GRASSLAND SOCIETY OF NSW INC.

Newsletter

Welcome to the first Grassland Society of NSW newsletter for 2017. Unfortunately we start the year on a sad note with destructive bushfires in many areas of NSW over summer. I recently travelled though part of the area affected by the Sir Ivan fire in the central west of NSW and saw the devastation first hand. Our thoughts and commiserations go out to all those affected.

If you have some time to spare you might consider volunteering for Blaze Aid. BlazeAid is a volunteer-based organisation that works with families and individuals in regional Australia after natural disasters such as fires and floods. Working alongside the rural families, the volunteers help to rebuild fences and other structures that have been damaged or destroyed. Equally important, volunteers also help to lift the spirits of people who are often facing their second or third flood event after years of drought, or devastating losses through bushfires. BlazeAid volunteers work in a disaster-affected area for many months, not only helping individuals and families, but also helping rebuild the local communities. Further information is available at blazeaid.com

2017 is shaping up to be an exciting year for the Grassland Society of NSW. We have already held one Pasture Update at Grafton in February (report on page 3). This will be followed by two in March and one in May (see below for locations and dates). Further Pasture Update events are on the drawing board for later in the year. Plus we have the return of the Society Conference at Cowra in July (refer to page 2). Make sure you keep an eye on our Facebook page and/or our website page www.grasslandnsw.com.au for all the latest news and event notifications.

As always we welcome contributions to the newsletter. Please contact me at

carol.harris@dpi.nsw.gov.au

Carol Harris, Editor

In this newsletter

Pasture Update reports 3

Australian Pastures Genebank 4

Economic and environmental differences between the nitrogen response functions of perennial ryegrass cultivars 5

SEED - the portal for Sharing and Enabling Environmental Data..... 8

Research Update 9

New Forage Value Index for Australia's dairy industry 10

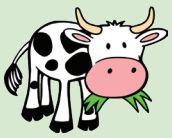
Well deserved award for Hugh Dove 10

From the President 11

Upcoming events

- Glen Innes Pasture Update - March 22
  Glen Innes Agricultural Research & Advisory Station
  Local contact: Kylie Falconer 0427 325 901
- Bega Pasture Update - March 24
  Bega Valley Civic Centre Bega
  Local contact: Wayne Schaefer 0405 159 098
- Tocal Pasture Update - May 18
  Tocal College
  Contact: Janelle Witschi 0408 612 235

For more details and to register go to www.grasslandnsw.com.au



CLAIM THE DATE

GRASSLAND SOCIETY OF NSW INC.

Grassland Society of NSW Biennial Conference

PROGRAM

Day 1 - 25th July

Session 1 - Big picture - Red meat and successful business

Session 2 - Filling the Feed Gap, Flexible Systems

Lunch

Bus Tours - Choice of three, East, South West & North West of Cowra, including beef, sheep, legumes, lucerne

Conference Dinner at Cowra Services Club

Day 2 - 26th July

Session 4 - Opportunities – legumes, natives, nutrition

Session 5 - Technology – EID, Drones, DSE potential

Lunch

Session 6 - Cowra Research Station - what's coming up

Conference Close

Conference Details

When: **25th & 26th July**

Where: **Cowra**

Registration Open:

1st June 2017

Early Bird Registrations close:

30th June 2017

For more information:

Contact: David Harbison

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dragriculture@activ8.net.au

Membership

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Only $60, or $25 for a student.

This gets you quarterly newsletters, conference proceedings and a discounted rate to the annual conference.

www.grasslandnsw.com.au

Pasture Update Reports

Fourty four people attended the Grafton Pasture Update on February 23. This location was a new venture for the Grassland Society of NSW and feedback was positive. It is hoped that this event will be the first of many events in the district.

The day kicked off in morning with a bus trip of the Department of Primary Industries (NSW DPI) Grafton Research station and a two local properties. Highligts of the morning bus tour included;

- Inspecting the "Grazing standing maize" project on the NSW DPI Grafton Research Station. At this stop Todd Andrews (NSW DPI) and Steven Lesson (BGA AgriServices) discussed the agronomy and management of maize. Early indications are that animal performance on the later maturing varieties of maize was good.

Todd Andrews, NSW DPI discussing the argonomy and management of maize at the NSW DPI Grafton Research Station

- Inspection of a tropical grass evaluation experiment with Steve Leeson on a local farm. At this stop the features of new panic grass cultivars – MegaMax 049 & 059 and Mulato II were discussed.

Steve Leeson, BGA AgriServices outlining the features of panic grass cultivars MegaMax 049, 059 and Mulato II to the attendees of the Grafton Pasture Update

- The last stop showcased another tropical - signal grass. At this stop Steve Leeson led a discussion on establishment of signal grass and the effect of soil type, African black beetle and Fusarium.

The afternoon session of the Pasture Update saw more formal presentations from ;

- Justine Cox, NSW DPI – Soil health to support productive pastures
- Dr Tom Davison, MLA – Key MLA pasture R&D investments
- Tom Amey, SAMRC – SAMRC's role in linking producers needs to R&D
- Neil Griffiths, NSWDPI – Beef Growth rates on summer pastures
- Fiona Borello, NCMC – Understanding your own grazing land management (NCMC Grazing BMP project).

The Grassland Society of NSW would like to thank Julie Dart from the North Coast Local Land Services for organising such a successful day in collaboration with BGA AgriSevices and Northern Co-Operative Meat Company Ltd.

Grafton Pasture Update attendees inspecting establishment of signal grass on a local Grafton property

mla
MEAT & LIVESTOCK AUSTRALIA

Where should the next Pasture Update event be?

Have you attended a Grassland Society of NSW Pature Update Event? If not has it simply been there hasn't been one close to you? Or perhaps a full day event or week day event doesn't suit you?

The Grassland Society of NSW state management committee is keen to hear from members on where they would like to see future Pasture Update events plus feedback on the event format and possible topics and field activities would be greatly appreciated.

Email your comments/suggestions to secretary@grasslandnsw.com.au

NSW GOVERNMENT | Department of Primary Industries

Australian Pastures Genebank

The Australian Pastures Genebank (APG) is Australia's first national pasture and forage genetic resource centre. It is the custodian of more than 83,0000 accessions of tropical and temperate pasture and forage genetic resources.

The APG vision is to conserve the diversity of Australia's current and prospective pasture and forage species for use nationally and internationally as the basis for enhanced agricultural productivity and environmental preservation now and forever.

Assured access to genetic resources is critical to help agriculture adapt to the future and would benefit not only primary producers, but also processors, marketers, breeders, education, the environment and regional farming communities.

National mandate
The APG mandate includes all pasture and forage species of actual or potential value to Australian agriculture.
This includes plants intended to be grown for: livestock, crop rotation and the environment.

Objectives and mission
The APG will conserve, maintain and distribute, plant genetic material in the form of seed and associated data of mandate pasture and forage species. Mandate pasture and forage species will be:

- acquired
- documented
- conserved
- maintained
- distributed.

Benefit sharing

The APG will operate under the framework of the International Treaty on Plant Genetic Resources for Food and Agriculture. It will adhere to the rules and standards of its Multilateral System. Accordingly, seeds and associated data will be provided under a Standard Materials Transfer Agreement in accordance with the APG Seed Distribution Policy. More specifically, the APG will make small quantities of mandated germplasm and related information available for food and agricultural:

- scientific research
- plant breeding
- genetic resource conservation or education.

Undertakings
As custodian of Australia's collection of pasture and forage genetic resources the APG has the following national and international responsibilities:

- Operate under the framework of the International Treaty on Plant Genetic Resources for Food and Agriculture.
- Establish mandated germplasm collections to meet foreseeable national breeding requirements.
- Support the introduction, quarantine and biosecurity of mandated germplasm.
- Establish relationships with scientists working on mandated germplasm to facilitate a coordinated introduction and regeneration program.
- Keep interested scientists informed of new accessions to the collection.
- Ensure maximum usefulness of the centre.
- Manage and administer the mandated germplasm in accordance with international Genebank Standards for Plant Genetic Resources for Food and Agriculture, including ensuring material is duplicated off-site as a safety deposit.
- Provide online access to publicly available information of mandated germplasm

Stakeholders
The establishment and operation of the APG is supported by:

- The South Australian Research and Development Institute (SARDI).
- Meat and Livestock Australia.
- Australian Wool Innovation.
- Grains Research and Development Corporation.
- Dairy Australia.
- Rural Industries Research and Development Corporation.
- Department of Primary Industries New South Wales.
- Department of Agriculture and Fisheries Queensland.
- Department of Primary Industries, Parks, Water and Environment Tasmania.
- Tasmanian Institute of Agriculture.
- Department of Environment, Land, Water and Planning Victoria.
- Department of Agriculture and Food Western Australia.
- Seed Services Australia.
- Australian Government Department of Agriculture and Water Resources.

Fun Facts

☘ The APG houses 75 000 accessions collected by Australian scientists which are believed to be unique to the world genebank collection.

☘ A backup of accessions will be deposited into the Global Seed Vault in Svalbard Norway in Febrary 2018.

The APG is managed by the South Australian Research and Development Institute (SARDI) and is located at Adelaide's Waite Campus research precinct.

For more information contact
Mr Steve Hughes, Leader,
Australian Pastures Genebank
Email: steve.hughes@sa.gov.au

APG AUSTRALIAN PASTURES GENEBANK

Ag Innovations

Economic and environmental differences between the nitrogen response functions of perennial ryegrass cultivars

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Abstract: Nitrogen (N) fertiliser is an important input in perennial ryegrass (*Lolium perenne* L.) systems for both economic and environmental reasons. A large body of perennial ryegrass N response data contributes to current recommendations, but owing to when the experiments were completed, the responses were for now outclassed cultivars. Might modern perennial ryegrass have different response functions and as a consequence, different profit maximising N rates and environmental risk profiles? Eight perennial ryegrass cultivars ranging from those which contribute to historical datasets, European and contemporary commercial cultivars to experimental cultivars soon (early 2020's) to be used by farmers were used in this experiment. Each cultivar was tested at 5 N rates; 0, 20, 40, 80 and 160kg N/ha per harvest. A single late spring harvest was analysed from an economic perspective. Old cultivars were found to exhibit a typical diminishing marginal return while the newer cultivars, on average, behaved linearly in the N range examined. New cultivars had a commensurately higher profit optimising N rate. Analysis of a winter harvest demonstrated cultivars vary significantly in their N uptake at all rates including 0 and 160kg N/ha. Given prior work demonstrates N uptake is inversely proportional to N leaching risk, newer cultivars with higher yields in winter may reduce this risk. The data indicates that for producer profits to be maximised, N use recommendations may need updating to reflect contemporary cultivar performance. Collection and analysis of more data is required to determine if cultivar specific responses exist and should be reflected in N use recommendations.

Introduction

Nitrogen (N) use on perennial ryegrass pasture has both economic benefits and environmental consequences. The importance of the benefits of N use is evidenced by the large body of historical research that contributes to current recommendations (Eckard 1999, Gourley *et al*. 2016 and Stott *et al*. 2016) and the volume of nitrogen fertiliser utilised by farmers. The environmental aspects of N use are increasingly well researched. As a company who breed and market improved perennial ryegrass and market and advise on fertilisers (PGG Wrightson Seeds Ltd and Incitec Pivot Fertilisers Ltd respectively), we were intrigued by the possibility that improvements in cultivars of perennial ryegrass may have consequence for both the economic and environmental aspects of N fertiliser use.

The role of N within pasture systems was thoroughly researched and reviewed in the 1990's as part of the Best Management Practices for Nitrogen in Intensive Grazing Systems project (Eckard 1999) which published guidelines suggesting the application of no more than 50kg N/ha per application to maximise economic efficiency, and no more than 200kg N/ha/year to minimise adverse effects on clover.

A more recent review of Australian pasture N response experiments aggregated data into seasonal and regional response functions (Gourley *et al*. 2016), made accessible to farmers via an interactive marginal costs analysis based decision support tool (Stott *et al*. 2016). This is a step forward from old recommendations that list linear responses, albeit recommending ceiling applications of 50-60kg N/ha. While the economics of this approach are sound (diminishing marginal returns and varying pasture price and utilisation) and the analysis is based on a large data set, the overwhelming majority of trials contributing to this decision support tool were completed prior to the 1990's (C Gourley personal communication 2013). As such, the majority of data contributing to industry best practice guidelines can only represent response functions of 'Australian' ecotypes of perennial ryegrass, as these were all that was available in Australia at the time. These 'Australian' ecotypes are in fact naturalised Northern European ryegrasses, examples of which include the ecotypes Victorian and Kangaroo Valley, most often containing standard endophyte (SE). As a result of their European origin 'Australian' ecotypes are winter dormant, with naturalisation to the Australian environment favouring plants which in comparison to modern cultivars (discussed below) could be described as semi-summer dormant, with comparatively poor late spring, summer and autumn growth.

Starting in 1999 with the cultivar (cv.) Impact SE, pasture seed companies began offering Australian farmers ryegrass with germplasm from North West Spain (Stewart 2006) with improved autumn, winter, late spring and summer growth. This type of germplasm now occupies all top positions in cultivar evaluation schemes in environments comparable to Australia's (Dairy NZ 2016).

There is a knowledge gap regarding the N response functions of modern perennial ryegrass cultivars which vary from old cultivars and amongst themselves in seasonal growth potential. From an economic perspective our primary concern is the response function's slope. If breeding has increased this, then farmer may be able to capture additional profits by increasing N applications in some seasons. Inversely, should breeding have decreased the slope of response functions, current recommendations may lead farmers to use too much N. Risk to the environment via leaching of N is strongly negatively correlated with pasture N uptake (Moir 2013). The increased growth of modern cultivars in winter may allow production to be increased via an increased N rate, while risk to the environmental is held constant. If we proceed to advise and regulate N use in the absence of this knowledge, we may unnecessarily constrain productivity as the genetic potential of perennial ryegrass performance improves over time.

If our hypothesis that improvements in perennial ryegrass genetics are of economic and environmental consequence is true, it may be that N use guidelines and N use regulation should take into consideration the cultivar sown.

Methods

The experiment was sown at Leigh Creek, near Ballarat, Victoria (37°33' S, 143°57'E, altitude 575 m, mean annual rainfall of 847 mm). The soil is a deep red Krasnozem weathered in-situ from basalt, select chemical characteristics of soil between 0 and 10 cm below ground level include pH (H2O) 5.3, electrical conductivity (Saturated extract) 1.0 dS/m, Olsen P 37 mg/kg, Colwell potassium 320 mg/kg and sulphate sulphur (KCl40) 7 mg/kg. The trial site was sown to lupins (Lupinus angustifolius) in the autumn of 2013. These and any weeds were sprayed out with glyphosate (1,620 g/ha) in spring 2013, cultivated and the site

chemically fallowed until May 2014 when the trial was sown.

To determine if a change in cultivar response to nitrogen has occurred as a result of breeding, historical and modern perennial ryegrass cultivars with vastly divergent seasonal growth potential were selected. The early maturing diploid ecotype Victorian SE and very early maturing cv. Fitzroy SE (bred from Kangaroo Valley germplasm) were sown to represent historical naturalised Northern European germplasm whose response to N determines current N use recommendations. The European diploid cv. Aberdart AR1 was included to represent material bred in Europe and sold to Australian and New Zealand farmers. The modern diploids cv. Ultra AR1 and cv. One50 AR37 and modern tetraploid cv. Base AR37 were included to represent contemporary Australasian bred cultivars with a range of yield potential (Dairy NZ 2016). To determine the effect of the AR37 novel endophyte at the trial location, Base AR37 seed was incubated following a proprietary procedure to generate an endophyte free line. An elite experimental tetraploid PGWLp AR37 was trialled to represent cultivars producers may have available to them in the near future.

The experiment was a randomised block design with three replicates. Two nitrogen management regimes were implemented. The first regime had all N rates (0, 20, 40, 80 and 160 kgN/ha) applied to all cultivars at every second harvest (to prevent the potential accumulation of N confounding response functions) and the second regime has 20, 40, 80 kgN/ha applied to Base AR37 and ecotype Victorian every harvest. A replicate of Base AR37 was also fertilised with 40 kgN/ha in the form of Green Urea (a urease inhibitor coated urea) and these results will be reported elsewhere. Nitrogen fertiliser was applied post-harvest by hand as pre-weighed amounts of Urea. Periodic basal fertiliser application of a specifically designed blend of nutrients ensured that other nutrients were non-limiting.

Yield was determined by full plot harvest of all forage above 50 mm from ground level and the collection of sub-samples for dry matter determination and nutritive analysis (not reported). Harvests occurred when the most advanced cultivars in the trial were observed to reach the three leaf stage as this has been shown to optimise pasture production (Fulkerson and Donaghy 2001) and nitrogen use efficiency (Rawnsley *et al*. 2014 and Staines *et al.* 2011). Environmental parameters were available from a nearby government weather station (BOM No. 087014) and soil moisture and temperate were logged under select plots using Watermark® soil moisture sensors at 10, 20 and 30 cm depths. Irrigation supplemented rainfall as required. Deep soil N was measured twice per year (10, 20 and 30 cm) under all Victorian SE and Base AR37 plots (not reported).

Spatial variation was accounted for using ASReml (VSN International 2016)) with cultivar/N rate combinations fitted as fixed effects. Response functions were fitted using CurveExpert Professional (Hyams 2016). As at March 2016 there were 11 harvests following an N application. Collection of data is expected to continue until autumn 2017 when approximately 20 harvests and associated N uptake, soil N, nutritive analysis and environmental data will require in-depth analysis from an economic and environmental perspective. Due to constraints of this poster format, only two harvests are discussed here. The economic discussion is framed around a late spring response and the environmental discussion a mid-winter response.

Results and discussion

At all harvests thus far we have identified significant differences between cultivars.

Nitrogen use economics

The 2 December 2015 harvest (after 44 days of regrowth) is utilised in this discussion of economic implications. A range of biologically sensible response functions were found to well model individual cultivar data. A number of cultivars were better modelled by the Hill equation (a dose response [DR] function)

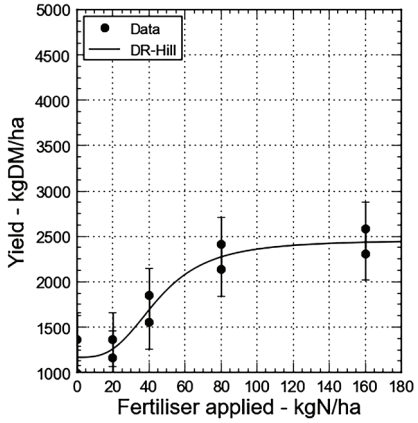

Figure 1. Old cultivar model

than the commonly used Mitscherlich function. The DR-Hill function was better able to account for the lack a response which was often observed between the 0 and 20kg N/ha treatments, which is consistent with reports of unreliable responses at low levels on N input (Eckard 1999). Some newer cultivars demonstrated essentially linear responses at this harvest with no indication of diminishing returns, i.e. PGWLp AR37 (r^2=0.94) Base Nil (r^2=0.88) and Ultra AR1 (r^2=0.96).

Until multiple harvests are available to develop seasonal specific response functions, we will avoid cultivar specific conclusions. We will however compare 'old' cultivars influencing current recommendations (Victorian SE and Fitzroy SE) with 'new' locally bred cultivars (Base AR37, Base Nil, PGWLp AR37, One50 AR37 and Ultra AR1), to determine if profit maximising N rate varies with the type of cultivar.

The Hill-DR model was most appropriate for 'old' cultivars (r^2=0.93) at the 2 December 2015 harvest, realistically capturing the minimal response observed between both 0 and 20kg N/ha and 80 and 160kg DM/ha, see Figure 1. If the price of N is taken to be 140 c/kgN and the value of grown forage 25 c/kgDM, N use should increase so long as the observed response to additional N (the slope of the response function) is greater than 5.6 kgDM/kgN (140 c/kgN / 25 c/kgDM), i.e. so long as the marginal cost of additional feed grown is less than its value. 'Old' cultivars reached this profit maximising point at approximately 82 kgN/ha.

Figure 2 presents a linear regression (r^2=0.92) fitted to all 'new' cultivar data from the 2 December 2015 harvest. Models that could account for a diminishing marginal return were no better fit. The slope of the linear regression was 13.9 kgDM/kgN and there is no evidence of a diminishing marginal return in this aggregated 'new' cultivar data, suggesting the economic optimum of this particular dataset lies beyond 160kg N/ha. To our knowledge, this is the first time two distinctly different nitrogen response functions have been identified in different types of cultivars within the one trial. This suggests the hypothesis of our work may

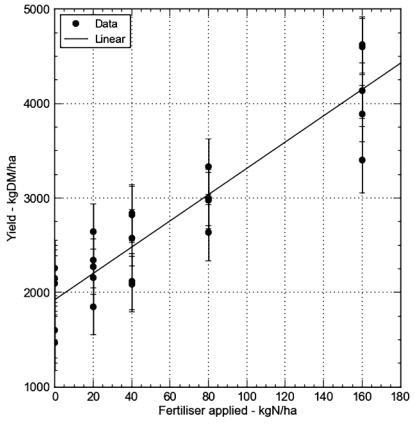

Figure 2. New cultivar model

be correct, and different types of perennial ryegrass do indeed have different N response functions in some seasons.

More data is required to determine if differences at a cultivar level (i.e. between modern cultivars) are significant. A single outlier was identified in the 'new' data (Base AR37, 80kg N/ha and 5,270kg DM/ha) and omitted. This did not materially affect the conclusions drawn, i.e. that the slope of an appropriate response function remained above 5.6 kgDM/kgN at 160kg N/ha.

Environmental perspective

The most relevant harvest thus far from an N leaching perspective occurred on 18 August 2015 after 85 days of regrowth. Figure 3 presents the nitrogen uptake in foliage at 0 and 160kg N/ha. Cultivars differed significantly in their ability to uptake nitrogen through winter, with the highest uptake under both 0 and 160kg N/ha occurring in PGWLp AR37 and the lowest in the European and naturalised northern European cultivars. Even in winter at Ballarat when mineralisation is low, cultivars with poor growth potential

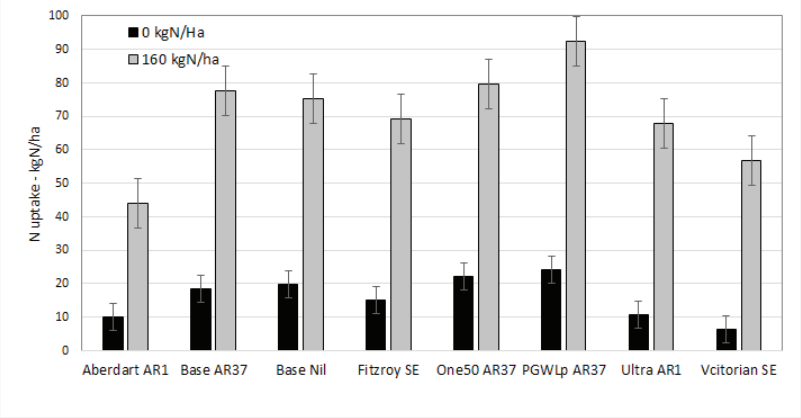

Figure 3. N Uptake, 18 August 2015

were unable to uptake all mineralised nitrogen in their foliage, i.e. they took up less N than PGWLp AR37 at 0 kgN/ha.

Moir (2013) found N uptake of different species was strongly negatively correlated with leaching loss under high N loads (300 and 700 kgN/ha) and suggested that different species posed different leaching risks. We identified variation between cultivars in their ability to uptake N in winter under relatively high N loads (160kg N/ha). As such, leaching risk from urine patches is also likely to vary with the cultivar sown. The challenge then becomes predicting maximum N uptake in an affordable manner. We identified a strong linear correlation (r^2=0.91) between N uptake of cultivars at 160kg N/ha and their growth at 80kg N/ha, which happens to be approximately the N input or Australia's and New Zealand's cultivar evaluation schemes, which aim for full replacement. This relationship may prove useful should regulatory N loss models wish to account for cultivar sown by utilising existing data.

Conclusions

The response of perennial ryegrass pastures to N is of significant economic and environmental consequence. Too little N and producers will fail to maximise profits, too much N and producers also fail to maximise profits whilst increasing the chance of negative externalities. While current N use recommendations are based on sound economics and science, the data used to derive those recommendations was collected on now outclassed cultivars. Current recommendations may therefore inadvertently constrain profitability. We undertook an N response trial testing cultivars that contributed to current N recommendations and contemporary cultivars. At a single late-spring harvest, response functions of older cultivars were best described by a dose response model which explained poor responses at low and high N rates. The response of aggregated modern cultivar data was best described as linear. Profit maximising N rates differed between new and old cultivars. We also demonstrate some but not all newer cultivars take up more N in their foliage during winter. This increase in uptake is explained by increases in winter yield. Further harvests and analysis will be completed to better understand the specific seasonal N response functions of ryegrass types and perhaps even cultivars. We confirm our hypothesis and demonstrate an understanding of differences between cultivar's N response functions may aid profits and better inform efforts to manage environmental risk.

Acknowledgments: We would like to thank: the research staff at PGG Wrightson Seed's Ballarat research facility for assisting with the considerable field work required to complete this trial; the management of IPF and PGW who had the foresight and appetite for risk required to fund this work; and the various experts in state and levy funded organisations who provide us advice on protocols, a sounding board for ideas and encouragement.

References

ASReml. (2015) Hemel Hempstead: VSN International Ltd

CurveExpert Professional. (2016) Madison: Daniel Hyams

Eckard R (1999) Best management practices for nitrogen in intensive pasture production systems. Melbourne: The University of Melbourne and Ellinbank: Natural Resources and Environment.
Dairy NZ. (2016) Forage Value Index. Available at http://www.dairynz.co.nz/feed/pasture-renewal/select-pasture-species/about-fvi/ (Accessed 15 March 2016)

Fulkerson WJ, Donaghy DJ (2001) Plant-soluble carbohydrate reserves and senescence — key criteria for developing an effective grazing management system. *Australian Journal of Experimental Agriculture* **41**, 261-275.

Gourley C, Chia K, Hannah MC, Awty IM (2016) A calibrated model for predicting pasture yield response to nitrogenous fertiliser. Manuscript in preparation.
Moir JL, Edwards GR, Berry LN (2013) Nitrogen uptake and leaching loss of thirteen temperate grass species under high N loading. *Grass and Forage Science* **68**(2), 313-325.

Rawnsley RP, Langworth AD, Pembleton KG, Turner LR, Corkrey R, Donaghy DJ (2014) Quantifying the interactions between grazing interval, grazing intensity, and nitrogen on the yield and growth rate of dryland and irrigated perennial ryegrass. *Crop & Pasture Science* **65**(8), 735-746.

Stott K, Malcolm B, Gourley C (2016). The dairy nitrogen fertiliser advisor- a tool to predict optimal N application rates in grazed dairy pastures. 60th AARES Annual Conference, Canberra, ACT 2-5 February, 2016.

Staines M, Morris R, Casson T, Bolland M, Russell B, Guthridge I, Lucey J, Bennet D (2011) Nitrogen for intensively grazed dairy pastures. Bulletin 4815, Western Australian Department of Agriculture and Food.

Stewart AV (2006) Genetic origins of perennial ryegrass (Lolium perenne) for New Zealand pastures in New Zealand. *In* 'Proceedings of the 13th Australasian Plant Breeding Conference', Christchurch, New Zealand, 18-21 April.

Editors Note: Reprinted with permission. This article first appeared in Proceedings of the Livestock Productivity from Pastures Symposium. Editor C. Harris. Australian Grassland Association Research Series No 3, Armidale 2016 (Australian Grassland Association).

SEED - the portal for Sharing and Enabling Environmental Data

The SEED (Sharing and Enabling Environmental Data) Portal - www.seed.nsw.gov.au was established in December 2016 as a central, easy to use resource where people can access, contribute and share environmental data in NSW.

The portal was a NSW Government initiative in response to community requests for reliable and readily available information about the environment in NSW.

Developed in consultation with the community and industry, SEED is an online resource for everyone, including landowners, researchers, local government, industry and special interest groups.

Initially containing publicly accessible Land, Air and Water data from NSW Government agencies, SEED will grow over time as more and different types of environmental data are added.

Who can use SEED?

SEED is for everyone who wants to:

- learn more about the environment in your local area
- see the data that is being used to make environmental decisions
- manage land and ensure its long term sustainability
- access data for research and advisory purposes
- help protect our environmental and cultural heritage.

How do I use SEED?
With SEED, you can search for environmental data and view it on the built-in map. You can overlay different types of data to gain a more complete picture of environmental conditions in a particular location. SEED also provides resources that assist you to understand the data, and links to the data in various formats should you wish to download it. Information about how to use SEED can be found under the 'Help' link at the top of any page.

Why has SEED been developed?
SEED is an initiative of the NSW Government in response to community requests for reliable and readily accessible information about the environment.

The recommendation to develop SEED initially came from a comprehensive review into coal seam gas (CSG) mining performed by the Office of the NSW Chief Scientist and Engineer, Mary O'Kane.

The community consultation conducted for that review indicated that people wanted the ability to form their own judgements about environmental conditions and impacts – including but not restricted to those related to mining. Further consultation conducted as part of the SEED development indicated a broad requirement for environmental data across the community.

What is different about SEED?
SEED represents a collaborative effort between government agencies to provide environmental data in a single source, rather than separately.
SEED provides a medium to visualise data without requiring scientific expertise or specialist mapping software.

SEED has been the catalyst for applying Creative Commons licensing to many data sources for the first time, for making data accessible in a standard format (through web services), and for improving the Metadata and Data Quality Statements that provide essential background information.
SEED provides a medium for publishing and giving visibility to new environmental data.

How can I contribute to SEED?
SEED is a community resource and needs your feedback to help it grow. Let the SEED team know about any additional types of data you would like to see, new features and functionality and queries about the quality and usefulness of individial datasets. This will assist the team to prioritise new data sources and future development. Your feedback and suggestions for SEED are welcome and can be contributed via the SEED Feedback Page - www.seed.nsw.gov.au/en/EDPHome/Feedback.aspx

WaterNSW

Research Update

Keeping 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.

Soilborne root disease pathogen complexes drive widespread decline of subterranean clover pastures across diverse climatic zones

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Abstract: Subterranean clover (*Trifolium subterraneum* L.) is an important pasture legume in many regions of Australia, and elsewhere. A survey was undertaken in 2014 to define the levels of soilborne disease and associated pathogens in annual subterranean clover pastures across southern Australia. Most of the 202 samples processed had very severe levels of taproot rot disease (disease index 60–80%) and extremely severe lateral root rot disease (disease index 80–100%). A complex of soilborne root pathogens including Aphanomyces trifolii, Phytophthora clandestina, and one or more of Pythium, Rhizoctonia and Fusarium spp. was found responsible for severe pre- and post-emergence damping-off and root disease. This is the first study to highlight the high incidence of A. trifolii across southern Australian pastures and the first to highlight the existence of natural synergistic associations in the field between Rhizoctonia and Pythium spp., Pythium and Fusarium spp., Pythium spp. and A. trifolii, and P. clandestina and A. trifolii. Nodulation was generally poor, mainly only in the 20–40% nodulation index range. There was no relationship between rainfall zone and tap or lateral root disease level, with root disease equally severe in lower (330 mm) and higher (1000 mm) rainfall zones. This dispels the previous belief that severe root disease in subterranean clover is an issue only in higher rainfall zones. Although overall the relationship between tap and lateral root disease was relatively weak, these two root-disease components were strongly positively expressed within each pathogen's presence grouping, providing explanation for variability in this relationship across different field situations where soilborne root disease is a major problem. Most producers underestimated the levels and effect of root disease in their pastures. This study established that tap and lateral root diseases are widespread and severe, having devastating impact on the feed gap during autumn–early winter across southern Australia. Severe root disease was independent of the highly variable complex of soilborne pathogens associated with diseased roots, geographic location and rainfall zone. It is evident that soilborne root diseases are the primary factor responsible for widespread decline in subterranean clover productivity of pastures across southern Australia. Implications for disease management and options for extension are discussed.

Crop and Pasture Science **68**(1) 33-44
http://dx.doi.org/10.1071/CP16098

Summer drought survival and recovery in Microlaena stipoides

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Abstract: *Microlaena stipoides* (microlaena) is an important perennial grass in over 7 million hectares of native pastures in southern Australia and can survive and persist despite severe soil water deficits during summer. Many other pasture species survive similar conditions by relying on summer dormancy, which raises the possibility that microlaena may behave similarly. A field experiment using rainout shelters was conducted on an existing microlaena pasture in north-east Victoria. The experiment was a split-plot design with two watering treatments ('summer storm' or 'summer dry') as main plots and three defoliation treatments (nil, intense defoliation, strategic defoliation) as subplots. The 'summer storm' treatment resulted in the formation of new buds and tillers and increased basal cover from 1% in February to 18% in March. A glasshouse pot experiment examined the recovery of microlaena after different periods of drought and subsequent rewatering. In the pot experiment, microlaena withstood relatively short (up to 30 days) dry periods and then recovered when rewatered. Thus, it appears that microlaena is a persistent, perennial pasture plant that, although it survives very dry summers in Mediterranean areas, is not summer dormant. Microlaena does not exhibit summer dormancy in response to moisture stress and enter a quiescent stage, because normal growth is prevented by the lack of water, but it quickly recommences growth when soil water becomes available. The ability of microlaena to withstand summer soil water deficits and to recruit from seedlings make it a valuable pasture species across drought-prone environments, and this undoubtedly partly explains its very broad adaptation across eastern Australia.

The Rangeland Journal **38**(5) 501-510
http://dx.doi.org/10.1071/RJ16005

New Forage Value Index for Australia's dairy industry

Australian dairy farmers can now make more informed, profitable decisions when choosing the best perennial ryegrass for their farming system and forage needs, following the launch of the Australian Forage Value Index (FVI).

Developed by Dairy Australia, in partnership with Agriculture Victoria, Meat and Livestock Australia and the Australian Seed Federation, the FVI is an independently-analysed, industry-endorsed economic index based on seasonal dry matter production.

Using a simple banding system, the FVI ranks the performance of 20 of Australia's most popular perennial ryegrass varieties relative to the typical climactic conditions within each dairy region, providing farmers with another tool to help lift farm profitability.

Dairy Australia's Group Manager Farm Profit and Capability, Chris Murphy, said there was currently no independent method available to assess the agronomic performance of the myriad of perennial ryegrass cultivars commercially available in Australia, until now.
"With little independent information on the traits and capabilities of these existing cultivars, farmers tend to stick with what they know and have used, which can result in lost production opportunity and reduced incentive to invest in new pasture cultivars," Mr Murphy said.

"The Forage Value Index scores are calculated by multiplying the seasonal yields of each cultivar (as determined by experimental trial data) with the economic value (as determined by case study farms in different dairying regions)."

The economic values for the increased dry matter yields in the trials ranged from $0.15 - $0.37 per kilogram of extra dry matter. Economic values are the change in operating profit for every kilogram of dry matter increase. The economic value varies with the season, for example, pasture grown on farm is worth more in winter than spring.

To be included in the FVI, each cultivar must have seasonal yield data from at least three, three-year trials using strict experimental protocols. All trial data was analysed by an accredited statistician and reviewed by a Technical Advisory Committee to determine its place within the FVI banding scale.

The New Forage Value Index for Australia can be accessed at -

http://www.dairyaustralia.com.au/Pastures-and-Feeding/Pasture/Forage-Value-Index/2017-Forage-Value-Index-Pasture-Tables.aspx

Dairy Australia is the national services body for the Australian dairy industry. The company acts as the collective investment arm of the industry, investing in essential research, development, extension and industry services.

Media enquiries:Felicity Gallagher — Media Manager, Dairy Australia 03 9694 3809 / 0417 540 059 / FGallagher@dairyaustralia.com.au

Well-deserved award for Hugh Dove

Congratulations to Grassland Society of NSW member and former representative on the state committee - Hugh Dove - for his recognition as a Member in the General Division of the order of Australia (AM) in this year's Australia Day Honours list.

The Award recognises Hugh's, 'Significant service to agricultural science as a researcher for 40+ years at CSIRO and as an editor, and to the study of animal nutrition.'

After completing an agricultural science degree, a diploma in education and then a PhD at the University of Melbourne, he joined CSIRO Plant Industry in 1975 and since then, has been involved in studies on the nutrition of grazing animals, principally sheep and cattle. Much of his work has been directed toward obtaining data with which to relate animal performance to pasture conditions, and data on the interaction between pastures and supplements. His work has been mainly with sown pastures but he has also worked extensively on the role of dual-purpose winter crops in grazing systems. In 2007, he was awarded the Research Medal of the Nutrition Society of Australia for services to animal nutrition research.

Other highlights and notable contributions to the livestock industries throughout his career include;

- Member of the Animal Ethics Committee - 1987–1996 and 2001–2011.
- Co-editor, (recent revisions) of the ruminant feeding standards in both the USA and Australia.
- Australian Institute of Agricultural Science and Technology – Fellow of the Institute and President, of the ACT and Southern NSW Branch - 2006–2010.
- Australian Society of Animal Production – Fellow.
- The Grassland Society of NSW – Member and State Management Committee member- 2003-2104.
- The Nutrition Society of Australia - Foundation Member, since 1976. Public Officer, until 2015. Elected Honorary Member, 2006. National Secretary, 1987-1990. Nutrition Society of Australia (Australian Capital Territory Group). Hugh held positions as Chairman, Honorary Secretary or Honorary Treasurer at various times, 1976-2004.
- Contributed as a member, or on organising or advisory committees of several international conferences including the series of International Symposia on Herbivore Nutrition, and for Australian Society of Animal Production, 1975-2011.
- Editor, 'Grass and Forage Science', British Grassland Society and the European Grassland Federation, 2010-2016.
- On the Editorial Board of the Journal of the Science of Food and Agriculture, 1983-2013 and Open Food Science Journal, 2007-2009.

On behalf of the Grassland Society of NSW members - well done Hugh not only on receiving the Australia Day honours, but also on your very successful and distinguished career.

From the President

Welcome to 2017, where sadly, many parts of the state have experienced severe bush fires of recent weeks, and all our thoughts go out to those that have been impacted. Stories of volunteers losing their own homes while helping others just isn't fair. We are a strong bunch in the bush, and we will need to be even stronger to help the many doing it extremely tough in such times. Please make the effort to call, visit or offer to help in any way, your own family and friends in need at this time.

On the pasture scene, the big wet of the latter half of 2016 has literally evaporated in early 2017. I am informed that small areas of the state are lucky and have green grass, while most of the state is now tinder dry. Dry feed is vanishing quickly, but fortunately the beef and sheep market prices are still holding up. I did hear this morning that the heat and dry is bringing bigger numbers to the selling centres and prices slipped a little this week. Hopefully autumn arrives soon and we see restocker demand continue.

I reread my February 2016 commentary about the weather ahead and found this – "a few models are now predicting an average or even slightly wetter 2016". In hindsight it would have been nice to know the definition of 'slightly'!! Forecasts aside, I would happily accept another 2016, with only 4" in September please.

The 30th conference of the Grassland Society of NSW Inc will be held at Cowra this year. July 25th and 26th are the dates, with the AGM on the Monday evening (24th). Please flag these dates in your diary. The committee is putting a great program together, around the theme "Your System – Taking it to the next level". We look forward to welcoming you to Cowra.

The 'Pasture Updates' continue to be a great initiative and success. There has already been one update at Grafton this year, and dates for future updates are Glen Innes on March 22nd, Bega on March 24th and Tocal on May 18th. Plans for updates in the central tablelands and the south will follow in spring. Please keep an eye on the society web site for the dates and locations of the 2017 Pasture Updates.

All the best, and I hope you can get to a Pasture Update near you in 2017, and /or the conference in Cowra in July.

Regards,

David Harbison,

President.

Have you forgotten to pay your 2016–17 Membership subs?

No problem - paying your subs is easier than ever.

Go to www.grasslandnsw.com.au and access the payment page via the green "JOIN NOW' button. Payments are processed through PayPal, but you don't need a PayPal account - simply choose the option to "Pay with a credit or debit card" which is below the login area on the PayPal page.

Don't forget to add your name to the comments box so we know you have paid.

NEW MEMBERS

The Grassland Society of NSW welcomes new members

Lisa Castleman - Wagga Wagga
Phillip Arnold - Balgownah Heights
Ian and Brenda McColl - Barraba
Anthony Christian - Tamworth
Valli Davidson - Curlewis
Anthea Bourne - Bathampton

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 approximately 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 – 2016-2017

State Executive

David Harbison (President)
Keith Garlick (Vice President)
Janelle Witschi (Secretary)
Frank McRae (Treasurer)
Mick Duncan (Immediate Past President)
Carol Harris (Editor)

Committee: Helen Burns, John Coughlan, Clare Edwards, Nathan Ferguson, John Ive, Lester McCormick and Luke Pope.

Branch Representatives

Lester McCormick (North West Slopes)
John Coughlan (Central)
John Ive (Southern Tablelands)
Mick Duncan (Northern Tablelands)
David Harbison (Central West Slopes and Plains)
Nathan Ferguson & Helen Burns (South Western Slopes & Riverina)

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 Snippets

Next Newsletter: The next edition of the newsletter will be circulated in June 2017. If you wish to submit an article, short item, a letter to the Editor or a photo please send your contribution to the Editor - Carol Harris at carol.harris@dpi.nsw.gov.au or DPI NSW 444 Strathbogie Road Glen Innes 2370. The deadline for submissions for the next newsletter is May 26 2017.

Electronic newsletter: Don't forget you can receive the Grassland Society of NSW newsletter electronically. Just email your details to Janelle (secretary@grasslandnsw.com.au) and you will be added to the list. Next newsletter you will receive an email notification with a link to the newsletter on the website.

Fan of Facebook - make sure you check out the Grassland Society of NSW Facebook page. You can either search for GrasslandNSW or access the Facebook page through our web site. Pasture Update details will be posted on the Facebook page as well as the website. Please feel free to Like Us, as well as post photos of pasture and/or related topics in your area.

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

This publication is prepared by the Grassland Society of NSW Inc and printed by GK Craig Printers, Orange on recycled paper