

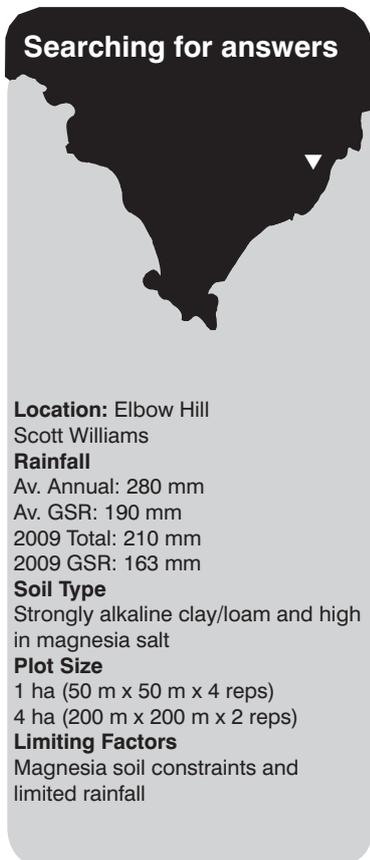
# Cowell Enrich project: Perennial shrubs, options for soil constrained areas

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RESEARCH

## Searching for answers



**Location:** Elbow Hill  
Scott Williams

### Rainfall

Av. Annual: 280 mm  
Av. GSR: 190 mm  
2009 Total: 210 mm  
2009 GSR: 163 mm

### Soil Type

Strongly alkaline clay/loam and high in magnesia salt

### Plot Size

1 ha (50 m x 50 m x 4 reps)  
4 ha (200 m x 200 m x 2 reps)

### Limiting Factors

Magnesia soil constraints and limited rainfall

## Key messages

- **Non-productive land is being utilised by using perennial shrubs for erosion control and ground cover.**
- **Livestock can maintain condition in the short term on native perennial grazing systems during the summer feed gap.**
- **Magnesia affected areas can be reduced under a shrub-based system with increased ground cover.**

## Why do the trial?

Ground cover has always been an issue on low rainfall areas of Eyre Peninsula. The aim of this project was to increase the productivity of areas that were continually suffering during the dry years and affecting the escalation of salt induced magnesia soils. Ground cover is vital to reduce the impact of magnesia soils caused through

the evaporation of moisture from the soil, thus creating a wicking effect and bringing the salts to the surface. These areas become more noticeable and spread in the dryer years, however, these areas can be minimised through increasing ground cover and shading to keep the soil cooler during the summer period.

Farming properties in these cropping areas are in need of good quality stock fodder reserves that can sustain ground cover over the crucial summer period. Woody perennial grazing systems are an alternative option to fill the feed gap on these soil types. They also offer the potential to move sheep into these smaller areas of perennial shrub systems at high stocking rates, thus resting paddocks during times of low feed availability.

## How was it done?

In 2008 Future Farm Industries CRC (FFICRC) and Eyre Peninsula Natural Resources Management Board (EPNRM) established a one hectare trial site using 15 mainly native shrubs selected from a potential 50 species of perennial shrubs, already trialled at Monarto, SA. These were divided into 4 replicated plots of 15 species x 36 plants each at Elbow Hill south of Cowell. Two other sites were established at Minnipa and Piednippie in 2009 (EPFS Summary 2011, pp135-138).

The shrub biomass, recovery and the sheep grazing preference have been monitored during autumn and spring each year since establishment. From the research and observations of the initial small plot trial, 4 varieties have since been selected and established in 2010 into a larger trial site of 4 ha at the same location.

## What happened?

Although the Eastern EP has had significantly below average rainfall since establishment of the shrubs in 2008, there has been good survival (up to 80%) and significant ground cover establishment consisting of native grasses, rye and barley grasses, medics and blanket weed in the inter-row, due to the grazing pressure and timing. Shrub growth range has varied, with species ranging from over one metre in height to a stunted 20 mm as indicated by canopy volume (Figure 1).

Grazing of the shrubs has occurred in autumn since 2009 at high a stocking pressure of 80-120 DSE/ha until the majority of leaf material was consumed. Stock were moved from one replicate to the next when the majority of leaf matter was removed from most of the shrubs. Each year grazing preference was recorded to establish the palatability of the selected shrubs. Whilst some of the saltbush varieties were left until last in replicate 1, by the time the sheep entered replicate 4, the shrubs were grazed more evenly, therefore, indicating sheep become more accustomed to the varieties over time.

The larger trial site was split in two (2 ha each) and grazed over a 10 week period as per the small plots at a grazing pressure of 40 DSE/ha.

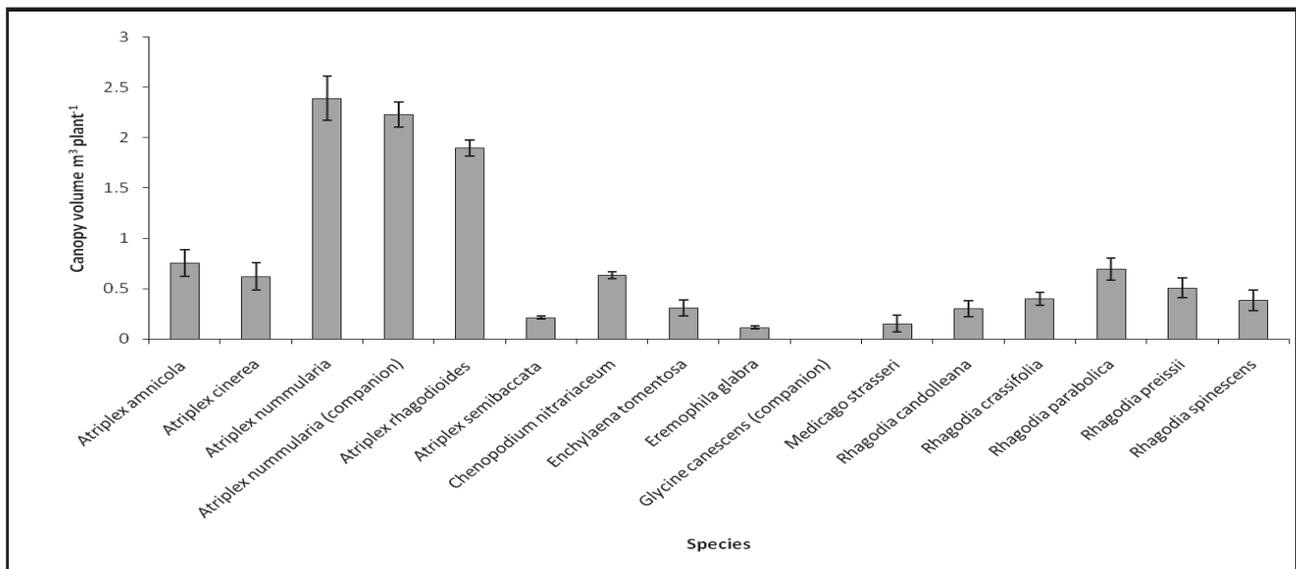


Figure 1 Average production (expressed as canopy volume) of the perennial forage species at Elbow Hill in April 2011

Table 2 Average weight of sheep during the grazing period in each of the trial sites, April to June 2012

Grazing Days	Large shrub site (stocking rate @ 40 DSE/ha)		Small shrub site (stocking rate @ 120 DSE /ha)		Paddock control	
	Entry weight (kg)	Average Weight (gain/loss kg)	Entry weight (kg)	Average weight (gain/loss kg)	Entry weight (kg)	Average weight (gain/loss kg)
	37.25		36.45		39.50	
14		+4.15		+2.15		
29		+4.60		-3.15		
37		+0.90		-0.35		
50		+3.85		+1.10		
65		+2.90		+3.40		
72		-0.40		+1.90		+6.80

In 2012 extra measurements of sheep condition/weight were monitored at intervals during the shrub trial grazing period and compared to a control paddock mob. Sheep initially gained weight in each of the 2 ha and small trial plots. The weight gain was mainly due to consumption of the inter-row plants (Barley grass and Blanket weed) before progressing onto the shrubs. Sheep in both shrub trials lost weight after long periods of grazing on shrubs only (Table 2).

### What does this mean?

Forage shrubs do provide an option for the non-productive cropping soils in Eyre Peninsula's mixed farming systems. However, identifying the best mix of shrubs that suit differing soil types and rainfall zones along with inter-row species, is still work that needs to be continued. These trials at

Elbow Hill have demonstrated that soil cover can be maintained on these magnesia areas under a shrub based system and through selected grazing. Also inter-row species such as native and annual grasses and medics increase to create a balanced system. This increased inter-row ground cover has meant that supplementary feeding of livestock has not been required during the last two years of these grazing trials.

With the development of these and further sites across EP and continued research into direct seeding (potentially a more cost effective option for establishment), inter-row species and shrub designs, some of the challenges may be overcome when establishing perennial shrub-based grazing systems. While shrubs are not the complete answer, this research in

combination with "best practice" land management and farming practices, there is potential to increase productivity and soil cover on some of EP's more vulnerable soils.

### Acknowledgements

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