Grassland Society of NSW Inc

Newsletter

By the time you get this newsletter the 2012 conference at Wagga Wagga will nearly be upon us. Don't miss your opportunity to attend as this year's committee has put together a really informative and innovative program. All the best to Nathan Ferguson and his team for a successful conference.

For those attending the conference a reminder that the Grassland Society of NSW AGM is on Tuesday 24 at 6pm in the Gulballanna Room in the CSU Convention Centre near Joyes Hall. All members are welcome to attend and contribute to the meeting.

Have you paid your annual membership subscription for 2012/2013? – Don't forget - payment details can be found on page 4.

On behalf of the 2011/2012 committee I would like to thank our sponsors in 2011/2012, without their support Grassland Society of NSW activities such as the conference and newsletter would not be possible.

Sponsors in 2011/2012 were;

Premier: Meat & Livestock Australia, Wrightson Seeds Australia, NSW Department of Primary Industries and Australian Farm Journal.

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Local: Dow AgroSciences, Town & Country Rural Supplies

Hay and Silage Competition: New Holland, Integrated Packaging, Pioneer Hi-Bred Australia.

Like many members I was very sad to hear the news of the passing of two of our long serving members, Haydn Lloyd Davies and Drew Wright.

Both Haydn and Drew were great contributors to the Grassland Society of NSW. When I took over as Editor from Haydn a couple of years ago, he was a great support and always maintained an interest in the newsletter – he was a great adviser and I am grateful for his assistance. My sympathies go out to both Haydn's and Drew's family.

Carol Harris
Editor

Catch a sneak peak of the conference on YouTube

To view some of the speakers promoting the Conference in July go to the website www.grasslandnsw.gov.au or find us on Facebook and follow the links to the YouTube videos.

In this newsletter

Messina (*Melilotus siculus*) - a new salt and waterlogging tolerant annual pasture legume for southern Australia

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Abstract

The commonly sown pasture legumes in southern Australia are sensitive to the combination of salinity and waterlogging. Messina (Melilotus siculus) is an annual pasture legume with much higher salt tolerance as both seedlings and mature plants than other legumes and with similar waterlogging tolerance to balansa clover (Trifolium michelianum). Glasshouse and laboratory studies have identified several mechanisms for salt and waterlogging tolerances that explain its adaptation to saline, waterlogged soils. Trials through the Future Farm Industries CRC are underway in South Australia and Western Australia to select the best adapted of 21 messina accessions for release as a new cultivar. Selection is also being conducted for a salt tolerant rhizobium strain able to persist over summer and nodulate regenerating messina plants. This paper discusses the ecology, physiology and agronomy of messina, progress towards its commercialisation as a new pasture species for saline, waterlogged soils and further work required.

Introduction

Large areas of southern Australia have become seriously affected by dryland salinity due to the clearing of native vegetation and rising watertables. Figures derived from the National Land and Water Resources Audit (2001) suggest that 1.3-1.5 million ha of agricultural land in Australia are currently affected by dryland salinity, with this area predicted to increase to 1.7-2.3 million ha by 2020. Areas affected by dryland salinity are often affected by winter waterlogging. Plants growing in such environments are subject to the additional challenge of hypoxia (low oxygen concentration), increasing their susceptibility to high shoot Na+ and Cl–concentrations. These adverse conditions have severe effects on plant growth and survival (Barrett-Lennard 2003). Such environments typically contain unproductive sea barley grass (*Hordeum marinum* L.) and are only suited to livestock production.

Greater animal production and subsequent economic benefits have been shown from incorporating saltland pastures into saline land (O'Connell *et a*l. 2006). Saltland pastures are generally based on the salt-tolerant grasses, puccinellia (*Puccinellia ciliata* Bor) and tall wheat grass (*Thinopyrum ponticum* (Podp.) Z.-W. Liu & R.-C. Wang) in high rainfall areas, or saltbush (*Atriplex* species) in low rainfall areas. However, saline landscapes are generally nitrogen deficient, resulting from denitrification and the lack of adapted legumes (Rogers *et al*. 2005). Companion legumes with salt and waterlogging tolerance are, therefore, required to sustain productivity of saltland pasture systems. Inclusion of an adapted legume into these environments can substantially increase farm profitability through increased pasture productivity and quality and subsequent improved animal performance (Masters *et al*. 2001).

Self-regenerating annual pasture legumes are widely used in the farming systems of southern Australia (Nichols *et a*l. 2007). However, currently used legumes, particularly subterranean clover (*Trifolium subterraneum* L.), are very sensitive to salinity (Rogers *et al*. 2005). Annual legumes need to germinate and establish in the years following sowing, but this occurs following the opening autumn rains, when soil surface salinity levels are generally at their highest levels (Nichols *et al.* 2008). There is clearly a need to identify annual legumes adapted to the combined stresses of salinity and waterlogging on saline soils.

Messina, *Melilotus siculus* (Turra) Vitman ex B.D. Jacks (syn. *M. messanensis* (L.) Mill.), has been identified as a very promising annual pasture legume for saline, waterlogged soils. Work is progressing through the Future Farm Industries Cooperative Research Centre (FFI CRC) towards commercialisation of the species as a new plant for agriculture, along with an adapted rhizobium strain. This paper summarises the results of studies on messina, its prospects for commercialisation and further work required.

Adaptation of messina to saline, waterlogged soils

Messina is native to saline, marshy areas of the Mediterranean basin, Iberian peninsular and east Asia (Marañon *et al.* 1989) and is naturalised in similar environments in southern Australia (Jeanes 1996; Paczkowska and Chapman 2000). Initial interest in messina came from a series of trials conducted across southern Australia, in which herbage production and persistence of 42 annual pasture legumes from 33 species were measured over three years at five sites that varied in extent of both salinity and waterlogging (Nichols *et al*. 2008). Burr medic (*Medicago polymorpha* L.) was productive on well drained soils with surface (0-10 cm) electrical conductivity (ECe) in summer >8 dS/m, while balansa clover (*Trifolium michelianum* Savi) was productive on soils subject to waterlogging, with summer surface ECe <8 dS/m. Messina was the only species that regenerated on waterlogged sites with summer surface ECe >8 dS/m and has persisted on sites with ECe >30 dS/m (Nichols *et al*. 2008; Nichols and Craig, unpublished data).

Salinity tolerance and avoidance mechanisms at germination

Messina has a range of salinity tolerance and avoidance mechanisms at germination. It has higher salinity tolerance per se as a germinating seedling than other pasture legumes. Nichols *et al*. (2009) showed messina germination was not reduced by 300 mM NaCl (equivalent to 30 dS/m), while significant reductions occurred for Scimitar burr medic at 240 mM and Frontier balansa clover at 120 mM NaCl. Studies by Rogers *et al*. (2011) and Jeffery (2011) confirmed the high salinity tolerance of messina at germination, and found variation within the species. For example Jeffery (2011) found no

reduction in germination percentage at 300 mM NaCl, relative to 0 mM, in 19 of the 21 messina accessions tested, while Frontier balansa clover and Jota Melilotus albus had <18% germination.

Messina has an ability to recover germinability after exposure to high levels of salinity. Nichols *et al*. (2009) showed messina was able to recover 31% of its potential germinability upon transfer to non-saline solution after 21 days in 600 mM NaCl. Jeffery (2011) found variation within 21 messina accessions for germination recovery following 14 days at 600 mM NaCl, with four recovering full germinability and seven with >70% germination. This compared with no germination of Scimitar burr medic or Jota *Melilotus albus* and 64% germination of Frontier balansa clover.

Seed coat impermeability (hard seeds) was shown by Nichols *et al*. (2009) to protect the seed against the toxic effects of salinity over summer. They also showed messina had a delay in the timing of hard seed breakdown (seed softening) over the summer–autumn period, compared to *T. subterraneum* and *T. michelianum*, which were ready to germinate by mid-March. This delay acts as a salinity avoidance mechanism to defer germination until late autumn-early winter, when reliable rainfall, capable of flushing salts from the surface, is more likely to occur. Jeffery (2011) found variation for seed softening patterns among 21 messina accessions. The first significant seed softening occurred after mid-April in 18 accessions and after mid-May in four of them.

Tolerance to salinity and waterlogging in the vegetative stage

The high salt tolerance of messina has been confirmed in glasshouse experiments. In a study of 19 Melilotus species Rogers *et al*. (2008) found 2-month old messina plants subjected to 28 d in an aerated solution of 240 mM NaCl had 89% the shoot biomass of non-saline controls, compared to 31% for Paradana balansa clover. Rogers *et al*. (2011) found variation for salinity tolerance among 29 messina accessions, with ten having >80% the shoot biomass of non-saline controls after 21 d at 300 mM; no plants of Frontier balansa clover survived. In another experiment shoot biomass of messina was 30% that of non-saline controls after 21 d at 450 mM, compared to 15% for both Paradana balansa clover and Scimitar burr medic (Teakle *et al*. 2012).

The high waterlogging tolerance of messina has been confirmed in glasshouse studies. Rogers *et al*. (2008) found messina shoot biomass after 28 d in stagnant solution (designed to emulate the hypoxic conditions of waterlogged soils) was 102% of aerated controls, compared with 99% for Paradana balansa clover and 29% for Sceptre lucerne (*Medicago sativa* L.). Root biomass of messina in the stagnant solution was 119% that of the aerated solution, compared with 144% for balansa clover and 32% for lucerne. Rogers *et al*. (2011) examined 23 messina accessions and found none had shoot growth reductions >20% in stagnant solution, compared with aerated controls, while root biomass was not reduced in any accession and increased by as much as 41%. Teakle *et al*. (2011) and Verboven *et al*. (2011) showed that waterlogging tolerance of messina is aided by a highly porous form of aerenchyma, termed phellem, which develops around the roots under stagnant conditions and enables O_2 transport from the hypocotyls.

A recent study by Teakle *et al*. (2012) showed that messina is very tolerant to the combined stresses of salinity and waterlogging. New leaves were produced in messina after 14 d in stagnant nutrient solution with 550 mM NaCl (~ sea water salinity), while both Paradana balansa clover and Scimitar burr medic died after 5 d in a 400 mM NaCl stagnant solution.

Commercialisation of messina and an adapted rhizobium strain

Initial field trials on saline, waterlogged soils showed that while messina was able to set seed and regenerate, the vast majority of regenerating seedlings failed to nodulate and grow (Nichols *et al*. 2008; Bonython *et al*. 2011). This was shown to be due to the inability of the commercial annual medic rhizobia (*Sinorhizobium medicae* strain WSM 1115) to persist over summer in the highly saline soil surface (Bonython *et al*. 2011). A field screening has identified several *S. medicae* strains with much greater ability to nodulate regenerating messina plants on saline soils, most notably SRDI 554 (Bonython *et al*. 2011). This now paves the way for development of messina as a new species for agriculture.

Field trials are currently underway to evaluate 21 accessions of messina over a 3-year period on saline, waterlogged sites in South Australia and Western Australia. Measurements include biomass production, seed production, seedling regeneration densities and nodulation ability. It is intended that the best adapted variety will be released to the seed industry in early 2013, along with the best salt-tolerant rhizobium strain.

Further research

Before messina can be released as a new species for agriculture, duty of care trials need to be conducted to minimise any risks to animal health. Messina has negligible levels of the chemical coumarin, found in other Melilotus species (Nair *et al*. unpublished data; Stevenson 1969), which can taint the flavour of meat, milk and flour and cause a haemorrhagic condition in livestock if fed mouldy hay (Masters *et al*. 2001). Messina also has similar nutritive value to other pasture legumes (Rogers *et al*. 2008). However, animal feeding trials need to be conducted to confirm its lack of anti-nutritional factors and its value as a stock feed.

Once the best adapted accession has been selected as a new cultivar, agronomic and grazing management packages need to be developed to optimise pasture performance and animal production. Factors include establishment methods, mixtures with salt tolerant grasses, fertiliser rates, broadleaf herbicide options and grazing strategies. Seed production strategies also need to be devised. A preliminary seed harvesting trial produced seed yields of over 1500 kg/ha (AD Craig, unpublished data), indicating the high yield potential of messina and its potential for seed harvesting with a conventional cereal harvester.

Conclusions

Messina will fill the gap of a pasture legume for waterlogged environments with summer soil surface salinity ECe values >8 dS/m. It will markedly increase the productivity of sea barley grass flats and be a companion legume to puccinellia and tall wheat grass or as an understorey legume to saltbush. Glasshouse and laboratory studies have identified mechanisms for salt and waterlogging tolerance that explains its adaptation to saline, waterlogged soils. Conservative estimates suggest messina can improve productivity by 4 dse/ha across an area of 600,000 ha, with lesser gains being achieved across another 1 million ha. A new messina variety, along with an adapted salt-tolerant rhizobium strain, will be released to the seed industry in 2013.

Acknowledgments

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On-line calculator to help beef producers maximise profits

A new and improved online calculator is set to transform the marketing of cattle in NSW and help producers maximise profits and better meet customer requirements.

NSW Department of Primary Industries (NSW DPI) Research Leader Animal Production, Michael Beer, said that BeefSpecs will help farmers target specific beef markets and get the most value out of their cattle operation.

"BeefSpecs is an online livestock model that predicts the future weight and fat levels in beef cattle," Mr Beer said.

"The tool allows farmers to make more informed management decisions and meet various customer specifications for weight, fat scores and other beef carcase requirements.

"The online calculator requires producers to input current live weight, rump fat depth, and frame score and provides an initial snapshot of growth and maturity parameters of cattle while on farm.

"Drawing on this analysis – and further information on animal sex, breed, hormonal growth treatment and growth rates – the calculator then estimates the beef carcase characteristics at point of sale.

"This allows producers to forward-plan and put in place strategies to ensure their cattle meet market requirements."

Michael Beer said market compliance is a major issue and the failure of producers to meet customer requirements is costing the industry millions of dollars in lost profit each year.

"Some 25 per cent of cattle fail to meet targets for carcase weights and fat specifications, at a cost of between $15 and $30 a head, depending on the target market," Mr Beer said.

"BeefSpecs arms producers with the right information to reduce non compliance and maximise their profits come selling time."

BeefSpecs has been developed by NSW DPI and Cooperative Research Centre for Beef Genetic Technologies in collaboration with Meat and Livestock Australia, University of New England, Department of Employment, Economic Development and Innovation, University of California Davis, and US Department of Agriculture Meat Animal Research Center.

BeefSpecs is available at: http://beefspecs.agriculture.nsw.gov.au/

Research Update

This is a new section of the newsletter to keep you up-to-date with pasture and grassland research in Australia. Abstracts of recently published research papers will be reprinted as well as the citation and author details in you wish to follow up the full paper.

Climatic conditions for seedling recruitment within perennial grass swards in south-eastern Australia

R. Thapa, D. R. Kemp and M. L. Mitchell (2012)

Recruitment of new perennial grass plants within existing grassland ecosystems is determined by seed availability, suitable microsites, nutrients and climatic conditions, water and temperatures. This paper reports on the development of criteria to predict recruitment events using modelled soil moisture conditions associated with recruitment of species in five field experiments at Orange (*Phalaris aquatica*), Trunkey Creek (*Austrodanthonia* spp.), and Wellington (*Bothriochloa macra*) in central New South Wales, Australia, and the frequency of those conditions during the past 30 years. Recruitment events were recorded when a rainfall event (median 68 mm across the three sites) kept the surface volumetric soil moisture (0–50 mm) above the permanent wilting point for at least 15 continuous days, allowing for, at most, two 'dry days' in between. A key finding from our study is that rainfall events creating favourable soil moisture conditions for seedling emergence typically occurred in the second half of February, sometimes extending to early March. Previously it was thought that recruitment would more likely occur through autumn, winter, and spring when rainfall in southern Australia is more reliable. The 30 years' data (1975–2004) showed that the *P. aquatica* site had a median of 20 continuous moist days each year in February–March, whereas, there were 16 and 10 days for the *Austrodanthonia* and *B. macra* sites, respectively. The probabilities of exceeding seven or 15 continuous days of moist surface soil were 98% and 78% at the *P. aquatica* site, 91% and 49% at the *Austrodanthonia* site, and 73% and 30% at the *B. macra* site, and indicated that some recruitment is possible in most years. These analyses were extended to several sites across New South Wales, Victoria, and Tasmania to estimate the frequency with which recruitment could occur within natural swards. Across these sites, the probabilities of exceeding seven continuous days of soil moisture were >55% and of exceeding 15 continuous days were lower, which showed that suitable climatic conditions exist during late summer–early autumn across south-eastern Australia for a recruitment event to occur. Future research may show that the criteria developed in this paper could have wider regional application.

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Haydn Lloyd Davies
1927 - 2012

The following is a eulogy written and delivered by John Ayres at Haydn's funeral. I will preface the main eulogy with some facts on Haydn's significant contribution to the Grassland Society of NSW.

Haydn joined the Society in 1992, immediately making a very positive contribution at annual conferences, field days and on the state executive committee. Haydn served as newsletter editor from 2001 until 2008, and as a state executive committee member from 1993 until 2008 when ill health caused him to retire. Haydn provided positive leadership to the Society as president from 1997 until 1999 when, under the constitution at that time, he was required to step down.

On a personal note; it was Haydn who approached me to take on the president's position in 2005 and subsequently gave me tremendous support and encouragement. It was a privilege to confer life membership to Haydn in 2006 in recognition of his outstanding and long term contribution to the Society.

Mick Duncan

The Eulogy from John Ayres now follows

I am honoured to be asked to contribute my observations on the professional life of my teacher, colleague and friend Professor Haydn Lloyd Davies.

By way of introduction, my association with Haydn began in student days when Haydn was academic supervisor of my doctoral studies at the University of NSW. In addition to helping me across the finishing line with my studies, Haydn was my mentor throughout my 40-something year career in agricultural research. Amongst many forms of support and advice, he also provided critical comment on most of my scientific papers prior to publication – this was invaluable. Helen knows only so well the innumerable phone conversations, exchanges of mail and email that were communicated unremittingly between us, especially in Haydn's so-called retirement.

Haydn Lloyd Davies was raised on a farm in Wales and commenced his formal agricultural education at the University of North Wales. He joined the Grassland Research Institute at Hurley in the UK after graduating in 1954. Subsequently, he joined the wave of internationally recruited scientists who so profoundly stimulated Australian agricultural research in the decades following WW II. Haydn's lifelong and passionate interest in the grazing industries, and more particularly 'pasture-animal interaction' phenomena, began at CSIRO's Dickson Experiment Station, Canberra in 1955 with his far-sighted studies on sheep production from native and improved pastures.

In 1959, still with CSIRO, Haydn transferred to Western Australia, where he researched the nutrition and reproduction of grazing sheep. His pioneering research showed that stocking rate on improved pastures could be dramatically increased without adverse effects on the nutritional status of the grazing animal. Importantly, he found that the advantage to productivity of increased stocking rate was offset by a high incidence of reproductive failure in ewes grazing the new improved varieties of subclover. This dichotomy led Haydn to original findings on the significance of naturally occurring plant oestrogens for infertility in sheep for which he is most renowned. He also uncovered the critical role of the trace elements cobalt and selenium in wool production.

In 1967, Haydn was appointed Director of the MC Franklin Laboratory in the Department of Animal Husbandry, Sydney University. His research here was on the growth and development of beef cattle, with special focus on carcase composition and meat quality. In 1975, now recognised as an international authority on ruminant nutrition, Haydn was appointed as the inaugural Professor of Pastoral Sciences at the University of NSW where he continued research on trace elements and the productivity of cattle grazing on marginal grazing lands that are so ubiquitous to the Australian landscape.

In addition to an outstanding contribution of scholarship and scientific output, mention must also be made of Haydn's encouragement and support for young emerging scientists. Also, he was extraordinarily active in the affairs of 'learned societies' concerned with pasture agronomy and animal science. For example:

• President of the Western Australia Branch of the Australian Institute of Agricultural Science in 1967-68 (and the same position in NSW in 1979-80)

• President of the NSW Branch of the Australian Society of Animal Production in 1971-72, member of Federal Council in 1973-74 and Editor of Federal Conference Proceedings in 1975

• Many and various Executive offices with the Nutrition Society of Australia.

Haydn was conferred as Fellow of the Australian Society of Animal Production in 1988, and in 2006 he was bestowed Life Membership of the NSW Grassland Society in recognition of his enduring contributions as a farmer member and Society office holder.

It is barely necessary to remind friends and family here today, that in all of this, Helen has played a major role both as his highly informed confidant - given her own background in agricultural science, and in providing enduring colleagueship and support to Haydn across their many professional interests.

In summary, Haydn is recognised by both the academic world and agricultural industry alike for major contributions to the 'green revolution' in the Australian grazing industries. Among many outstanding scientific achievements, Haydn verified the link between sheep infertility and naturally occurring plant hormones, and equally importantly he highlighted the significance of trace elements for both sheep and cattle production on marginal grazing lands.

As a highly respected scientist and academic, he persistently advocated the application of scholarly methodologies and sound science to agricultural research. Throughout his long and meritorious career he made highly valuable contributions to innovations in commercial agriculture, to the professional development of generations of agricultural scientists and to the functioning of learned societies.

From a village and farming heritage in rural Wales to this meritorious contribution to the grazing industries in Australia, I say ….. 'job well done old friend'.

CONFERENCE PROGRAM

Tuesday 24 July

5:00 pm – 6:00 pm Pre-conference registrations (Joyes Hall)

6:00 pm Grassland Society of NSW Annual General Meeting (Gulballanna Room in the CSU Convention Centre near Joyes Hall)

Wednesday 25 July

7:30 am – 8:30 am Registrations

8:45 am WELCOME - Mick Duncan, Grassland Society of NSW.

9:00 am Session 1

'Recognising and working within landscape limitations for increased productivity.' Dr Belinda Hackney, District Agronomist, NSW DPI, Bathurst.

'How has grazing management changed to utilise differences in the landscape? A follow up to the 2001 Gundagai conference?' Rodney Purcell, Producer, Brungle.

Poster Papers, Morning Tea & Trade Displays

11:00 am - Session 2

'Soil Carbon, variation across the landscape' Susan Orgill, Research Officer, Soil Carbon, NSW DPI , Wagga Wagga.

'Alternative Fertilisers, what do pasture trial results tell us?' Fiona Leech, District Agronomist, NSW DPI, Yass

'Humic products - Potential or presumption for agriculture? Can humic products improve my soil?' Kim Billingham, Project Officer – Agronomist, NSW DPI ,Taree.

12:30 pm - Lunch

1:00 pm - Session 3 - Bus Tours

Tour A - High Rainfall Tablelands (Rosewood & Tarcutta). Sponsored by Bendigo Bank, Agribusiness Banking, Wagga Wagga, Tarcutta Rural Supplies, Tarcutta and Anderson's Agriservices. Perennial pastures the key to successful beef production. Visit a fantastic undercover set of cattle yards that allow cattle work to be done snow, rain, hail or shine at Rosewood. Prime Lamb production, making the most of the landscape.

Tour B - Cross Property Planning (Kyeamba). Visit a group of farmers in the Kyeamba Valley that have undertaken a Cross Property Planning sequence to better manage agriculture in the landscape.

Tour C – Mixed farming tour (Wagga – Narrandera). Inspect pasture variety and crop sequencing trials - EH Graham Centre. Corporate farm - sheep grazing, cropping, irrigation and state of the art, architect designed woolshed. Lucerne hay production.

6:30 pm - 7:00 pm PRE-DINNER DRINKS and CANAPES (beer, wine and soft drinks only)

7:00 pm CONFERENCE DINNER at Wagga Wagga RSL Club & GUEST SPEAKER. HAY & SILAGE COMPETITION - Sponsored by Integrated Packaging, New Holland Agriculture, Pioneer and NSW DPI Feed Quality Service.

Thursday 26 July

8:30 am - Session 4

'Phosphorus in the landscape: a sustainable phosphorus future for Australian pastures' Dr Richard Simpson, Senior Research Scientist, CSIRO Plant Industry.

'Grassgro helped me fine tune my farming system, how can it help you?' Oliver Cay, Producer, Cooma.

'Why fertilise native pastures?' Doug Alcock, Livestock Officer (Sheep and Wool), NSW DPI, Cooma.

Poster Papers, Morning Tea & Trade Displays

11:00 am - Session 5

'Effect of fertiliser on the productivity and persistence of perennial native grasses.' Mike Keys, Agronomist, Chris Houghton Agricultural, Queanbeyan.

'Intensive rotational grazing can improve profitability and environmental outcomes.' Warwick Badgery, Research Agronomist, NSW DPI, Orange Agricultural Institute.

'Perennial pasture species for the mixed farming zone - we don't have many options'. Richard Hayes, Research Agronomist, NSW DPI, Wagga Wagga Agricultural Institute.

Lunch and Trade Displays

1:20 pm - Session 6

'How a new decision support tool helps mixed farmers make pasture sowing decisions, to cover crop or sow alone.' Jeff McCormick, Research Agronomist, NSW DPI, Wagga Wagga Agricultural Institute.

'Increasing the proportion of female lambs by supplementary feeding oats high in omega-6 fatty acids at joining.' Dr Edward Clayton, Livestock Research Officer, Ruminant Nutrition, NSW DPI, Wagga Wagga Agricultural Institute.

'Q&A, what's the driving force behind our next generation of farmers? A 1 hour facilitated session to close the conference, with 4 to 6 <40 year old farmers discussing what is driving them in agriculture. What did they get out of the conference?'Facilitated by Phil Graham.

Close and Afternoon Tea.

REGISTRATION OPTIONS

2012/13 Membership can be paid prior to conference registration.
For further information go to www.grasslandnsw.com.au

CONFERENCE OPTIONS	MEMBER	NON MEMBER
FULL Conference package[1] *(early) payment before June 30*	□ $220	□ $300
FULL Conference package[1] Student / Additional member	□ $180	n/a
FULL Conference package[1] *(late) payment after June 30*	□ $250	□ $300
Conference **single day rate**[2] Wednesday July 25	□ $90	□ $135
Conference **single day rate**[3] Thursday July 26	□ $90	□ $135
Conference **DINNER ONLY**[4]	□ $60	□ $60
Please indicate your **BUS TOUR Preference**	A or B or C	
SUB-TOTAL		
I would like to attend the **Annual General Meeting**	YES	NO
I would also like to pay my **2012 / 2013 Membership**	□ $50 / □ $25 (Student)	
TOTAL		

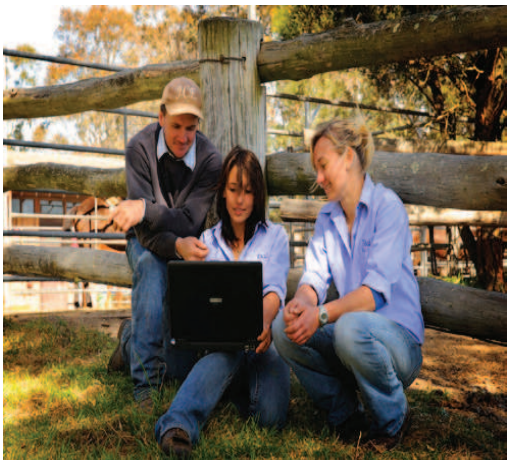
NOTE: The Grassland Society of NSW is exempt from GST

[1] **Full Conference package** includes conference sessions on both days, conference proceedings, lunches, satchel, morning and afternoon teas, bus tours, canapes and conference dinner

[2] **Single day rate (Wednesday)** includes conference sessions, conference proceedings, satchel, lunch, morning and afternoon tea, bus tour. Rate does not include conference dinner.

[3] **Single day rate (Thursday)** includes conference sessions, conference proceedings, satchel, lunch, morning and afternoon tea.

[4] **Conference dinner** includes pre-dinner drinks (beer, wine and soft drink only), canapes and two course meal.



For further information or enquires on the Conference please call the Conference Convenor Nathan Ferguson on 0419 616 154
or email nathan.ferguson@dpi.nsw.gov.au

William Andrew (Drew) Wright
1923 - 2012

Drew was born on a small farm of 60 acres outside the town of Omagh in Northern Ireland. His good school marks earned him a prestigious scholarship to Queen's University, Belfast where he studies agriculture. After graduation in 1945, he undertook postgraduate training at Cambridge University and a course of tropical agriculture at the Imperial College for Tropical Agriculture in Trinidad and Tobago in 1947. Later that year he was posted by the British Colonial Service to the Gambia, to the remote village of Jenoi to develop rice production systems. He met and married Brenda Santer, who was a dietitian in a medical research team working in a near-by village, in 1949. Widespread tropic diseases and an unpleasant climate made his work difficult, but in spite of contracting malaria Drew completed his posting and reported to the Governor that the prospects for rice were not promising.

After attended an administration school for promising government officials at Cambridge, Drew, Brenda and baby Sheila were posted to Kenya in 1951. He worked first at Mombasa where sons, Hugh and Tim were born and later at Machakos. His research aimed at determining viable cotton varieties for the area and farming systems to intercrop cotton and peanuts. There followed a posting to Mauritius in 1959 and in 1961 to Nairobi, Kenya working as a senior government official.

Sadly, Brenda was diagnosed with stomach cancer and returned to England for treatment where she died in 1961. This was a difficult period for Drew having to fly between Africa and England for work and caring for a young family.

Drew was remarried in December 1962 to Ann Twigg and in November 1963, Philip was born. Drew was now acting Director General and was offered the position of Director General post independence by the future President, Jomo Kenyatta. Drew, however decided in 1964, to take his family back to Northern Ireland.

In 1966, the Wright family emigrated to Australia and Drew joined the Department of Agriculture in NSW and worked as a research agronomist at the Pasture Research Unit at Berry. In conjunction with the soil chemists, Ian Vimpany and Jim Bradley, he conducted extensive research on the phosphorus and potassium status of south coast soils. As a result, Australian Fertilisers Ltd manufactured special fertilizer products for dairy pastures. Drew assisted in the formation of the very successful South Coast Agricultural Research and Extension Council (SCARE) Council, an organization comprising farmers, dairy factories and the Department to fund and organise research and extension activities on the South Coast. In 1975, Drew was appointed as the Assistant Principal Agronomist (Research) located at Wagga and in 1977 he was promoted to the position of Principal Agronomist, (Pastures) at the Head Office in Sydney. From Sydney he retired to a property, "The Overflow" in Orange in 1983.

In 1985, Drew was instrumental in galvanizing interest in the formation of the Grassland Society of NSW. It was his vision and he served many years on the Grassland Society Committee.

In 2004 Drew and Ann moved from "The Overflow" to a small block nearer to Orange. Sadly in January 2011, Ann died.

He lived on at the block until his peaceful death on 16th May 2012.

Drew will be remembered as a thorough gentleman who made a strong contribution to pasture production in NSW. He had a wealth of determination, a very good intellect and was a man who was unafraid to uphold a high standard on matters of moral principle.

New weed species added to Weeds of National Significance list

NSW will join the fight against some of Australia's worst weed species as 12 invasive weed species are included in a national weeds initiative. The newly-recognised weeds were selected based on their invasiveness, impact on primary industries and natural ecosystems and potential to spread.

Bringing Australia's Weeds of National Significance to 32, the 12 newly declared weeds include: African boxthorn, asparagus weeds, bellyache bush, brooms, cat's claw creeper, fireweed, gamba grass, madeira vine, opuntioid cacti, sagittaria, silverleaf nightshade and water hyacinth.

Further information on these weeds is available at the NSW DPI website:
http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds

or The Weeds of National Significance Website http://www.weeds.org.au/WoNS/

Key soil carbon messages

Susan Orgill, Research Officer Soil Carbon
NSW Department of Primary Industries

Soil organic carbon is a vital component of productive agriculture, but there are many myths and misconceptions about it. Below are the key messages from NSW DPI about soil carbon.

1. Soil is a significant carbon sink.

Sequestration of carbon in agricultural soils through appropriate management actions has been recognised as an important tool to mitigate climate change. Carbon is the main element present in soil organic matter, on average making up 58% by weight.

2. Increasing soil organic matter can improve productivity by improving soil structure, increasing nutrient cycling and encouraging diversity of soil organisms.

Increasing soil organic matter benefits agricultural production through improved soil function and greater resilience to a more variable and changeable climate.

3. Farm productivity is closely linked to soil functions that depend on decomposition of organic matter.

When soil organisms decompose organic matter they make some of the nutrients available for plants, and secrete glue-like substances that bind soil particles together which improves soil structure. The improved structure allows root growth and movement of air and water through the soil.

4. To increase the amount of carbon stored in soil, carbon-based inputs need to be greater than the losses. If the balance isn't right then the amount of carbon in soil is depleted.

Soil carbon increases through increased biomass production and retention and application of carbon-rich amendments. The main losses of carbon from the soil are through organic matter decomposition by micro-organisms, soil erosion, biomass burning, and product removal in food and fibre. When there is a net gain in the mass of carbon in soil, the soil is said to be sequestering carbon.

5. There are different types of organic matter in soil; some decompose more quickly than others.

Organic matter is a diverse group of organic materials of differing composition and at different stages of decomposition. In soil, organic matter comprises partially decomposed organic residues, microscopic organisms, well-decomposed humus, and burnt residues such as charcoal. Each of these broad groups serves diverse and overlapping soil functions. It is important to have all these components to sustain the soil functions that support plant productivity and carbon sequestration over various timescales.

6. The mass and forms of carbon in soil depend on soil type, climate, vegetation and land management.

Soils can 'protect' organic matter from natural decay by forming soil aggregates and mineral-organic matter complexes. This 'protection' of organic matter from decomposition has implications for carbon sequestration. Clay particles are more effective than sand and silt particles in protecting soil organic matter. Different forms of clay particles vary in their capacity to retain organic matter in soil. Climate influences the rate of decomposition. For example, in warm humid environments organic matter decomposes more quickly than in both dry/cold and dry/hot environments. Some organic materials decompose faster than others. Legume residues, for example, break down more quickly than low-nitrogen materials such as cereal stubble or woody forest residues.

7. There are land management options to increase the mass of carbon in soil.

Practices that generally increase the amount of organic carbon in soil include stubble retention, pasture phases in crop rotations, maintaining ground cover on grazing land, and improving plant production through nutrient management and overcoming soil constraints such as acidity.

8. The mass of carbon in soil is closely related to the amount of nitrogen, phosphorus and sulphur in soil.

The transformation of organic residues into humus (or "humification") by soil organisms requires nitrogen, phosphorus and sulphur (and other elements in smaller quantities). These elements are constituents of organic matter and must be present in organic residues or added to the soil for humification to occur.

9. Many Australian soils have the potential to store a large mass of carbon.

Most agricultural soils have much less soil organic matter today than in their pre-settlement native vegetation state. This means there is a known capacity for these soils to store more carbon, but achieving this potential may be difficult under some agricultural management systems. The best option is to manage land to maximise biomass production and biomass return in the most profitable and sustainable manner.

10. The current convention for calculating the stock of carbon in soil is in tonnes per hectare, to a depth of 30cm.

To calculate the carbon stock contained in the soil, you need to know the density (g/cm3) of the soil as well as the total organic carbon concentration (g/100g). To calculate the soil carbon stock (tonnes of carbon per hectare), you multiply the carbon concentration (g/100g) by the bulk density (g/cm3) by the depth of soil (cm). That is; Carbon stock (T/C/ha) = Carbon concentration (g/100g) x bulk density (g/cm3) x depth (cm) To convert this to tonnes of carbon dioxide equivalents (CO2e), multiply the carbon stock (T/C/ha) by 3.67 (based on the atomic weight of carbon and oxygen). That is; Carbon dioxide equivalents (CO2e) = Carbon stock (T/C/ha) x 3.67

For more information
www.dpi.nsw.gov.au/agriculture

Or contact:

Susan Orgill, Research Officer Soil Carbon Climate in Primary Industries Unit Agricultural Resources Branch, Agriculture NSW NSW Department of Primary Industries

Email: Susan.Orgill@dpi.nsw.gov.au

This article is reprinted from the NSW Department of Primary Industries website

New Evercrop experiments in southern NSW

Evercrop experiments that change the focus from improving pasture establishment under cover cropping to better establishment of mixed pastures have been sown at six sites in southern NSW.

The Evercrop project continues to discover more about dryland pastures, aiming to better understand the role that perennial pastures lucerne and phalaris, used with annual legumes such as sub clover, strand medic and biserrula, can play in rotation with crops.

The new experiments were sown across south-west NSW, from Mirool in the north to Burrumbuttock in the south, from Eurongilly in the east to Yanco in the west, and also included sites near Lockhart and Wagga Wagga.

The species are either sown together or separately in alternate rows to assess whether better pasture swards can be achieved simply by changing the placement of seed.

These experiments cover a range of environments, enabling evaluation of the pasture species and sowing arrangements under different conditions.

District agronomist at Yanco, Mary-Anne Lattimore said there is a great need for further work on pasture establishment, particularly in drier environments.

"In regions where annual rainfall is low, it is a real challenge to establish other pasture species with lucerne, due to competition for moisture," she said.

"It's important to get the balance and plant numbers right so that you end up with a good productive pasture sward".

The site Ms Lattimore coordinates at Yanco Agricultural Institute – the driest of the six experimental sites – receives an average of 400 mm of rain annually.

District agronomist at Temora, Bob Thompson, believes annual medics will prove to be a very useful companion to lucerne in the western wheat-belt.

"Annual medics reduce the potential for colonisation by problem weeds like capeweed, thistles and spiny emex, while having a high tolerance to herbicides commonly used in newly sown lucerne swards".

"The barrel medics occupy areas where there are few lucerne plants, in particular, the bare areas at gateways and around watering points."

Additional trials at Temora will evaluate the application of herbicides to seedling lucerne, perennial grass and annual medics.

Perennial grass seedlings will be evaluated for their tolerance to herbicides used to control annual ryegrass, wild oats and barley grass.

Mr Thompson said farmers have expressed concerns about the practicalities of adopting perennial grass-based pastures due to the difficulty in controlling these grass weeds.

District agronomist at Albury, Janet Walker said local farmers are particularly interested in looking at alternative options, such as grasses, to put in a mix with lucerne.

"These may give better ground cover over the season and also reduce the livestock health issues associated with a pure lucerne stand," she said.

The Evercrop trial sown at Burrumbuttock will provide data on how the dry matter production and persistence of these mixes compare to a pure lucerne stand.

Many farmers have already sown lucerne in a mix with phalaris or fescue, so the Evercrop data should show if this practice is economically beneficial.

The Lockhart site is located just west of town on a well-drained, red clay soil and was sown in late May into good moisture.

Lockhart agronomist Lisa Castleman believes pastures often contain a number of species, both sown and volunteer, some desirable and some weeds.

"Legumes contribute the nitrogen that in turn drives the grass component of a pasture, however without the most appropriate grass species there is an increased risk of getting undesirable volunteers such as barley grass, brome grass, silver grass and annual ryegrass," she said.

"This trial provides us with research at a local level on both species selection and sowing method."

The project started in 2008 as a collaboration between DPI, CSIRO, the Future Farm Industries CRC and GRDC, and other partners across southern Australia.

For more information contact Geoff Casburn, Wagga Wagga
02 69381630
geoff.casburn@dpi.nsw.gov.au

This article is reprinted from the July Edition of AgToday a NSW Department of Industries publication

RIRDC Rural Women's Award - NSW/ACT

Develop your skills. Make a difference. Inspire others.

The Rural Industries Research & Development Corporation (RIRDC) Rural Women's Award (RWA) has entered its second decade as one of the most successful and enduring leadership and capacity building initiatives in rural Australia.

Since the Award began in 2000, more than 170 women have been recognised in Australia.

The Award identifies and supports emerging leaders and change agents who have the capability and resources to drive innovation, productivity and sustainability within primary industries, and build economic and social development within rural communities.

Award finalists receive financial and practical support to implement their visions for primary industries and enhance their leadership capabilities.

Who can enter?
The Award is open to all women involved in primary industries and natural resource management. No formal qualifications are required.

What is the bursary?
The Award provides a $10,000 bursary for each State and Territory winner to provide the resources to develop your vision into a project or initiative that will benefit primary industries and rural Australia.

Examples of some of the initiatives the Bursary can be used for include:

- formal training in leadership and business management;
- overseas study tours;
- establishing business plans or pilot programs;
- developing education or promotional campaigns;
- networking at forums and conferences to grow your knowledge of industries and markets;
- developing training programs;
- testing information technology initiatives; and
- publishing books.

It's just a matter of using your imagination to dream big about what you want to do and the future direction of your industry or rural community.

Leadership and development opportunities
The winner and runner-up in each State and Territory has the opportunity to complete the Australian Institute of Company Directors Course and will be supported to develop and implement a 12 month leadership plan.

The Company Directors Course is a comprehensive and credible learning program relevant to board directors and business entrepreneurs. The course provides a thorough knowledge of the role and duties of being a board member, and knowledge of organisational performance, strategy development, risk management and financial performance, which are all critical to operating any business enterprise.

The Leadership Plan will provide 12 months of facilitated individual strategic support to enhance your leadership development and help with the implementation of your Award vision, along with networking, media and public relations opportunities.

Enter the Award
Applications for the 2013 Award will open on 1 August and close 15 October 2012.

Rural women are encouraged to give it a go or nominate someone they think is up to a new and exciting challenge.

For an information package and a list of past winners and finalists who have kindly offered to mentor women applying for the Award, contact

Allison Priest on 02 6391 3620 or email: allison.priest@dpi.nsw.gov.au

Information on selection criteria and how to enter are also available at the RIRDC website: www.rirdc.gov.au

Calling all livestock producers of southern Australia

Do you want to have a say in how MLA's invests in future pasture nutrient management research and extension programs?

All livestock producers in the mixed farming and grazing zones of southern Australia are invited to go on-line at www.mla.com.au/phosphorussurvey to participate in a survey that will help guide MLA's major Phosphorus Use Efficiency program.

The survey is part of a 12-month project being led by Helen Burns, based at the Wagga Wagga Agricultural Institute that links NSW DPI with industry bodies and agencies from NSW, Victoria, Tasmania, South Australia and Western Australia.

According to Ms Burns the project follows an MLA-funded review by CSIRO that highlighted the need and opportunities to improve nutrient management in pastures, and particularly to improve recovery of applied phosphorus from the current low rates of 18 – 25%.

"We need input from producers about what is happening on the ground and a good response to the survey will give us a snapshot of current nutrient management practices, the role of soil testing, tools and information sources producers use in their decisions, and also who influences these decisions," said Ms Burns.

"We are reluctant to ask producers to fill in yet another survey, but this is the first extensive survey of its type on pasture nutrient management and provides a cost-effective way of providing a lot of information from a very large group of producers.

"The on-line survey can be accessed throughout July and has been designed so there is no need to search through files for information," she said.

Producers will need to set aside about 30 minutes to fill in the survey and as a gesture of appreciation, those completing the survey will be invited to enter a draw for one of two $500 gift vouchers from a major national retailer.

Contact Helen Burns at Wagga Wagga on (02) 6938 1947 or helen.burns@dpi.nsw.gov.au

Australian Grasslands Association Research Series No 2

PERENNIAL GRASSES in pasture production systems

Canberra, May 15-16 2013

CALL FOR PAPERS

Papers are invited on pasture production systems based on 'perennial' grasses, either temperate or tropical, in the high rainfall pasture zone and the mixed farming zone (medium to low rainfall environments).

Suggested themes are;

1. Pasture persistence – at what cost? (biological, management & economics),
2. Quality and feed value in animal production systems,
3. Developments & innovations in perennial grass breeding and management,
4. Opportunities and roles for perennial grasses in a changing climate.

Papers are invited from authors with expertise and experience within these themes and regions. Papers by producers and the broader industry (including overseas regions) describing there own systems, issues, problems and solutions are also welcome.

Deadline for abstract - August 31 2012

Deadline for receipt of full paper - November 30 2012

When preparing your abstract and full paper please follow the guidelines at www.australiangrasslands.org.au

Email your abstract to, or for more information contact Carol Harris carol.harris@dpi.nsw.gov.au

Grassland Society of Southern Australia Inc

GRASSLAND SOCIETY OF NSW

The Australian Grasslands Association is a partnership between the Grassland Society of Southern Australia and the Grassland Society of NSW

From the President

I begin on a sad note, acknowledging the deaths of two of our long serving members, Haydn Lloyd Davies in April and more recently Drew Wright in May. Our sympathies go to Haydn's and Drew's families.

Haydn and Drew were great supporters of the Society, both serving in executive capacities and instrumental in getting the Society started over 25 years ago. They maintained their support and interest until poor health intervened.

The Society owes much to these two scientists for their foresight, vision and dedication to agriculture as researchers and communicators. In addition, their friendship and good company will long be remembered by many of us who had the good fortune to be associated with them.

Tributes to Haydn and Drew appear in this issue. Many thanks to John Ayres, John Read and Malcolm Campbell for these contributions.

Preparations for our conference to be held in Wagga on July, 24th – 26th are nearing completion with most members having received a registration form. These are also available from our internet site.

The conference program will provide something of interest and inspiration to all attendees. The convenor, Nathan Ferguson, has put in a tremendous effort to attract top speakers on a range of topics that cover soil fertility, grazing management, alternative fertilisers, perennial pasture options and a session on omega – 6 fatty acid effects on lambing gender.

In addition, the ever popular bus tours will give attendees the opportunity to see, first hand, successful and enterprising pasture and crop strategies in the Wagga district.

An interesting extra feature of the conference is a " Q and A " facilitated by Phil Graham, exploring the aspirations of our younger farmers. This promises to be a great opportunity to look ahead with motivated farmers discussing their hopes for a bright future.

I strongly encourage all our members to attend the conference and ask you to invite non member friends and neighbours to come along to see for themselves the benefits of Society membership.

Best wishes,
Mick Duncan

The Grassland Society of NSW Inc is a unique blend of people with a common interest in developing our most important resource - our Grasslands

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
or contact the Secretary at secretary@grasslandnsw.com.au or at PO Box 471 Orange 2800

Office Bearers of the Grassland Society of NSW – 2011-2012

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If you are interested in reactivating an old branch or forming a new branch please contact the Secretary at secretary@grasslandnsw.com.au or by mail at PO Box 471 Orange NSW 2800

Grassland Society of NSW News

New members: The Grassland Society of NSW welcomes new members Barb Chenoweth, Howlong, Sandy Middleton, Holbrook, Justine Baird, Wallaobba and Steve Price, Melbourne.

Next Newsletter: The next issue of the newsletter will be circulated in September. If you wish to submit an article, short item or letter to the editor for the September newsletter please send your contribution to the Editor - Carol Harris at 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 August 31 2012.

Grassland Society of NSW - PO BOX 471 Orange NSW 2800, www.grasslandnsw.com.au

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