

Enrich; Multi-purpose healthy grazing systems using perennial shrubs. Small plot field evaluation site – Miling.

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Purpose:	1. To quantify the survival and growth of alternative shrub species for grazing 2. Determine how these shrub species respond to grazing by sheep, and what preferences animals show for the different species.
Location:	Miling
Soil Type:	Heavy loam

BACKGROUND SUMMARY

As well as providing feed for livestock, plants in grazing systems can play important roles in managing natural resources, such as ground cover, organic matter, carbon sequestration and the water balance. As the need to place more emphasis on the interactions between vegetation, grazing livestock and natural resources increases, we need to learn more about using a broader range of plants in our grazing systems, and capitalising on plants that are 'pre-adapted' to our variable climate.

Enrich commenced in 2005 as a collaborative effort to explore new options for sustainable grazing systems that incorporate perennial shrubs. The focus has been on mixed farms in low-medium rainfall areas where few perennial pasture options exist, particularly summer-active perennials that could remain productive through 'summer droughts'. In contrast to previous investigations of shrubs as a feed source for livestock, the Enrich project has taken a multi-pronged approach to assessing the potential role of forage shrubs by (i) exploring Australian native shrubs more thoroughly by screening more species and exploring more ways that they can benefit livestock if part of the diet (improving rumen function or gut health); (ii) considering shrubs as complementary plants to other pasture species; and (iii) considering grazing behavior and opportunities to better manage animals with diverse forage options.

TRIAL DESIGN

The Miling site is one of 16 regional sites established around southern Australia and has been planted with a selection of 15 species suited to the region. These shrub species are:

Species name	Common name ¹
• Acacia saligna	Golden wreath wattle
• Atriplex amnicola	River saltbush
• Atriplex nummularia ²	Old man saltbush
• Atriplex rhagodioides	Silver saltbush
• Atriplex semibaccata	Berry saltbush
• Chameacytis proliiferus	Tagasaste
• Chenopodium nitrariaceum	Nitre goosefoot
• Convolvulus remotus	Australian bindweed
• Enchylaena tomentosa	Ruby saltbush
• Glycine canescens ²	Silky glycine
• Medicago strasseri	Tree medic
• Rhagodia crassifolia	Fleshy saltbush
• Rhagodia parabolica	Mealy saltbush
• Rhagodia preissii	Mallee saltbush
• Rhagodia spinescens	Thorny saltbush

¹ Note: common names can differ from region to region

² Note: *G. canescens* is a climbing species and was planted only in combination with *A. nummularia*. *A. nummularia* was planted with and without *G. canescens*

The site was deep ripped to 20cm prior to planting, with rows 3 metres apart. Planting occurred on 12th August 2008. The trial consists of 15 species replicated 4 times. Plots contain a single species and consist of 6 rows by 6 plants within the row, each planted 1.5 metres apart. The site was established by planting tube stock and was watered at planting only. Weeds were slashed in September of 2009.

Plant survival was assessed 2 months post planting and shrub size and health were measured late April and again in mid December 2009. A summary of these results are provided.

The site is due to be fenced and grazed for the first time during March/April 2010. Plant selection and plant response to grazing will be assessed using routine scientific methods, including a leaf removal scoring system and a total biomass assessment method.

RESULTS

The following data are the average of 4 replicates of each species, focusing on the core 24 plants in the middle of each plot, allowing for a 1 plant buffer around the perimeter of each plot.

Table 1 Average shrub survival, health and morphology at the Enrich regional site at Miling.

Plant species	Autumn 2009				Spring 2009			
	Proportion of surviving plants	Average plant height (cm)	Average canopy volume (m ³)	Average health (0=good, 4=dead)	Proportion of surviving plants	Average plant height (cm)	Average canopy volume (m ³)	Average health (0=good, 4=dead)
<i>Acacia saligna</i>	89%	53	0.512	0.6	79%	99	1.577	1.2
<i>Atriplex amnicola</i>	72%	41	0.324	1.2	74%	47	0.446	1.7
<i>Atriplex nummularia</i>	95%	49	0.118	0.1	87%	87	0.550	0.6
<i>Atriplex nummularia</i> (+ <i>Glycine canescens</i>)	77%	52	0.137	0.8	79%	84	0.514	0.8
<i>Atriplex rhagodioides</i>	97%	44	0.136	0.2	88%	71	0.492	0.8
<i>Atriplex semibaccata</i>	94%	22	0.169	0.4	81%	25	0.224	1.9
<i>Chameacytis proliiferus</i>	91%	44	0.025	1.1	82%	78	0.123	1.3
<i>Chenopodium nitrariaceum</i>	83%	63	0.259	0.8	85%	75	0.490	1.4
<i>Convolvulus remotus</i>	79%	11	0.015	1.1	65%	30	0.118	1.8
<i>Enchylaena tomentosa</i>	90%	38	0.112	0.7	91%	43	0.153	0.9
<i>Glycine canescens</i>	23%	39	0.057	3.1	14%	55	0.070	3.5
<i>Medicago strasseri</i>	29%	9	0.000	3.0	15%	30	0.014	3.6
<i>Rhagodia crassifolia</i>	63%	32	0.055	1.6	64%	47	0.216	2.0
<i>Rhagodia parabolica</i>	61%	31	0.029	1.6	64%	53	0.202	1.8
<i>Rhagodia preissii</i>	74%	39	0.067	1.2	79%	60	0.347	1.6
<i>Rhagodia spinescens</i>	75%	36	0.113	1.1	82%	44	0.392	1.3

DISCUSSION

Establishment and growth to date have been good. Low survival rates for some species appear to be consistent with that seen at other trial sites. Monitoring will continue, and information on responses to grazing will be available in due course.

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