

# Revegetation Fact Sheet

## Native Grasses

Native pastures for the Mallee

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There are many species of native grasses found around South Australia adapted to a wide range of soils and conditions. They have a high nature conservation value being a major food source and habitat to many native birds, lizards and mammals. Many appear after fire, providing protection for the soil and germinating trees and shrubs.

Most native grasses are perennials and can be divided into cool season grasses  $C_3$  and warm season grasses  $C_4$ . The terms  $C_3$  and  $C_4$  refers to their carbon fixation pathway in photosynthesis. Characteristics of  $C_3$  plants are that many are frost tolerant, stay green in winter and actively grow in winter, whereas  $C_4$  plants are nearly all are frost susceptible, dormant in winter and actively grow in summer.

### Native pastures

Native grasses were the backbone of our early grazing industries. Wallaby grass (*Austrodanthonia* spp) was prized by graziers at the turn of the century and interest only changed with the introduction of superphosphate and imported species that relied on it.

In low rainfall areas, it can prove difficult to establish introduced species, often failing to persist, especially during a drought. But native grasses are mostly perennial, persistent, drought and frost resistant as well as palatable and have good water use efficiency. Their ability to withstand harsh conditions and poor soils makes them a valuable pasture component.

*'Native pastures are vital for the long term productivity and sustainability of many grazing enterprises in the Mid and Upper North of SA'*

*Mid-North Grasslands Working Group*

Two new varieties of Wallaby grass 'Taranna' and 'Bunderra' were released in NSW 1997 which persist under heavy grazing and is abundant and high yielding in many environments.

Strategic grazing and resting management is vital for the sustainability of native pastures.

### Potential Benefits

- Rain and soil moisture are used more efficiently by using cool and warm season species
- Animal production is maintained over the summer and autumn period by grazing pastures that grow in both warmer and cooler seasons
- Dryland salinity is minimised by using rainfall and soil moisture
- Seed production
- Minimising soil erosion
- Low use of fertiliser
- Present in many areas avoiding establishment cost

### Uses

- Pasture for stock
- Revegetation sites
- Mine and quarry site rehabilitation
- Stabilising banks in waterways
- Growing in between rows in orchards or vineyards
- Native animal habitat
- Species can grow on harsh, hilly landscapes on stony, shallow soil
- Amenity landscaping

### Disadvantages

- Scarcity and high price of seed
- Large areas of native pasture that needs to be sown to provide sufficient feed
- Difficulty in harvesting and sowing seed
- Many native grasses have a dormancy period causing problems in establishment
- Seed can contaminate fleeces and carcasses if grazed incorrectly



### Identification

Native grasses on farms can be found in areas where there has been no cultivation, in remnant bush, along fence lines or roadsides. They can often be seen while flowering and are usually still green through summer. For identification it is better to collect the whole plant with seed spikes.

### Water use by plant communities

The amount of moisture held in the soil throughout the year depends on rainfall, soil type and depth, evaporation and the type of plants present such as bushland, annual or perennial pasture. The amount of water that can be utilised by the plants depends on their growing times, root systems and storage capabilities.

Annual species that grow in the cooler months on winter rainfall have less developed root systems than perennial species that grow into the summer months that in order to survive need to access deeper soil moisture with strong root systems.

Native grassy woodlands made up of C<sub>3</sub> and C<sub>4</sub> species efficiently used soil moisture throughout the year and maintained water balance. As the land was invaded by introduced cool growing pasture plants and trees were removed, water use was changed and the excess rainfall added to groundwater.

### Establishment

Weeds and other introduced pasture species need to be controlled one or two years before sowing native grasses. This is very important to reduce competition and allows the grasses to establish. In most cases cultivation is not recommended as this only increases weed germination, which must again be sprayed out before sowing.

Do not fertilise as this only benefits the introduced species.

Generally, sow cool season grasses C<sub>3</sub> in autumn and warm season grasses C<sub>4</sub> in spring at a rate of 100-200 viable seeds per square metre ensuring good soil to seed contact.

Due to genetic variations within a species it is important to know where your seed is sourced. If possible collect seed from an area as near as practicable to your site or if purchasing seed select a form that is suitable.

### Grazing Management

Grazing management is based on the species present in the pasture and their growth cycle. All grasses, whether introduced or native are at their highest digestibility and quality when actively growing.

Rotational grazing and strategic spelling or resting is important to give plants time to recover and restore leaf area and root reserves, and to allow plants to flower and set seed so that self seeding can thicken up the pasture.

The Mid North Grasslands Working Group carried out trials in the Mid North of South Australia over three years, showing that with correct grazing strategies farmers could increase their stocking rates on native grass pastures, increase water-use efficiency and reduce bare ground.

*'One of the significant results from the project was the 60% increase in stocking rate achieved in the cell grazing treatment.'*

Cell grazing is based on plant growth rate and grazing at high stock numbers for a short period.

*'The most significant changes recorded on all sites was an increase in average pasture growth rates and water use efficiency which resulted in an increase in stocking rates'*

*Mid North Grasslands Working Group*

### Pasture development

Some native grass pasture can be modified by increasing autumn-spring growth by over sowing with annual legumes and fertilising. This would be determined by what grasses are present and required management. A Danthonia/Clover mix or Bothriochloa/Clover mix works well by restricting the clover component to 20% of the pasture and ensuring adequate grazing pressure to avoid clover dominance in spring.

	Frost tolerant	Drought tolerant	Production t/ha	Forage value	Crude protein %	Digestibility %	Response to fertiliser
Bothriochloa	low-moderate	high	3.8 - 10.4	low-moderate	4.4 - 14.5	48 - 59	increase
Chloris	low-moderate	moderate	0.32 - 2.8	moderate	9.4 - 10.9	55 - 68	increase
Enneapogon	moderate				15	62.1	
Austrodanthonia	high	high	5 - 7.8	moderate-high	10 - 17	45 - 74	increase
Austrostipa	high	high	2.0	low-moderate	3 - 17	<60	decrease

## C<sub>3</sub> (cool) species that grow in the Murray Mallee

### Spear Grass (*Austrostipa* spp)

A tufted perennial, with rough to touch leaves that are covered in minute hairs. Seed heads are usually open and contain pointed seeds with long sharp awns. The awns are a survival mechanism that buries the seed into the ground using a corkscrew effect; it is these awns that are a major contaminant in fleeces and carcasses.

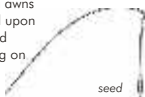


*Stipa* spp

### Harvesting and establishment:

Harvest seed in November by hand stripping and surface sow the following spring or autumn, germination occurs at 15-25°C. The long awns will spiral vigorously when moistened and upon drying, burying the seed into the soil. Seed dormancy is from 4-11 months depending on species.

- Grazing heavily in spring will reduce the potential for seed contamination
- When established, *Austrostipa* were observed to dominate and exclude winter active weeds



### Wallaby Grass (*Austrodanthonia* spp)

A tufted perennial with fine, some times hairy, leaves that usually remains green all year. Seed heads are white and fluffy on maturity, producing many seeds. It is drought resistant, persistent and valued as a pasture plant.



*Austrodanthonia* spp

### Harvesting and establishment:

Hand, vacuum or brush harvesting from October-December have been successful methods for harvesting, but is difficult to sow mechanically without some form of processing due to the hairy nature of the seed. Seed dormancy is from 3-4 months. Broadcasting seeds on disturbed ground in spring or autumn when there is available soil moisture has resulted in good establishment, although a weed free bed is essential.

Germination occurs at temperatures 15-25°C.

- Pastures containing *Austrodanthonia* and clover needs to be carefully managed so that clover does not dominate.
- *Danthonia* is very sensitive to herbicides.



Flowering times	Spring	Summer	Autumn	Winter
<i>Bothriochloa</i>				
<i>Chloris</i>				
<i>Enneapogon</i>				
<i>Austrodanthonia</i>				
<i>Austrostipa</i>				

### Obtain permission

To collect native seed from Forest Reserves, National parks and Wildlife Reserves, Crown Land, roadsides and local council reserves a permit is required from the National Parks & Wildlife, Department of Environment and Heritage. Written approval must also be obtained from the management authority before collecting. On private land, written permission must be sought from the landholder. Check with the Department of Environment and Heritage before collecting.

## C<sub>4</sub> (warm) species that grow in the Murray Mallee

### Windmill Grass (*Chloris truncata*)

A prostrate biennial or short lived, 2-3 years perennial, 10-50cm high with a dense crown relying on spring and summer rainfall. Seed heads consist of 6-9 spikes arranged like spokes in a wheel with black seeds.

#### Harvesting and establishment:

Harvest early summer and autumn, although seed quality is best in early summer. Broadcast seed over the site in spring to make the most of soil moisture after the risk of frost.

- Better suited to grazing by sheep than by cattle.
- Applications of phosphate at 50 kg/ha and sulfur 10 kg/ha can significantly increase seed yield
- Chloris has been reported to have a high tolerance to glyphosate



immature seed head



mature seed



*Chloris truncata*



seed

### Black Bottle Washers (*Enneapogon nigricans*)

Small tufted perennial up to 45 cm tall, the leaves are light green-grey and erect with a single flower spike. The seed head is dense, dark green turning grey as seeds fall. Remains green all year.

#### Harvesting and establishment:

Seed harvesting (see *Austrodanthonia*) can be carried out between November-December and seed dormancy can be from 4-9 months. Surface sow from September-April after opening rains with germination occurring in temperatures 20-30°C.



seed



*Enneapogon nigricans*

### Red Grass (*Bothriochloa macra*)

A perennial grass with prostrate leaves and reddish, wiry stems up to 80 cm tall. Seed heads have 3-6 silky spikes that fall when ripe. It is drought resistant, persistent and valued for its soil conservation in heavily grazed summer pastures.

#### Harvesting and establishment:

Optimum time for harvesting is when seed heads are reddish in colour and seed readily falls at tips of spikes. Seed has a short dormancy period of a few months. Sow in spring or early autumn (seedlings can be damaged by frost) seed will germinate between 20-40°C. Harvested seed-bearing hay spread over the site is also a method for establishing grass.

- Best grazed in early summer to prevent seed set as grass with seed heads is avoided by stock.



CSU Herbarium



seed



*Bothriochloa*

#### For further information contact:

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