



# Upper North Farming Systems Native Grass Nutrition Factsheet 2

## INTRODUCTION

This fact sheet summarises feed test information for 10 common native grasses growing in native pastures in the Upper North of South Australia, as well as defining different types of grasses, common feed terms used in this fact sheet and in feed test results.

## TYPES OF GRASSES

### C<sub>3</sub> Grasses

Also known as winter active grasses e.g. Wallaby Grasses (*Austrodanthonia* species) and Spear Grasses (*Austrostipa* species). These grasses photosynthesise using a biochemical system that fixes carbon in molecules containing three atoms, or C<sub>3</sub> pathway.

### C<sub>4</sub> Grasses

Also known as summer active grasses e.g. Windmill Grass (*Chloris truncata*) and Kangaroo Grass (*Themeda triandra*). These grasses photosynthesise using a biochemical system that fixes carbon in molecules containing four atoms, or C<sub>4</sub> pathway.



Noded Spear-grass (*Austrostipa nodosa*) growing in Upper North

## OTHER INFORMATION

### Test season

Native grasses were tested four times in winter 09, spring 09, summer 2009/10 and autumn 2010. With four exceptions, as material for analysis was unable to be collected due to mowing of vegetation mainly during spring 2009.

### Green: Dry Ratio

The Green: Dry Ratio gives an indication of the amount of green verse the amount of dry grass in the sample tested. However grasses will have a mix of both green and dry feed on offer.



Curly Windmill grass (*Enteropogon acicularis*) growing in Upper North

## FEED TERMS

The following is a list of the meanings of the terms used in this fact sheet. You will find this list helpful for understanding nutrition and analysis of feed test results.

### Crude Protein (CP)

The amount of true protein (composed of amino acids) plus non-protein nitrogen, expressed as a percentage of dry matter.

### Digestible Dry Matter (DMD)

An estimate of the percentage of dry matter digested by animals **including** minerals in the feed. As minerals have no energy value, this figure tends to overestimate the energy content of feed stuffs - especially if feed is mineral rich.

### Dry Matter (DM)

The total amount of feed remaining after water has been removed. It may vary from less than 10% for lush pasture to 90% for dry straw or grains. All analysis is expressed on a dry matter basis, as the water content can vary considerably, and the dry matter contains the nutrients animals require (protein, energy, fibre, minerals and vitamins).

## FEED TEST RESULTS

Plant Samples	Test season	Green: Dry Ratio	Crude Protein %	Digestibility % (DMD)	Dry Matter %	Energy (ME) MJ/kg DM	Moisture %	NDF %	General comments (based on data in table)
<b>C<sub>3</sub> Grasses</b>									
White top ( <i>Austrodanthonia caespitosa</i> )	Winter 09	50:50	10.6	51.0	62.4	7.2	37.6	65.0	Dry stock maintenance feed only. The energy and protein are only sufficient for dry stock when green and the high NDF would restrict intake. Energy and protein levels do not meet dry stock requirements when all foliage is dry.
	Spring 09	100:0	9.6	59.1	42.9	8.5	57.1	64.4	
	Summer 09/10	95:5	9.8	50.2	55.6	7.0	44.4	71.8	
	Autumn 10	0:100	3.9	32.1	87.8	3.9	12.2	81.3	
Desert spear-grass ( <i>Austrostipa eremophila</i> )	Winter 09	100:0	33.3	72.0	28.3	10.8	71.7	47.8	The energy is sufficient for lactating and young animals while green, although protein levels are excessive. As the plants mature the quality declines and is only maintenance feed for dry stock. When all foliage is dry the high fibre restricts feed intake and the energy and protein are below the requirements of dry stock.
	Spring 09	100:0	11.7	58.7	41.0	8.5	59.0	66.3	
	Summer 09/10	0:100	4.6	41.5	88.3	5.5	11.7	80.5	
	Autumn 10	50:50	7.6	35.5	68.7	4.5	31.3	73.7	
Noded spear-grass ( <i>Austrostipa nodosa</i> )	Winter 09	100:0	21.8	69.1	38.3	11.0	61.7	55.2	The energy is sufficient for lactating and young animals while green, although protein levels are excessive and the NDF is above requirements which may restrict intake. As the plants mature the quality declines and is only maintenance feed for dry stock. When all foliage is dry the high fibre restricts feed intake and the energy and protein are below the requirements of dry stock.
	Spring 09	100:0	8.2	53.1	40.8	7.5	59.2	72.5	
	Summer 09/10	10:90	4.6	44.4	78.6	6.0	21.4	81.6	
	Autumn 10	0:100	5.4	40.6	87.9	5.4	12.1	75.7	
<b>C<sub>4</sub> Grasses</b>									
Brush wire-grass ( <i>Aristida behriana</i> )	Winter 09	20:80	8.6	49.1	60.1	6.8	39.9	65.2	Dry stock maintenance feed only. The energy and protein are only sufficient for dry stock when green in winter and the high NDF would restrict intake. Energy and protein levels do not meet dry stock requirements when containing a mix of dry and green plant material over summer and autumn. No Spring sample collected.
	Summer 09/10	50:50	6.3	39.3	60.3	5.1	39.7	69.4	
	Autumn 10	40:60	5.9	37.8	49.3	4.9	50.7	77.2	
Red grass ( <i>Bothriochloa macra</i> )	Winter 09	0:100	4.6	42.6	53.2	5.7	46.8	66.6	Energy and protein levels would not be sufficient for dry stock when green or dry. No Spring sample collected.
	Summer 09/10	90:10	4.5	43.4	43.6	5.9	56.4	69.0	
	Autumn 10	50:50	5.5	48.7	26.7	6.8	73.7	65.0	



White top  
(*Austrodanthonia caespitosa*)



Desert spear-grass  
(*Austrostipa eremophila*)



Noded spear-grass  
(*Austrostipa nodosa*)



Red grass  
(*Bothriochloa macra*)



Brush wire-grass  
(*Aristida behriana*)

## FEED TEST RESULTS CONTINUED

Plant Samples	Test season	Green: Dry Ratio	Crude Protein %	Digestibility % (DMD)	Dry Matter %	Energy (ME) MJ/kg DM	Moisture %	NDF %	General comments (based on data in table)
<b>C<sub>4</sub> Grasses continued</b>									
Windmill-grass ( <i>Chloris truncata</i> )	Summer 09/10	5:95	5.1	42.3	75.1	5.7	24.9	73.9	Dry plant material would not have sufficient energy and protein levels for dry stock. Green leaf in autumn would have protein levels sufficient for dry stock. The high NDF would restrict intake. No Winter or Spring sample collected
	Autumn 10	50:50	8.7	43.7	34.5	5.9	65.5	75.5	
Blue-grass ( <i>Dichanthium sericeum</i> )	Winter 09	95:5	17.3	65.4	26.1	9.6	73.9	53.1	The energy is marginal for lactating and young animals while green in winter although the protein levels are ideal. As the plants mature or is green over summer/autumn the quality declines and is only maintenance feed for dry stock. No Spring sample collected
	Summer 09/10	100:0	10.0	57.7	34.2	8.3	65.8	61.4	
	Autumn 10	95:5	7.3	44.4	28.1	6.0	71.9	70.9	
Black-head grass ( <i>Enneapogon nigricans</i> )	Winter 09	60:40	9.7	49.4	47.0	6.9	53.0	63.9	Dry stock maintenance feed only. The energy and protein are sufficient when containing some green leaf, although protein is sufficient for animal growth in spring when foliage is green. High NDF may restrict intake.
	Spring 09	100:0	14.8	62.2	33.1	9.1	66.9	59.8	
	Summer 09/10	100:0	7.8	50.4	64.8	7.1	35.2	71.4	
	Autumn 10	95:5	8.7	45.7	44.9	6.2	55.1	71.9	
Curly Windmill-grass ( <i>Enteropogon acicularis</i> )	Winter 09	0:100	6.4	48.4	87.4	6.7	12.6	69.5	Dry stock maintenance feed only. Energy levels do not meet dry stock requirements when containing a mix of dry and green over summer and autumn although the green leaf maintains protein levels adequate for dry stock. Energy is marginal for lactating or young animals in spring although the protein is good. This species would be good to wean lambs onto due to there being no seed contamination issues. High NDF would restrict intake.
	Spring 09	100:0	18.8	63.6	31.8	9.3	68.2	64.6	
	Summer 09/10	5:95	7.1	44.9	83.1	6.1	16.9	66.4	
	Autumn 10	50:50	7.9	40.6	54.9	5.4	45.1	72.2	
Kangaroo grass ( <i>Themeda triandra</i> )	Winter 09	95:0	12.1	57.2	40.1	8.2	59.9	61.8	Dry Stock maintenance feed, although would be adequate for maintaining weaners over summer as protein levels are sufficient. The high NDF would restrict intake.
	Spring 09	100:0	6.8	47.3	27.3	6.5	72.7	74.0	
	Summer 09/10	100:0	13.2	59.8	35.5	8.7	64.5	69.6	
	Autumn 10	95:5	10.6	54.8	33.2	7.8	66.8	70.4	



Black-head grass  
(*Enneapogon nigricans*)



Kangaroo grass  
(*Themeda triandra*)



Blue-grass  
(*Dichanthium sericeum*)



Windmill-grass  
(*Chloris truncata*)



Curly Windmill-grass  
(*Enteropogon acicularis*)



## SUMMARY OF SHEEP AND CATTLE NUTRIENT REQUIREMENTS

	Energy (ME) (MJ/kg DM)	Crude Protein (%)	Neutral Detergent Fibre (%)
Ewe / wether - maintenance	8	8 %	30-55 %
Ewe - late pregnancy	10	14 %	30-43 %
Ewe - lactating	11	15 %	30%
Weaner lamb	11	16 %	30-35 %
Dry cow – maintenance	8	8 %	30-60 %
Cow – lactating	10.5	15 %	30-35 %
Weaner Steer	11	16 %	30-40 %

### FEED TERMS (CONT. FROM PAGE 1)

#### Metabolisable Energy (ME)

The feed energy actually used by the animal, calculated from digestible organic matter percentage, and expressed as megajoules per kilogram of dry matter (MJ/kg DM).

#### Moisture

The amount of water in the feed. It may vary from ~10% for grains to > 80% for fresh pasture.

#### Neutral Detergent Fibre (NDF)

The percentage of total cell wall material or plant structure in a feed. This includes lignin (not digestible), cellulose (partly digestible) and hemicellulose (digestible). NDF is the most useful measure of fibre content currently available. Usually, the lower the NDF, the more an animal will eat.

### GENERAL FEED TEST COMMENTS

Generally all native grasses tested were very high in fibre which restricts livestock feed intake. Refer to nutrient requirement table.

Native pastures are generally made up of a range of grasses, legumes and other plants. Livestock tend to selectively graze the higher value plants in order to get a balanced diet. Select the class of livestock for grazing a paddock according to their nutrient requirements and the feed on offer.

### FURTHER INFORMATION

#### Feed tests

Foster, P.R., Reseigh, J. and Myers, R. J. (2009). An Introduction to the Nutritional Composition of Australian Native Grasses: Forage and Seed. Adelaide, Rural Solutions SA.

Reseigh, J and Schuppan, D (2009) Upper North Farming Systems: Native Grass Nutrition Fact sheet 1. Rural Solutions SA, Adelaide.

#### Plant identification

Jessop, J., Dashorst, G. R. M. and James, F. M. (2006). Grasses of South Australia. Kent Town, Wakefield Press.

Mid North Grasslands Working Group (2007). Grasses, Gums and Groundcovers. Clare, South Australia, Mid North Grasslands Working Group.

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