# Enrich - Identifying Forage Shrub Options for Eyre Peninsula

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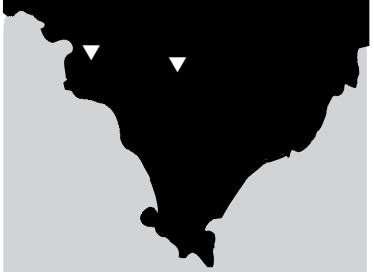
RESEARCH

**Searching for answers**



**Location:** Minnipa Ag Centre
**Rainfall**
Av Annual: 325 mm
Av GSR: 242 mm
2010 Total: 410 mm
2010 GSR: 346 mm
**Paddock History**
2008: Wheat
2009: Wheat
**Soil Type**
Red sandy loam

**Location:** Piednippie
Tim and Trecina Hollitt
**Rainfall**
Av Annual: 379 mm
Av GSR: 305 mm
2010 Total: 456 mm
2010 GSR: 377 mm
**Soil Type**
Grey calcareous sandy loam

**BOTH SITES**
**Plot size**
Plant spacing 2 metres within rows and 3 metres between rows
**Environmental Impacts**
**Soil Health**
Soil structure: Stable
Compaction risk: Nil
Ground cover or plants/m$^2$: Forage shrubs
Perennial or annual plants: Perennial
Grazing Pressure: Nil
**Water Use**
Runoff potential: low
**Resource Efficiency**
Energy/fuel use: Standard
Greenhouse gas emissions ($CO_2$, $NO_2$, methane): Cropping and livestock
**Social/Practice**
Time (hrs): Extra livestock management
Clash with other farming operations: Standard management
Labour requirements: Livestock will require feed rotation or supplementry feeding and regular checking
**Economic**
Infrastructure/Operating inuts: High cost of establishment
Cost of adoption risk: Low

## Key messages

- **Trials of potential new fodder shrub species at Minnipa and Piednippie have shown generally strong establishment and early growth.**

## Why do the trial?

There are opportunities on Eyre Peninsula for a more resilient crop-livestock system that allows for a highly flexible cropping program whilst maintaining a substantial livestock enterprise. Often this involves finding ways to gain greater grazing value and a more reliable forage base from soils that can be marginal for cropping. This has led to an interest in research that is aimed at identifying better perennial species than what is already available in low rainfall areas.

## How was it done?

Fifteen species of perennials (Table 1) were planted at Minnipa as tubestock in July 2009, after the sites were deep ripped (30-50 cm deep) and weeds chemically controlled. Fourteen of the 15 species were planted in monoculture, and *Convulvulus remotus* (Pink Bindweed) was planted as a mixture with *Atriplex nummularia* (Old Man Saltbush). Each species was planted in plots of 36 seedlings, with each species replicated 4 times to account for soil, weed and germplasm variation across the site. The site was not grazed in 2010 to allow the shrubs time to establish. In autumn 2011 livestock will be introduced to both sites to quantify shrub performance under grazing. Ongoing measurements (Table 2) over the life of the trial will monitor shrub survival and growth. The Piednippie site was also established in 2009 using similar methods and includes mostly similar species (Table 1).

## What happened?

Measurements taken at both sites have shown that *Atriplex nummularia* has been the fastest growing shrub, with good establishment and survival. However the biomass production results give advantage to the taller shrubs with the height x width x depth calculation used. A width x depth x height calculation would benefit the ground cover types such as *Atriplex semibaccata* (Creeping Saltbush).

## What does it mean?

Measurements of shrub survival and growth will continue next year at Minnipa and Piednippie with livestock to be introduced to the site and more meaningful data of shrub performance under grazing will be collected. Grazing preferences by sheep for the different shrub species will also be assessed. This is an important consideration since diet selection by animals can tell us about nutritional and 'extra-nutritional' effects of plants that we cannot easily measure in the laboratory. Assessments of conventional forage quality will also be conducted and together with the survival and growth data, will provide more conclusive information on which to base forage shrub selection for the Eyre Peninsula environment. Shrub size and its early growth performance are important traits, but are not the only criteria to be considered when including new forage species into grazing systems.

## Acknowledgements

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***Table 1 Botanical and common names of the forage shrub species planted at the Minnipa and Piednippie Enrich field trials in 2009***

| Botanical Name | Common name/s | Location |
|---|---|---|
| *Atriplex amnicola* | Swamp Saltbush/River Saltbush | Both |
| *Atriplex cinerea* | Grey Saltbush/Coastal saltbush | Piednippie |
| *Atriplex nummularia* | Old Man Saltbush | Both |
| *Atriplex nummularia* / *Convulvulus remotus* | Old Man Saltbush + Pink Bindweed | Minnipa |
| *Atriplex paludosa* | Marsh Salt Bush | Piednippie |
| *Atriplex rhagodioides* | Silver Saltbush | Both |
| *Atriplex semibaccata* | Creeping Saltbush | Both |
| *Chameacytisis prolifer* | Tree Lucerne | Both |
| *Chenopodium nitrariaceum* | Nitre goosefoot | Both |
| *Enchylaena tomentosa* | Ruby Saltbush | Both |
| *Eremophila glabra* | Emu Bush/Tar Bush | Both |
| *Eremophila maculata* | Spotted Emu Bush | Piednippie |
| *Medicago strasseri* | Tree Medic | Both |
| *Rhagodia crassifolia* | Fleshy Saltbush | Both |
| *Rhagodia parabolica* | Fragrant Saltbush/Mealy Saltbush | Both |
| *Rhagodia preissii* | Mallee Saltbush | Both |
| *Rhagodia spinescens* | Thorny Saltbush | Both |

***Table 2 Plant establishment and survival from an initial 36 tubestock and average biomass production (average individual plant height x width x depth/100) at Minnipa and Piednippie***

| | Plant establishment and survival | | | | Biomass production | |
|---|---|---|---|---|---|---|
| **Minnipa** | 12 Nov 09 | 4 Feb 10 | 7 Apr 10 | 29 Oct 10 | 7 Apr 10 | 29 Oct 10 |
| *Atriplex amnicola* | 32 | 34 | 33 | 32 | 529 | 447 |
| *Atriplex nummularia* | 35 | 35 | 35 | 35 | 936 | 2776 |
| *Atriplex rhagodioides* | 36 | 36 | 36 | 31 | 499 | 1717 |
| *Atriplex semibaccata* | 22 | 20 | 22 | 15 | 219 | 159 |
| *Chameacytisis prolifer* | 34 | 33 | 34 | 10 | 6 | 93 |
| *Chenopodium nitrariaceum* | 29 | 30 | 28 | 27 | 156 | 412 |
| *Convulvulus remotus** | 16 | 14 | mv | 7 | mv | mv |
| *Enchylaena tomentosa* | 30 | 29 | 29 | 29 | 80 | 185 |
| *Eremophila glabra* | 31 | 23 | 24 | 16 | 16 | 51 |
| *Eremophila maculata* | 12 | 5 | 4 | 2 | 4 | 10 |
| *Medicago strasseri* | 26 | 27 | 27 | 23 | 6 | 87 |
| *Rhagodia crassifolia* | 22 | 21 | 24 | 19 | 36 | 292 |
| *Rhagodia parabolica* | 31 | 32 | 32 | 32 | 155 | 891 |
| *Rhagodia preissii* | 24 | 26 | 27 | 25 | 132 | 786 |
| *Rhagodia spinescens* | 35 | 35 | 35 | 34 | 125 | 703 |
| | **Plant establishment and survival** | | | | **Biomass production** | |
| **Piednippie** | 1 Nov 09 | 21 Jan 10 | 3 Apr 10 | 31 Oct 10 | 3 Apr 10 | 31 Oct 10 |
| *Atriplex amnicola* | 31 | 31 | 31 | 31 | 271 | 305 |
| *Atriplex cinerea* | 31 | 27 | 29 | 20 | 100 | 322 |
| *Atriplex nummularia* | 36 | 36 | 36 | 35 | 272 | 1711 |
| *Atriplex paludosa* | 35 | 35 | 35 | 35 | 57 | 197 |
| *Atriplex rhagodioides* | 36 | 36 | 36 | 36 | 91 | 536 |
| *Atriplex semibaccata* | 32 | 31 | 31 | 27 | 217 | 286 |
| *Chameacytisis prolifer* | 36 | 34 | 34 | 6 | 5 | 30 |
| *Chenopodium nitrariaceum* | 26 | 25 | 29 | 17 | 3 | 184 |
| *Enchylaena tomentosa* | 35 | 34 | 34 | 31 | 37 | 101 |
| *Eremophila glabra* | 34 | 27 | 26 | 21 | 14 | 71 |
| *Medicago strasseri* | 29 | 26 | 28 | 25 | 14 | 121 |
| *Rhagodia crassifolia* | 26 | 25 | 26 | 22 | 18 | 154 |
| *Rhagodia parabolica* | 35 | 35 | 35 | 32 | 36 | 219 |
| *Rhagodia preissii* | 32 | 32 | 32 | 30 | 120 | 751 |
| *Rhagodia spinescens* | 36 | 35 | 35 | 27 | 62 | 163 |

* *Convulvulus remotus* growing with *Atriplex nummularia.*