addition, the combination of pulse and cereal crops meant that spray options were limited post- sowing.

Table 3: Plant count analysis taken on 21 June 2021

	Plot 1		Plot 2		Plot 3		Plot 4	
	(Plants/m2)		(Plants/m2)		(Plants/m2)		(Plants/m2)	
	Oats	Vetch	Oats	Vetch	Oats	Vetch	Oats	Vetch
Location 1	100	80	248	112	164	48	272	96
Location 2	100	108	240	64	136	68	292	112
Average	100	94	244	88	150	58	282	104
Std Dev	0.0	19.8	5.7	33.9	19.8	14.1	14.1	11.3

Table 4: Silage and Harvest yields, calculated from dry matter cuts. Samples taken on *28 September 2021, ^14 October 2021, ~22 October 2021

	Plot 1		Plot 2		Plot 3		Plot 4	
	Oats	Vetch	Oats	Vetch	Oats	Vetch	Oats	Vetch
Silage Yield (t/ha)	13.98*	0.28*	13.62*	0.04*	3.09^	0	4.44^	0
Hay Yield (t/ha)	6.63^	0	4.89^	0	3.07~	0	9.33~	0

Table 5: A selection of nutritional results from dry matter cuts for each plots at silage and hay timing.

Plot #	Harvest Stage	Harvest Date	% Crude Protein	Degradable Protein of CP	ME 1X (MJ/kg)	Net Energy Lactation (MJ/kg)	% TDN*	% Ash	% Crude Fat	% Acid Detergent Fibre	% Neutral Detergent Fibre
1	silage	28/09/2021	10.9	69	9.13	5.17	59	7.4	1.9	30.3	54.3
1	hay	14/10/2021	12.4	76	9.1	5.19	58	11.4	2.2	31.2	52.6
2	silage	28/09/2021	9.8	68	8.07	4.26	53	8.9	2.1	38.5	63.3
2	hay	14/10/2021	9.3	89	9.21	5.1	60	8.1	1.5	35.9	57.3
3	silage	14/10/2021	5.5	72	7.99	4.18	54	6.8	1.7	39.2	65.4
3	hay	22/10/2021	10.4	88	7.96	3.93	52	8.6	1.4	44.6	67
4	silage	14/10/2021	7.2	79	8.12	4.16	54	5	1.6	39.1	65.9
4	hay	22/10/2021	6.6	74	9.17	5.3	60	5.9	1.3	33.9	53.8

Earlier sown plots were placed into the dry paddock, and subsequently had very little rain on them. The later sown plots conversely had limited time to establish before it rained. Rain then continued throughout the season with June being very wet leading to the vetch seed being inundated with water.

Due to the wet season, and hence high weed load, application of Urea was not possible or economically viable given there would be a likely reduction in fodder quality.

During the season, plots 1 and 2 were always visibly more advanced. The vetch was present until the oats reached a height where it out competed it. Vetch in plots 3 and 4 struggled from the beginning. At harvest, the plots varied in height dramatically, but in the East of the paddock where the crop seemed to thrive, plot 2 always had the tallest oats. The stems of the oat plant in plot 3 seemed to be the thickest.

Varieties of vetch and oats are commonly used together and are often grazed, keeping the oats at a manageable level and gives the vetch a chance to compete. The impact of grazing was not considered at the time of deciding rates and varieties, resulting in the oats smothering the vetch.

In summary, the overall quality of the fodder in this demonstration would suit dry stock or as a supplement for lush, high quality grass. It would however make low quality feed for a milking herd. The best quality visually and nutritionally was from plot 1, which was consistent with both hay and silage. Plot 4 was very wet throughout the season and had little vetch growth which could explain the very low (6.6,7.2) crude protein %. The nitrogen was possibly leached and had a water logging effect.

Knowing the end user of the fodder crop being grown is a key outcome from this year's demonstration site at Boorhaman. If a mixed crop is being grown then spray options need to be known and prepare accordingly for that. Hay and silage quality depends on what crop and variety, is grown and then the timing of the cut.



Image 1: *Vetch and oat emerging 10 June 2021 (photo credit: Shane Byrne Murray Dairy)*



Image 2: *Plots 1 & 2 early sown on right, plot 3, late sown on left 27 July 2021 (photo credit: Jane McInnes Riverine Plains Inc.)*