



# Grassland Society of NSW Inc

## Newsletter

The first Australian Grasslands Association Research Series – The Australian Legume Symposium in February 2012 was a great success. The symposium attracted 110 delegates from Australia and overseas and comprised 23 invited and selected presentations as well as 22 poster papers.

The Australian Grasslands Association is a partnership between the Grassland Society of NSW and the Grassland Society of Southern Australia and in this first venture was generously sponsored by the Rural Industries Research and Development Corporation, Meat and Livestock Australia, Pastures Australia, PGG Wrightson Seeds and Heritage Seeds.

The mission of the Australian Grasslands Association is to provide a regular series of reviews that will enable the pasture industry to recognise the

emerging problems it faces and respond to them either through changes in existing research priorities or by proposing new priorities. Each year the Association will host a forum on a specific topic with the relevant scientific community allowing them to directly contribute to the review of the industry, the development of a research agenda and investment priorities for use by funding organisations. Pasture legumes were chosen as the starting point for this research series as the contribution of legumes to Australian agriculture although significant, is often overlooked.

Relevant poster papers and abstracts from the Australian Legume Symposium will feature in issues of the newsletter over the remainder of the year. In this issue there is a reprint of a very interesting poster paper by John Brockwell and Elaine Leach looking at the changing frequency

of two medic species over 50 years (page 5). Professor Joe Bouton from the Noble Foundation in Oklahoma USA was a guest speaker at the symposium – in his After Dinner speech he presented a timely reminder on how important investment in pasture legumes is – a transcript of his speech can be found on page 11.

The preparations for the Annual Grassland Society of NSW conference at Wagga Wagga are well underway with details on page 2. Also don't forget the associated 2012 NSW Hay and Silage Feed Quality Awards – conditions of entry and an entry form can be found on pages 8 and 9. Once again there are great prizes (\$5000 worth) on offer.

*Carol Harris*  
Editor



### Grassland Society of NSW

#### 2012 Conference



*Mark it in your diary NOW*

24th-26th July 2012

Joyes Hall, CSU Wagga Wagga

*More details on page 2*



### In this newsletter

Get into the guts of worm control .....	3
Changing frequencies of occurrence of two annual medics on soils of the grazing lands of central New South Wales – 50 years of observation .....	5
Inspiring the next generation of agricultural scientists .....	7
2012 NSW Hay and Silage Feed Quality Awards .....	8
Future investment in forage legumes: Let's remind everyone how important it is? .....	11
From the President .....	15



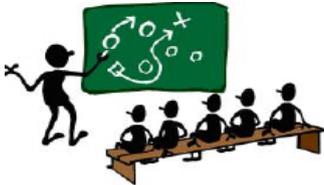
*THE GRASSLAND SOCIETY OF NSW INC.*

## ***27th Annual Conference***

### *Managing a Grazing Business for Profit in the Agricultural Landscape*

24 - 26 July 2012, Joyes Hall Charles Sturt University - Wagga Wagga Campus

Themes include; what management actions can be implemented for sustainable agricultural production in the landscape; what impact increasing soil fertility has on native pastures and farm profit; and how pastures fit into a mixed farming enterprise.



The conference is shaping up to have some interesting speakers including Dr Richard Simpson, a Senior Research Scientist, with CSIRO Plant Industry. Dr Simpson will present a paper discussing Phosphorus in the agricultural landscape. In October 2009 Dr Simpson, in conjunction with others from CSIRO and NSW DPI, released the booklet 5 Easy Steps to ensure your making money from superphosphate.

The balance of speakers will include graziers, NSW DPI research and extension staff, consultants, lectures and researchers from CSU and the EH Graham Centre. These speakers will discuss a wide range of topics from Omega 3 fatty acids and sex ration in sheep, to Soil Carbon, Humic substances to alternative fertilisers, farmers using Grassgro® to fertilising native pastures. The conference is sure to have something that will appeal to all involved in the grazing industry.

The ever popular bus tours will also be available. Tours are likely to look at mixed farms, incorporating crops and livestock, to the higher rainfall areas to the east of Wagga. For those interested in cross property planning there will be a tour to the Kyeamba Valley for a discussion with producers that have begun a cross property planning process.



#### **For More Information**

**Visit the website - [www.grasslandnsw.com.au/news/conference/](http://www.grasslandnsw.com.au/news/conference/)**

**or contact Nathan Ferguson on 0419 616 154 or [nathan.ferguson@dpi.nsw.gov.au](mailto:nathan.ferguson@dpi.nsw.gov.au)**

# Get into the guts of sheep worm control

Dr Stephen Love, NSW DPI Armidale, [stephen.love@nsw.dpi.gov.au](mailto:stephen.love@nsw.dpi.gov.au)

The important elements of sheep worm control are fairly straight forward. Implementing them, however, takes some planning and commitment. But the effort pays dividends, especially as worms are the number one health cost for the Australian sheep industry.

Here is an outline;

## Fitter/less vulnerable sheep

This is basically down to genetics and nutrition. Your choice of rams will make your flock fitter or weaker with respect to worm infections throughout time.

Choose rams with a favourable (i.e. as negative as possible) Australian Sheep breeding value (ASBV) for worm egg count (WEC).

Is it worth paying the premium? You bet it is.

The big costs from worms are not drenches, drenching, worm testing and paying a premium for rams with superior resistance to worms. Most (80 per cent) of the cost of worms is from production losses, and most of this is well nigh invisible (apart from mortalities), just like the worms themselves.

Clinical signs of worms (anaemia/scours/obvious ill thrift) are just the tip of the iceberg. The other main player in the fitness stakes is nutrition.

Immunity requires nutrition. Well bred sheep are not much use if not well fed.

Meeting target weights in weaners and condition scores in pregnant ewes makes a world of difference to worm control

## Control exposure

Manage exposure of vulnerable sheep to worm larvae on pasture. This means preparing low worm-risk pastures for weaners, lambing ewes and probably rams as well.

Preparation essentially involves keeping paddocks sheep-free for a time so existing contamination is not topped up by a new contamination. This allows worm larvae on pasture to decline through time to relatively safe levels.

The time required depends on temperature. The warmer it is, the faster the larvae die. With daily temperatures about the mid-20s (e.g. summer time in temperate areas), 80 to 90% of larvae die in three months. The time required in winter (15 degrees and lower) is about double that.



*A kid with bottle jaw consistent with barber's pole infection (symptoms the same in sheep). Photo supplied by Libby Read, North West LHPA*

So for spring lambing, preparation of the lambing paddock needs to start a month before joining.

In very cold areas, sheep can graze the lambing paddock in winter months (if consistently below 15 to 18 degrees during the day), because it will be too cold for barber's pole worm and black scour worm eggs to develop and produce larvae.

And remember these eggs – unlike larvae – don't last long: five days for barber's pole worm and 16 days for black scour worm eggs, so they can't hang in there waiting for warmer weather.

For weaning in January, weaner paddock preparation needs to start in early October. These times can be shorter in warmer areas.

## Smart drenching

Apart from routine drenches, like a pre-lambing drench for ewes, and a drench for weaners at weaning, or the first summer drench in central and southern NSW, all other drenching decisions should be based on regular worm egg count monitoring (Wormtest).

In low rainfall areas of course (e.g. western NSW) there should be no routine drenching.

When it comes to drenching, in most cases a broad-spectrum drench will be required, whether short or long acting. The most important question to ask is; "Is this drench highly effective (i.e. at least 95% effective) on my property? Not more than 10% of producers can answer this with any certainty, because only about 5 to 10% regularly and objectively test their drenches for effectiveness.

The gold standard is a full-blown on-farm resistance test (Drenchtest worm egg count reduction test), but in between times a useful tool is the humble Drenchcheck. This is simply a worm egg count 10 days or so after a drench, in the case of short-acting drenches.

Given the cost of drenches and, more particularly, the cost of using an ineffective drench, a Drenchcheck should be viewed as an investment, not a cost.

## Keep resistant worms out

Drench imported sheep with a high effective combination of drench, optimally, four unrelated drench actives, with one of them being Zolvix (monepantel). Practically, this might mean up the race once with say a triple-active, then up the race with Zolvix.

## If nothing else – Wormtest

Invisibility makes worm control challenging. The worms themselves are hard to see, most of the cost from worms is invisible, and the problem of drench resistance is largely invisible. Regular worm testing with Wormtest makes all this visible, and therefore more manageable.

If nothing else, monitor worm burdens and drench effectiveness using Wormtest regularly.

### For more information visit

<http://www.dpi.nsw.gov.au/agriculture/livestock/sheep/health#Internal>.  
<http://www.wormboss.com.au>

## WHAT'S ON THE CARDS FOR YOUR PASTURES?

**You can't predict the future, but you can plan for it.**

You can't always be sure what Mother Nature's going to deal you. So it makes sense to plan now to have more grass when you need it most.

For over 70 years, we've been giving Australian farmers a hand in reducing risk by helping them plan and sow for the future. It's all about getting the balance right. If you get the right mix and seed, you can enjoy more frequency of growth throughout winter and spring. Which is why we spend over \$1 million every year on research to develop seed for Australian farming conditions.

Don't leave your winter and spring pastures to chance, call 1800 421 868 to order a copy of our FREE Pasture Guide or pick up a guide from your local Murray Goulburn store.



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wrightsonseeds.com.au

### **Australian Society of Agronomy**

*Capturing Opportunities and Overcoming Obstacles in Australian Agronomy*

The 16th biennial Conference of the Australian Society of Agronomy will be held at the University of New England, Armidale between October 14 and 18 2012.

The conference will consist of invited and submitted papers covering topics such as pasture management, farming systems, climate change & energy, resilience and biosecurity, crop production, energy opportunities, natural capital and soil water management. Bus tours in the Liverpool plains, Tamworth, Gunnedah and New England regions will be a conference highlight.

For more information and registration details go to:

[www.agronomy.org.au/events/2012](http://www.agronomy.org.au/events/2012)

### **22<sup>nd</sup>**

### **International Grassland Congress**

*Revitalising Grasslands to Sustain Our Communities*

*Sydney September 15-19 2013*

For the first time, the International Grassland Congress will be held in southern Australia. Associated with the main congress in Sydney will be a range of pre- and post-conference workshops, tours and satellite meetings around the state. The program will explore the current issues facing grasslands around the world, and share the latest industry developments and solutions. Program themes include; 1. Improving the efficiency of production of products derived from grasslands 2. Improving grassland resources and 3. People in grasslands: improved policies, practices and processes

For more information go to:

[www.igc2013.com](http://www.igc2013.com)

# Changing frequencies of occurrence of two annual medics on soils of the grazing lands of central New South Wales — 50 years of observation

John Brockwell<sup>1,3</sup> and Elaine M.A. Leach<sup>2</sup>

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<sup>2</sup> IBM, 8 Brisbane Avenue, Barton, ACT 2600, Australia.

## Introduction

Species of *Medicago* are exotic to Australia. Most species of the genus that have become naturalised arrived in this country by accident. The mode of their introduction is not known with certainty, but there is plausible speculation (Brockwell *et al.* 2008). Many of the ships that brought early settlers to Australia also carried sheep, cattle and horses; sometimes burrs were in the fleece or on the coat. Stocks of hay to feed the animals were often replenished at Atlantic ports, the Canary Islands, and the Cape of Good Hope. Invariably, this hay contained pods and seeds of legumes. Cocks *et al.* (1980) present an informative review of the entry of wild plants into Australia.

By the middle 1860s, annual species of *Medicago* (medics) were well established in semi-arid parts of western New South Wales (Pastoral Times 1866). They became of considerable importance to rural industry (Beadle 1948) despite the adherence of their burrs to fleece constituting vegetable fault in wool. In 1958, Andrew and Hely (1960) made a comprehensive survey of the frequencies of occurrence of medic species on soils of the Macquarie Region (Premier's Department 1948) of central New South Wales. Related surveys have been conducted on a number of occasions since. This paper and the accompanying poster record the changing frequencies of two medics, *M. minima* (L.) Bart. — small woolly burr medic, *M. laciniata* (L.) Mill. — cutleaf medic, over the 50-year period 1958-2008. The work was done mostly in the Macquarie Region but some observations were made further west.

The methods of Andrew and Hely (1960) were used throughout.

## Methods

Observations were made on eight occasions (1958, 1959-60, 1962, 1986, 1987, 2000, 2001 and 2008) at 25-60 positions in approximately 350 paddocks on the six major soil types of the region. The presence or absence of the two medics at each position (in quadrats ~400 sq. cm in area) was recorded. The proportion of quadrats occupied by each medic was an index of its frequency of occurrence. The soil classification of Downes and Sleeman (1955) was used by Andrew and Hely (1960) in the initial survey and we have used it ever since. Of course, soil classification has been progressively modernised since 1955 and the nomenclature of Downes and Sleeman (1955) is now outdated. Various, more recent nomenclatures are shown in Table 1.

## Results

*Medicago minima* occurred with varying degrees of frequency on all six soil types (Table 2a). *M. laciniata* was essentially confined to brown acid soils, grey and brown soils of heavy texture and red-brown earths. Over the 50 years of our survey, the frequency of *M. laciniata* approximately doubled on these soil types whereas the frequency of *M. minima* declined on all six soils and in almost all other situations (Table 2a, 2b, 2c, Table 3). *M. laciniata* was most frequent in the more westerly, drier part of the region (Table 2b, Table 3), and was more tolerant than *M. minima* of declining winter rainfall (Table 3).

## Discussion

Over the past 50 years, *Medicago laciniata* has replaced *M. minima* as the dominant medic in the western part of central-western New South Wales. Although the frequency of occurrence of *M. laciniata* increased while the frequency of *M. minima* declined, we are convinced that the two events are unrelated. This conviction is based on our observations that *M. minima* frequency declined throughout the region during the 50-year survey period, even in those parts where *M. laciniata* did not occur. We speculate that the decline of *M. minima* may be a natural phenomenon that occurs as a relatively new species (~150 years for *M. minima*) comes to terms with its new environment. (*M. laciniata* is believed to have arrived in central New South Wales more recently than *M. minima* — cf. Vincent 1954.) An analogous condition, known as medic decline, affects *M. littoralis* and *M. truncatula* in the Eyre Peninsula of South Australia (e.g. Howieson *et al.* 2000)

## References

- Beadle NCW (1948). 'The Vegetation and Pastures of Western New South Wales, with Special Reference to Soil Erosion.' (Soil Conservation Service of New South Wales: Sydney.)
- Brockwell J, Fettell NA, Bowman AM, Smith W, Sweeney G, Charman N, Ballard RA (2008). Symbiotic competence of rose clover (*Trifolium hirtum* All.) *Australian Journal of Agricultural Research* **59**, 802-813.
- Cocks PS, Mathison MJ, Crawford EJ (1980). From wild plants to pasture

Table 1. Classification of the 6 main soil types in the survey area (Downes and Sleeman 1955), and subsequent re-classifications.

Downes & Sleeman (1955)	Stephens (1962)	Northcote (1979)	Isbell (1996)
Red-brown earth	Red-brown earth	Red brown earth	Chromosol
Grey & brown soils of heavy texture	Grey & brown soils of heavy texture	Grey, brown & red clays	Vertosol
Black earth	Black earth	Grey, brown & red clays	Vertosol
Brown acid soils	Brown soils of light texture	Red earth	Chromosol
Red loam	Krasnozem	Euchrozem	Chromosol
Solodic soils	Solodized soils	Yellow earth	Sodosol

cultivars: Annual medics and subterranean clover in southern Australia. In 'Advances in Legume Science'. (Eds RJ Summerfield, AH Bunting.) pp. 569-596. (Royal Botanic Gardens: Kew, UK.)

Downes RG, Sleeman JR (1955). CSIRO Soil Publication No. 4. (CSIRO Publishing: Melbourne.)

Howieson JG, O'Hara GW, Carr SJ (2000). Changing roles for legumes in Mediterranean agriculture: developments from an Australian perspective. *Field Crops Research* **65**, 107-122.

Isbell RF (1996). 'The Australian Soil Classification. Australian Soil and Land Survey Handbook.' (CSIRO Publishing: Melbourne.)

Northcote KH (1979). 'A Factual Key for the Recognition of Australian Soils', 4<sup>th</sup> edn. (Rellim Technical Publications: Glenside, SA.)

Pastoral Times (1866). Untitled article in the *Pastoral Times*, a newspaper published in Deniliquin, New South Wales, from 1859 onwards; cited from Andrew and Hely 1960)

Stephens CG (1961). CSIRO Soil Publication No.18. (CSIRO Publishing: Melbourne.)

Vincent JM (1954). The root-nodule bacteria of pasture legumes. *Proceedings of the Linnean Society of New South Wales* **79**, iv-xxxii.

This paper was printed with the permission of the Australian Grasslands Association and first appeared in the "Proceedings of the Australian Legume Symposium". Australian Grasslands Association Research Series No 1, Melbourne 2012.

Table 2. Changing frequencies of occurrence of *Medicago laciniata* and *M. minima* (a) on the same soil types (over 28 years), (b) on the same soil combinations (over 42 years), and (c) at exact same sites (over 22 years). Percentage of quadrats occupied by each medic was the index of its frequency of occurrence. For each soil type (soil combination) and each year of observation, values for medic frequencies are arranged in pairs - *M. laciniata* upper, *M. minima* lower. A value in bold font indicates that that value is significantly greater than its companion value ( $P < 0.05$ ).

(a) Medic frequencies on SAME SOIL TYPES												
Soil type	Red-brown earth		Grey & brown soils		Black earth		Brown acid soils		Red loam		Solodic soils	
Year	58	86-7	58	86-7	58	86-7	58	86-7	58	86-7	58	86-7
<i>M. laciniata</i>	19.2	47.8	13.4	<b>36.7</b>	0.1	0.9	<b>87.7</b>	<b>70.7</b>	0.0	0.0	0.0	0.0
<i>M. minima</i>	<b>58.7</b>	34.9	<b>48.3</b>	20.2	<b>43.0</b>	<b>27.9</b>	57.0	30.9	<b>78.4</b>	<b>52.0</b>	3.0	10.2

(b) Medic frequencies on SAME SOIL COMBINATIONS (of brown acid soils)												
Soil combination	Nangery		Giridale B		Giridale A		Nyngara Whitbarrow		Nyngara Pangee		Nyngara Bogan	
Year	59	01	59	01	59	01	59	01	59	01	59	01
<i>M. laciniata</i>	1.5	12.4	30.0	<b>73.6</b>	10.2	<b>56.0</b>	35.3	<b>60.4</b>	2.7	<b>34.4</b>	57.0	<b>70.4</b>
<i>M. minima</i>	<b>15.4</b>	15.2	46.2	1.2	<b>24.4</b>	2.4	<b>65.2</b>	20.0	15.3	15.6	65.8	11.6

(c) Medic frequencies at EXACT SAME SITES											
Soil type	Red-brown earth		Grey & brown soils		Black earth		Brown acid soils		Red loam		
Year	86-7	08	86-7	08	86-7	08	86-7	08	86-7	08	
<i>M. laciniata</i>	61.6	44.8	32.0	6.0	0.0	4.0	0.0	52.0	0.0	0.0	
<i>M. minima</i>	36.8	24.0	0.0	0.0	56.0	24.0	33.3	14.3	73.3	38.7	

Table 3. Changing frequencies of occurrence of *Medicago laciniata* and *M. minima* in 4 geographical zones located along a south/north transect between 146°42' E and 146°54' E. Percentage of quadrats occupied by each medic was the index of its frequency of occurrence. Winter rainfall and winter component of total annual rainfall both diminished from south to north. In each zone medic frequencies are arranged in pairs - *M. laciniata* upper, *M. minima* lower. A value in bold font indicates that that value is significantly greater than its companion value ( $P < 0.05$ ).

Zone - south (1) to north (4)		1	2	3	4
Most appropriate rainfall recording station		Bobadah	Miandetta	Girilambone	Gongolgon
Latitude		32°18' S	31°39' S	31°18' S	30°21' S
Mean rainfall (mm)	Annual	393	402	408	394
	Winter	183	167	176	166
Medic frequency	<i>M. laciniata</i> 1960	21.6	13.9	9.8	5.1
	<i>M. minima</i> 1960	41.3	34.6	19.2	12.8
	<i>M. laciniata</i> 2000-01	<b>54.0</b>	<b>60.0</b>	<b>75.6</b>	<b>60.0</b>
	<i>M. minima</i> 2000-01	20.4	12.0	2.4	1.6

# Inspiring the next generation of agricultural scientists

Susanna Greig, Primary Industry Centre for Science Education, UNE, Armidale, susanna.greig@une.edu.au

Twenty three students (including those travelling from WA, QLD and Tasmania) attended the UNE PICSE student camp in January 2012. The students joined Carol Harris at the Glen Innes Agricultural research station to discover the 'Long Term Rotational' experiment. These students also thoroughly enjoyed and appreciated an activity learning about and comparing soil pH, soil texture, soil erosion and biological activity to assess and compare the soil health and its ability to support different crops and pastures.

In addition, 5 day PICSE Industry Placement experiences were completed by 2 students offered PICSE Industry Placement Scholarships through the University of New England (UNE) and Charles Sturt University (CSU) PICSE Activity Centers.

Dani Robson from Calrossy Anglican School in Tamworth, completed her UNE PICSE Industry Placement with Stephanie Cameron from East West EnviroAg (EWEAg). While at EWEAg, Dani completed a project of her own design to monitor and compare the quality of soil under continuous cropping against the soil under improved pasture.

"My results revealed that the cropping samples had a higher cation exchange capacity indicating higher fertility within the soil. However, the improved pasture

had higher organic carbon suggesting the soil is healthier. My experience at EWEAg really was a terrific experience and great fun" Dani explained. "My placement has definitely changed my view on what I would like to do at University. I still wish to do a Bachelor of Agriculture, but am now considering Agribusiness instead of a diploma of Education. I'd like to get out in the industry and see what different types of management people use on their properties and their views on Agriculture as an industry. In this way, this scholarship has given me loads more to think about, as it really has made me excited about different options, which really appeal to me. Now I am doing some more thinking to refine my choices and thanks to PICSE I can do this in an informed way"

Karli Shaw from Wagga Wagga High School completed her CSU Industry Placement working alongside Ed Clayton a livestock research officer and Michael Friend a senior lecturer of livestock production. Karli was involved in work collecting measurements from sheep and assessing the effect of omega -3 and omega- 6 fatty acids on the sex ratio of lambs and also a project to observe the effect of a chemical compound found in grass and its effect on lamb growth and respiration rate.

Karli explained, "Prior to becoming involved in PICSE I can honestly say that I

had no idea of my career choices and university options that I wanted to pursue next year. After applying for the scholarship, attending the week long camp and industry placement, I can now say that I do. I wish to study animal science at Charles Sturt University and pursue a career in animal research. Working with industry professionals for my placement has certainly helped me and I am very grateful for it."

PICSE is a national program, which focuses upon attracting and increasing the supply of high quality young people into science based primary industry careers. This is achieved through the PICSE Industry Placement Scholarship offered to motivated tertiary bound school leavers.

The PICSE program has two NSW Activity Centres based at the University of New England (UNE), Armidale and at Charles Sturt University (CSU), Wagga Wagga.

The Grasslands Society of NSW has sponsored the NSW PICSE Activity Centres based at the UNE and CSU. This support has enabled a grasslands focus in the 2011-12 phase of the PICSE program and has been greatly appreciated.

School visits are completed by PICSE Science Education Officers, Susanna Greig and Emma Wordsworth to promote the PICSE scholarship and to outline the work and careers of our sponsors such as the Grasslands Society of NSW. This presentation reached 921 students in NSW schools in 2011.

Furthermore, the grasslands support has been acknowledged at all major NSW PICSE activities as well as on the UNE & CSU PICSE webpages <http://www.picse.net/UNE/index.htm>; <http://www.picse.net/CSU/index.htm>.

< The 2012 University of New England PICSE students at their presentation day in February 2012. Photo supplied by Susanna Greig



**PGG Wrightson Seeds**

# 2012 NSW Hay and Silage Awards to recognise top quality

Neil Griffiths, NSW DPI Tocal

The NSW Grassland Society and NSW DPI are organising Hay and Silage Feed Quality Awards in 2012 to recognise producers who are making the best quality hay and silage in NSW.

While it has been a difficult season in some areas there have been reports of excellent quality silage and hay being made across NSW. These awards aim to focus attention on feed quality and encourage all producers to better understand the importance of quality when they make and feed hay or silage.

Entries will open in April when producers can start sending samples to the NSW Feed Quality Service in Wagga Wagga.

The awards will be presented at the NSW Grassland Association annual conference which is to be held in Wagga Wagga 24 to 26 July 2012.

Organisers hope all producers will take advantage of the discounts being offered by the Feed Quality Service to analyse hay and silage samples submitted as part of the awards program. To add further interest major sponsors Integrated Packaging, New Holland and Pioneer will provide \$5000 worth of prizes for winners to be announced at the Grassland Society of NSW conference.

An entry forms can be found on the next page or from NSW DPI and NSW Grassland Society websites and officers,

sponsors and from the NSW Feed Quality Service Wagga Wagga.



## NSW Hay and Silage Feed Quality Awards 2012

### Conditions of Entry

- Samples (approx. 500g) are best sent using a Post Paid Feed Quality Service sample kit available from NSW DPI. Silage should be frozen in a plastic bag then wrapped in newspaper before posting early in the week. If you don't have a green FQS bag, samples can be posted early in the week to: Feed Quality Service, NSW DPI, Locked Bag 701, Wagga Wagga NSW 2650
- The aim of these awards is to promote the benefits of high quality hay and silage to all farmers with emphasis on the importance of feed quality in animal production and how to achieve feed quality in conserved forages.
- Awards will be based on feed quality analysis results from the NSW DPI Feed Quality Service with emphasis on metabolisable energy and crude protein. Results will also be compared with guidelines provided in NSW DPI Silage Note 4 ([www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)) and TopFodder Successful Silage manual.
- Awards will compare hays and silages in each category i.e. one award for each crop or pasture type, not separate awards for hay and silage.
- Samples must be representative and must come from commercial lot size intended for feeding to animals. Minimum lot size 5 tonnes of product.
- Samples must be of forage (hay or silage) conserved and/or fed in 2011/2012.
- Limit of 4 entries (samples) per farm or producer.
- Awards will be presented at the NSW Grasslands Society Annual Conference to be held in Wagga Wagga 24-26 July 2012.
- It is desirable for all entrants to keep photos and an example of entries until after awards are announced.
- Winners agree to co-operate with the organisers (NSW DPI and Grasslands Society of NSW) to conduct relevant field days, press and media following the awards.

**Closing date: 6 July 2012 - For further information phone 02 6938 1957 (lab) or 02 4939 8948**

**Note:** Results of early submissions will be sent out at the end of each month.

We thank sponsors of these awards:



NSW Feed  
Quality Service

# NSW Hay and Silage Feed Quality Awards 2012

Entry form to be sent with sample to *Feed Quality Service*

Name: ..... Business name: .....

Postal address: .....

Phone: ..... Fax: .....

Email: .....

Property address (if different): .....

Property Identification Code (PIC): .....

Sample details:  Hay (\$42.10)  Silage (\$70.40) Bale or pit size: .....

Note: You must enclose a cheque made payable to Trade & Investment NSW

## Crop/pasture description (1 only) Details/varieties

- Winter/temperate pasture .....
- Summer/tropical pasture .....
- Winter crop .....
- Maize .....
- Other summer crop .....
- Lucerne .....
- Other .....

Harvest: Date: ..... Growth stage/maturity: .....

Machinery used to mow/bale/harvest etc: .....

Storage method/facility: .....

Additives applied at harvest: .....

Quantity stored: .....

Time from mowing till harvest or storage: .....days

### Payment Authorisation (must be completed)

I hereby authorise Trade & Investment NSW to test the sample I have identified according to the above details as an entry in the 2012 NSW Hay and Silage Feed Quality Awards. I have enclosed a cheque for \$\_\_\_\_\_

I accept that the judge's decision will be final and will not be challenged.

Name: ..... Signature: ..... Date: .....

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# Future investment in forage legumes: Let's remind everyone how important it is?

Joe Bouton

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*Editors note: The following article is a transcript of Professor Joe Bouton's After Dinner speech at the Australian Grasslands Association - Legume Symposium in February this year. Joe is a senior Professor with the Samuel Roberts Noble Foundation in Oklahoma. The Noble Foundation is recognised as one of the USA's leading research facilities conducting plant science research and agricultural programs to enhance agricultural productivity regionally, nationally and internationally. Joe conducts breeding and genetic research on temperate forage species for use in pasture and livestock systems throughout southern USA and has released 17 forage cultivars. Joe was an invited guest of the Australian Grasslands Association.*

There are a couple of quotes that come to mind about my giving a speech such as this. The first is from Winston Churchill who said "There are two things that are more difficult than making an after-dinner speech: "Climbing a wall which is leaning toward you and kissing a girl who is leaning away from you". I have always found the climbing the inward leaning wall and kissing the reluctant girl parts to be true, so I have to believe the speech part to be true too. I hope when I am finished you would not use the word "difficult" to describe this speech.

The second is from no one in particular but is the good advice for any after dinner speaker. "There is no such thing as a bad short speech"! This needs no explanation, just adherence on my part. And not like a preacher I knew who always would make a big show about taking off his watch and placing it before him on the podium like he was going to stay on time, and then never looking at it for another 2 hours!

For this speech, I also plan on applying the following quote I first read in C.S. Lewis' book *Mere Christianity* (that he attributed to Dr. Samuel Johnson) as the most applicable advice for what I want to achieve tonight and would represent the actual theme of this talk. "People need to be reminded more than they need to be instructed."

So, much as your school teachers and professors from the old days, and especially like your mothers, I plan on reminding you, and even scolding you, of some basic facts that sometimes get overlooked when we get too comfortable with the status quo; which in this case

is a modern pastoral agriculture system that has possibly strayed too far from its successful past and why forage legumes remain potentially the most important part of that production system.

Input costs across all of pastoral agriculture include, but are not limited to, very significant increases in three things commonly used in forage-livestock production; feed, fuel, and fertilizer or the 3 Fs. In the past, if a livestock producer needed to supplement his forage feed supply, he could buy feed grains at a reasonable price; if he needed to harvest and store or even plant his own forages, he could depend on relatively cheap fuel; if he wanted to fertilize his grass base, he could depend on cost effective nitrogen fertilizer. Although still available, the cost of the three Fs is becoming less sustainable and driving up the input costs to levels that may not be economically sustainable. So, we need to remind everyone from farmers to researchers to decision makers that we have the answer right now to help mitigate these increasing costs: Nitrogen fixing, high quality forage legumes!

So, reminder number 1; input costs across pastoral agriculture are high and rising, but Eureka, we have forage legumes to mitigate these costs.

A very interesting bulletin was published by Auburn University (Alabama, USA) forage extension specialist Don Ball that demonstrates the cost effectiveness of forage legumes. Over the years, scientists at Auburn had conducted numerous beef steer grazing experiments that involved various forage species. These studies involved crossbred animals of similar breeding and weights, and they were conducted over multiple years. They therefore provided a good basis for comparison of both the animal production potential and the production cost of 37 forage production systems commonly used in the southern United States. The most notable findings were, first, the seven lowest total pasture costs per unit of gain and eight of the ten lowest total pasture costs per unit of gain involved legumes; and second, adding legumes to either tall fescue or cocksfoot grass pastures substantially lowered pasture cost per unit of gain. In fact, this management practice resulted in the lowest pasture costs per unit of gain of

the 37 forage alternatives evaluated.

So, reminder number 2; forage legumes are cost effective in livestock production.

In addition to basic genetics and breeding principles, forage improvement programs are also governed by range, forage, and pasture management principles in order to have desired impact. This too is a very unique feature of forage breeding not found in breeding the major grain crops.

On reflection, this author sees in his own career a few milestone events that speak to the value of understanding and using basic management principles in setting breeding goals. These include Dr. G.O. Mott's tropical forages management class at the University of Florida where Dr. Mott emphasized that since grazing tolerance and persistence are THE primary traits for forages, then early generation testing under animals was necessary. In other words, why advance genotypes in the breeding program if they were not persistent under grazing?

A simple concept not followed by many forage breeders unfortunately. This principle evolved later into the approach we used to develop the lucerne variety 'Alfagraze' and other persistent, grazing tolerant lucerne varieties. Tutorials with Dr. Ross Humphreys, a noted Australian agronomist, while he was on sabbatical at Florida led me to a better understanding of the diversity of useful species, especially legumes, and the concepts of poly-culture management of species in a pasture environment. The influence of Dr. Carl Hoveland as my main collaborator was in designing experiments that not only measured the effect of the animal on the plant, but also the effect of the plant on the animal; another unique feature of forage breeding not applicable to grain crops. The practical advice and mentoring of Dr. Harold Brown, a crop physiologist who was heavily involved in the pioneering work on C4 photosynthesis. And, finally, Dr. Glenn Burton, the most productive and creative grass breeder in the United States for years, whose achievements led to his election the US National Academy, who taught me to give the farmer what he wants in the way of new varieties and not what you think he wants. The main attribute of these five men to the direction of my own breeding program

was that four of them were management, physiology, and ecology scientists and not geneticists.

So, reminder number 3; do not forget basic forage management principles especially when designing legume breeding programs.

A main perennial pasture system is perennial ryegrass and white clover. This is a very good base system indeed; in fact, pastoral agricultures in all the world's geographies would love to have this as their base. But, has pastoral agriculture, especially its dairy industry where daily production is paramount, become too reliant on this system to supply most of its current and future needs? Are white clover breeders up against the biological and genetic limits to dramatically improve the crop for all environments; especially in a future of increased temperature and drought as predicted due to climate change? Can other species be considered to add to this base and increase high quality forage during the base system's off season or during times of environmental or pest stress?

On a personal note, I remember standing in lucerne field in the Canterbury Plains right outside Christchurch, New Zealand during a dry period. All the ryegrass-clover pastures as far as the eye could see were dry and brown, yet the lucerne was up to my knees in green growth with lambs happily grazing. I asked my companion, a very well respected New Zealand pastoral scientist, why, in this context, is there not more lucerne used in New Zealand? His answer was "in this context, I cannot explain it!"

Therefore, we can become almost blind to the use of other forage legumes for specific situations. Not many things stuck with me when I took my first plant breeding course 40 years ago, but one principle that did was "to define your reference population of species and genotypes and your reference population of environments". As an example, in Oklahoma, our farmers use cereals, such as wheat and rye, for winter grazing. As part of our mission at the Noble Foundation to assist these farmers, we were looking for an annual legume with enough yield to add quality and reduce nitrogen fertilizer needs of this annual

grazing system. Our agronomist, Twain Butler, was charged with finding the right species for our environment which in the autumn and winter is usually warm and dry. Well, Twain tested all types of species, from Trifoliums to Medics and everything in between, and when we started, we were convinced that the annual Medics would emerge as our best option; but you know what did emerge was Hairy Vetch (*Vicia villosa*). There are many and varied forage legumes species that have potential, but you won't know which ones until you actually test them in your "reference population of environments".

So, reminder number 4; we are too reliant on certain forage production systems and too few legume species; we need to continue to broaden our germplasm base and farmer use of more species.

However, this reminder leads to another situation that is often overlooked when an organization tries to introduce a new legume species and that is getting the seed from the breeder to the farmer. This is a simple concept, but in my experience, one that is continually overlooked. For us now with Hairy Vetch, getting a seed company to outlay capital and other resources to produce and sell a new cultivar to risk-averse farmers is a tall order indeed. This is because a company could invest 100s of thousands of dollars into seed production and conditioning as well as advertising and marketing, before the first bag of seed is sold. If farmers are reluctant to use the new species, as they usually are, then this produces a high economic risk for the company. My only take home message here is if you are clever enough to develop a new cultivar of a new legume species, then you must be clever enough to find a way to produce and commercialize it. This means working in partnership with the commercial seed companies, and even directly with farmers to show them how it could work on their farm; a scenario thought by many academics to be beneath them. However, if you want a new cultivar to die, just adopt that attitude.

So, reminder number 5; don't forget seed production, commercialization, and farmer acceptance as you develop new species and cultivars within them.

There is another fundamental concept that must continually be emphasized: in most situations, nitrogen fertilized grasses supply the persistence base in pastoral agriculture, while the legume component simply needs enough persistence, either on a short term or long term basis, farm or paddock level, so it can fulfill one or both of its main roles of replacing nitrogen fertilizer via its nitrogen fixing ability or supplementing protein and energy to the overall forage supply. In some ways, this also makes the persistence standard for the legume much less than the grass. It just simply has to have "enough" persistence; whatever that may be depends again on the farmer's "concept of productivity". In most mixed grass-legume paddocks, the minimum legume percentage is usually around 25% of the available forage supply in order to fulfill its main roles.

However, this is not to minimize the importance of persistence as an important management and breeding standard for all forage legumes. In fact, a Trilateral Workshop was held in Honolulu, Hawaii in 1988 and its proceedings were published as a book by the American Society of Agronomy under the title "Persistence of Forage Legumes". This workshop is a good synopsis for where this general issue was in 1988, and probably even today, for the three countries involved, Australia, New Zealand, and the USA. In the Workshop's summary paper, one of the main conclusions that emerged was how difficult it was to gain consensus of a definition for "legume persistence". Thus, for the Workshop participants, the main debate was whether to base persistence on the New Zealand view of stability and productivity in any given environment or the USA view of survival of plant material. A good compromise was offered by the Australian R.J. Clements: "... persistence can include concepts of productivity, but the maintenance of adequate plant numbers is the essential criterion".

Reminder number 6; let's get real about the persistence standards for legumes; it is the grasses that have the highest persistence standards. In fact, what would be easier to do: add nitrogen fixing ability to the grass or to increase legume persistence to the minimum 25% standard?



At the International Grassland Congress held in New Zealand and Australia in 1993, I had the pleasure of chairing the session on forage crop improvement. In those days, biotechnologies were being touted for their potential to add novel variation not found in the available germplasm through transgenics or speed up the selection process itself via genetic markers. However, participants at this practical plant improvement session did not deal with these two issues to any extent in their papers and posters leading to a conclusion in my session chair paper that they evidently did not view them as a bottleneck larger than the evaluation process itself. Also, for the participants, most problems associated with forage crops were believed to be governed by multiple genes which were not so easily manipulated in those days with genetic markers. Therefore, the main conclusion at that time were biotechnologies had great potential, but the lack of interest shown them raised questions regarding their short-term impact.

Now move forward almost 20 years, and genomic and transgenic biotechnologies are now starting to be routinely used in conjunction with traditional plant breeding. However, now the overriding issue is their cost and cost effectiveness for a breeding program's main goals.

Everything, and I mean everything, with the new technologies is expensive when compared to the old "seed, feed, and fertilizer" model of past plant breeding and forage agronomy programs; not just marginally expensive, but fold more expensive. This cost, especially the development and personnel costs, has been made somewhat bearable due to government investment, but it remains high and growing. In fact, I confess now that the reason I invested a lot of energy and resources into biotechnologies was their potential to cost effectively speed up the selection and breeding phases allowing more of my resources to be spent on the final testing phase of the cultivar development process where most breeders will tell you is the most time and resource consuming step. So, my original plan to free up resources due to use of biotechnologies has been completely blown up.

Is investment in transgenics a wise course today? Before I answer, I would like to remind the audience that I, and my organization, the Samuel Roberts Noble Foundation, have been, and remain, a staunch supporter of the use of transgenes. However, when pinned to the wall with this very sensible question, my answer would have to be: It would be very wise indeed if high value traits were in the

market today in several of the main forage and pasture crops, but except for one trait in lucerne, Roundup Ready, they are not.

It would still be wise if important traits have potential to be added in the near future, but at this stage, this may not be achievable. Why is this? Well, we are just now realizing the "non-science" issues associated with transgenics are a real problem. For example, when you hear people from the large biotech companies speak informally about the total cost of bringing a transgene to market, amounts such as \$28 million USD, \$50 million USD, and even lately, \$100 million USD are kicked around. Regulatory costs are a big part of this overall cost. These same people then say that if a trait cannot charge a high trait fee (Note: I must remind you that the tech fee is placed on top of the current proprietary seed price) and then garner something like 50% market share, it is not worth the risk to try and commercially deploy it. A tall order, indeed! There are not many traits that have this type of market power; only a trait that removed pasture bloat would have that power for legumes.

Another, non-science issue that has emerged, which is pertinent for countries like Australia and New Zealand, is the "green centric" view of its regulatory agencies and its citizenry. I have been depressed lately about this trend. At the same time, I do not want to sound like a grumpy old man to the young in this audience, but my own personal experience, along with many scars on my back, especially when dealing with regulatory agencies, have led me to these points of view on transgenics. And it is a tragedy, because transgenics is a powerful technology that needs to be fully utilized for the betterment of mankind and its agriculture. So, at this stage in my career, my advice to those who wish to continue to push for the practical use of transgenics is that you stay positive and adopt a missionary spirit: live in the moment, cherish your wins, forget your loses, and keep your eye on the final prize.

Even for genomics, where the underlying issues are less controversial, there are problems. The good news is these problems are self inflicted and therefore correctable. The underlying technologies such as genetic marker systems are simply always changing, requiring a frustrating increase in investment and a delay for their practical use. For example, my own organization's program has moved from RFLPs to RAPDs to SSRs to SNPs to now genotype by sequencing technologies over the past

15 years with no cultivar yet developed that has depended, even partially, on the use of this tool. The ever changing technology model may work well for the computer industry where the consumer is willing to change very quickly their personal technology, but in pastoral agriculture where 50 year old varieties are still used, this may not be economical or even practical. The turnover time for each generation of breeding is also long and when technologies continue to change it causes further delays in their practical use. Therefore, maybe it is time for someone, probably a plant breeder, to hold genomicist's feet to the fire and say "Make the current markers work as a selection tool before we move to a new marker system"!

Finally, technology based resources are going to fewer and more traditional forage species because these crops are the ones that have greater economic value and where industry partners will also invest. Therefore, this will favor legumes like lucerne and white clover. Even for other legumes with an identifiable path to market, this concentration of biotech resources into fewer species requires efforts on the part of those primary programs to find ways that technology developed for one legume species has utility across other species.

Reminder number 7; although opportunities for using biotechnologies in forage legume breeding are more restricted today, their potential impact remains immense, so we must continually strive to improve cost, effectiveness, and applicability to all species.

In conclusion, I hope these 7 reminders will serve as a basis for farmers and scientists, but especially for decision makers who fund pasture research, to invest more funding and political capital into forage legumes. However, I am afraid that all I know about policy and funding decisions are very general, and are taken from the perspective of 35,000 feet; much like when you are in airplane and look out the window on a clear day.

My former boss at the Noble Foundation, Mike Cawley, tells a story about an Oklahoma judge who had done well in his personal life and whose wife liked to run their horses in Santa Anita, California during the racing season. Well, he told Mike that after a hard week at the bench sentencing criminals, he liked to go and join his wife in California. He would go to the airport in Dallas, Texas and get a first class ticket, board the plane, and after take-off, he would get the stewardess to bring him 2 large scotch and waters. He

would knock these back and then look out the window. He commented to Mike, "You know sitting in first class, and drinking scotch, the world does not look so bad at 35,000 feet"! Well, unfortunately, the funding and policy world does not look so rosy when you finally land the plane and see all the details.

For example, unprecedented population growth is responsible for increasing pressure for producing more food on the world's arable, and now even marginal, crop land including intensively managed pastures as well as extensively managed grasslands and rangelands. Related pressures are the needs and wishes of the many diverse segments of this growing population. In fact, public demands on all grasslands, including amenity areas, are related to their multiple functions and values that range from fodder for both domestic and wild animals, to ensuring clean water sources, to an ability to sequester carbon and help

clean the air, to protect soil from erosion, to protect animal and plant biodiversity and their habitats, to support tax income for rural communities, and to provide recreational opportunities and open space and improvement of quality of life. Whew; that's a lot!

Policy responses for these varied societal pressures continue to cause political debates, and in some cases, new approaches for using both intensively and extensively managed grasslands; all against an environmental and social background that cannot accept risk, and cannot even agree on real versus perceived risk; a position, unfortunately, adopted by the regulatory agencies.

This complicated picture at the world's societal level leads one to hope that the best government policies will continue to evolve, and in turn, positively affect how all grasslands are managed, and for our purposes tonight, support research on the very valuable forage legumes.

Realizing the potential of forage legumes will require future investments in R&D to expand their collection and use and to understand current gaps in legume biology and genetics as well as how to apply the new biotechnologies in a cost effective manner. It was the goal of this talk to provide suitable context to support a rationale for this type of investment.

However, I know you are saying, "Hell, he didn't tell me anything I didn't already know"! Well, that was exactly the point. I only hope these reminders embolden you to act on them. Thank you.



## **The State of the Climate 2012**

State of the Climate 2012 provides an updated summary of long-term climate trends. It notes that the long-term warming trend has not changed, with each decade having been warmer than the previous decade since the 1950s. The warming trends observed around Australia are consistent with global-scale warming that has been measured during recent decades, despite 2010 and 2011 being the coolest years recorded in Australia since 2001. Global-average surface temperatures were the warmest on record in 2010 (slightly higher than 2005 and 1998). 2011 was the world's 11th warmest year and the warmest year on record during a La Niña event. The world's 13 warmest years on record have all occurred in the past 15 years.

There has been a general trend towards increased spring and summer monsoonal rainfall across Australia's north during recent decades, and decreased late autumn and winter rainfall across southern Australia. The summary shows that the very strong La Niña event in 2010 followed by another in 2011 brought the highest two-year Australian-average rainfall total on record.

State of the Climate 2012 also highlights the increase in global sea level and notes sea-level rise around Australia since 1993 is greater than, or equal to, the global average. Our observations show that sea-surface temperatures around Australia have increased faster than the global average. The concentrations of long-lived greenhouse gases in the atmosphere reached a new high in 2011. Annual growth in global fossil-fuel CO<sub>2</sub> emissions between 2009 and 2010 was 5.9 per cent, reversing a small decline of 1.2 per cent recorded between 2008 and 2009 during the global financial crisis.

*The full report is available at*

*[www.bom.gov.au/announcements/media\\_releases/ho/stateClimate2012.pdf](http://www.bom.gov.au/announcements/media_releases/ho/stateClimate2012.pdf)*

## From the President

Seasonal conditions across the state vary from very good to excellent depending on exact location.

A bit too good in some areas and our sympathies go to those landholders in the north where record flooding is once again causing havoc. As was recently described from a particularly severely flood affected area, "one flood too many"

Elsewhere, pasture growing conditions are as good as most memories can stretch. I was, however, reminded only recently, "it will get dry again!" This is of course a fair comment and simply

serves to remind us that we live in a very variable country in climate terms. Where possible, hay, silage or grain conservation is thoroughly recommended to manage for this inevitable if not pessimistic development.

Plans are well underway for this year's conference to take place at Wagga Wagga from the 24<sup>th</sup> to 26<sup>th</sup> July. Nathan Ferguson from the NSW DPI at Tumut is convening the conference and has some excellent speakers lined up to deliver stimulating presentations. Please put the date in your diary now.

Finally, I would like to once again promote our internet site [www.grasslandnsw.com.au](http://www.grasslandnsw.com.au) It is full of great information on a wide range of topics relevant to livestock and pastures. In addition, past conference proceedings are available, equally full of information just as relevant to day as many years ago.

Cheers to all,

*Mick Duncan.*  
*President.*



## Letter to the Editor

I attended the recent 'Legume Conference' of which GSSA was a sponsor. It was a great event and I was proud of the Society. There was a combination of breadth and focus, mostly very well-presented papers.

I commented in one session that the arrival of sub clover in Australia was probably the most important single event in our economic history. It did a good job of getting established over the next 70 years, then was transformed into a great plant with the use of phosphate and molybdenum and an understanding of nodulation (I asked How and when did the rhizobium arrive? No one was prepared to guess!). It transformed southern Australia. At a rough estimate it fixes between 5 and 10 billion dollars worth of nitrogen annually - and will go on doing so.

Even more importantly - and the conference oozed with this - we became a nation of legume lovers, recognising beyond any other nation the importance of naturally fixed atmospheric.

The great 'elder' of the nitrogen fixers - lucerne - got plenty of coverage at the conference - did the Romans really know what they were about? An amazing range of other possible contributors were discussed, giving me confidence that, in a time of scarcer research resources, the legume future is in good hands.

(Dr) David F Smith AM

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The Grassland Society of NSW was formed in March 1985. The Society now has approx 500 members and associates, 75% of whom are farmers and graziers. The balance of membership is made up of agricultural scientists, farm advisers, consultants, and or executives or representatives of organisations concerned with fertilisers, seeds, chemicals and machinery.

The aims of the Society are to advance the investigation of problems affecting grassland husbandry and to encourage the adoption into practice of results of research and practical experience. The Society holds an annual conference, publishes a quarterly newsletter, holds field days and is establishing regional branches throughout the state.

Membership is open to any person or company interested in grassland management and the aims of the Society. For membership details go to [www.grasslandnsw.com.au](http://www.grasslandnsw.com.au) or contact the Secretary at [secretary@grasslandnsw.com.au](mailto:secretary@grasslandnsw.com.au) or at PO Box 471 Orange 2800

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***Grassland Society of NSW News***



Welcome to new members: Simon Turpin, Namoi Catchment Management Authority, Gunnedah, NSW; Greg Miller, Molong, NSW; Nigel Phillips, Wagga Wagga, NSW; Alan Cummine; Gundaroo, NSW and Dr P Morrell, Northam, WA.



Next Newsletter: The next issue of the newsletter will be circulated in early June. If you wish to submit an article, short item or letter to the editor for the June newsletter please send your contribution to the Editor - Carol Harris at [carol.harris@dpi.nsw.gov.au](mailto:carol.harris@dpi.nsw.gov.au) or DPI NSW 444 Strathbogie Road Glen Innes NSW 2370. The deadline for contributions to the next newsletter is May 18 2012.

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