



# GRASSLAND SOCIETY OF NSW INC.

## Newsletter

Hello everyone and welcome to the first Grassland Society of NSW (GS NSW) newsletter for 2018.

The Pasture Update events continue to be popular with two activities already held in 2018 - the first at Moree (February 15) and the second at Grong Grong (March 20). A report from the Moree event can be found on page 2.

Details of future Pasture Update events will be posted on the website and our Facebook page when available.

The GS NSW committee are always on the hunt for a new location (region) for a Pasture Update or a topic that needs to be covered at an event - please don't hesitate to contact the Secretary ([secretary@grasslandnsw.com.au](mailto:secretary@grasslandnsw.com.au)) or a committee member with your suggestions.

Looking after yourself, your family, workers and visitors to your farm is essential for a happy and healthy farm. A summary of a report on hospitalisations as a result of farm injuries for the period 2010–11 to 2014–15 on page 6 makes for some sombre, but important reading. Want to know more about farm safety - there is a wealth of information available online to help you manage this critical aspect of farm life - check out <http://www.safework.nsw.gov.au/health-and-safety/industry-safety/farming> and <https://www.farmsafe.org.au/>

With many areas of the state experiencing dry conditions the shadow of drought is on many peoples minds. Articles on pages 4 and 5 outline how new technology is being used to provide faster and more detailed seasonal variability information which will enable producers to make better-informed

farm and stock management decisions.

In this issue of the newsletter we also start a series of articles that will continue over the course of the year, exploring the establishment of temperate perennial pastures. The series starts by looking at the factors to consider before sowing a pasture (page 8) and budgeting requirements for a new pasture (page 9).

As always I am keen to receive articles, letters to the editor and photos for the newsletter. Please email any contributions to [carol.harris@dpi.nsw.gov.au](mailto:harris@dpi.nsw.gov.au) by May 25.

I hope you enjoy the newsletter,

Carol Harris,  
Editor



The Grassland Society of NSW now holds biennial conferences rather than annual conferences.

Therefore the next conference will be held in 2019. If you have a suggestion regarding location, topics or speakers for the 2019 conference please contact the Grassland Society of NSW Secretary at [secretary@grasslandnsw.com.au](mailto:secretary@grasslandnsw.com.au)

In the meantime keep an eye on the website or Facebook page for notifications of a Pasture Update Event near you in 2018.

[www.grasslandnsw.com.au](http://www.grasslandnsw.com.au)

<https://www.facebook.com/GrasslandNSW-252973384729003/>

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## Moree Pasture Update report

The first Grassland Society of NSW Pasture Update for 2018 held at Moree in North West NSW kicked off with an early morning bus tour to "Weebollabolla" owned by Sandy Munro. Diligence to weed control, species selection, stubble cover and sowing depth were keys to "Weebollabolla's" tropical pasture success in 2017 and has boosted their confidence to undertake another 120 ha later in 2018.

Mr. Ross Becker, Livestock Manager, detailed to the field tour delegates, the attention to detail and planning that is needed for success in establishing tropical grasses growing on the "Dunroy" block.

The paddock had 4 years of an oat crop for grazing and in the last year the oat crop was sprayed out. A stubble height of 25- 30 cm high was maintained which allowed the conservation of moisture (reduced evaporation) and protection of the soil surface. The tropical pasture was a mix of 25% of MegaMax 059 green panic, 50% Premier digit and 25% Creeping bluegrass sown at 7.5 kg/ha. The Bambatsi panic in the paddock was a legacy of earlier pasture improvement programs.

Mr. Becker said with the disc sowing machinery he used, the small grass seeds could be placed just under the soil surface with some seed dropped on top. The bus tour looked at an area in the paddock that was a grey clay, where the pasture had not established as well as further into the paddock on self-mulching black soil. The second area had grown more stubble and retained it, providing more protection to the establishing tropical grasses.

Mr. Becker said the paddock would not be grazed until after seed set, as he was attempting to get the Premier digit grass to thicken up as it did not establish as well as the MegaMax 059 and creeping bluegrass.

The next stop was a stock route just east of Moree, to view a trial to control Mimosa bush (*Vachellia farnesiana*) funded by North West Local Land Services (LLS) and Dow AgroSciences conducted by B & W Rural and the Gwydir Valley Irrigators Association. The trial plots were either sprayed or slashed or mulched and then sprayed. There does not appear to be any clear improvement in control with the mechanical treatments. Initial assessments showed good responses to a range

of herbicides, but the second assessment recorded regrowth in most plots indicating follow up treatments would be required. The trial continues and is available for follow up inspections.

Delegates returned to the Moree Services Club to hear from a range of speakers. Cameron Allan Program Manager - Sustainable Feedbase Resources from Meat and Livestock Australia (MLA) detailed the feedbase R&D MLA were involved with, what had been achieved in the program thus far and future direction. Details were provided around research into phosphorus efficiency, tropical pastures to address the summer autumn winter feed gaps and annual legumes improving late summer autumn feed.

Senior Research Scientist from NSW Department of Primary Industries (NSW DPI), Suzanne Boschma, detailed the results on a completed MLA project that included tropical legumes. Tropical grasses need nitrogen, to be productive and persistent with nitrogen and rainfall, tropical grasses produce 100 kg DM/ha/day, with only rainfall and nil nitrogen 35 kg DM/ha/d and with nil nitrogen and nil rainfall less than 10 kg DM/ha/d. Desmanthus a non-bloating legume was shown to be a valuable legume as a companion with tropical grasses. The 2 commercial lines of desmanthus Marc and Progardes were similar in performance. The cultivar Progardes is

a mix of 5 desmanthus types and NSW DPI was given the opportunity to assess the individual lines with JCU2 performing particularly well in northern inland NSW.

Leucaena had also been researched at Tamworth and other field sites, while demonstrating adaptability to northern NSW it is not recommended because it also produces prolific amounts of seed and therefore it has weed potential. There is a breeding program funded by MLA and led by the Department of Primary Industries and Regional Development (formerly DAFWA) out of Western Australia, to breed a sterile line of Leucaena.

Research results on water dynamics under pasture combinations was presented by Sean Murphy, Senior Research Scientist from NSW DPI. The objective of our pasture systems is to meet livestock intake requirements by growing pasture species that efficiently use our soil water and that are suited to our summer dominant and variable rainfall pattern, Dr. Murphy said.

Do plants in a pasture mixture share water? Not all the time - it depends on which plants has the first dibs on water - that is who grows first in the growing season. Where lucerne and digit grass were planted together, the lucerne has first crack at water, so dominates the mixture. Digit grass and desmanthus are equal users because they grow at similar



Kate Pearse NW LLS, Peter Birch B & W Rural and Cameron Allan MLA, inspecting the growth of MegaMax 059 at Weebollabolla Moree at the Pasture Update field tour. Photo: Lester McCormick.





Ross Becker (insert) Livestock Manager Weebollabolla describes the establishment of tropical grasses to delegates on the Moree Pasture Update field tour. Photos: Lester McCormick.

times. *Leucaena*, is the last to draw water so herbage production is suppressed by other pasture species.

Legumes for pasture systems was addressed by NSW DPI Research Scientist, Carol Harris. Legumes are the rock stars in the pasture system and are the cheapest way of getting the nitrogen needed to grow grass. The rule of thumb is for 1 tonne of legume dry matter produced 22 – 25 kg of nitrogen is produced.

Ms Harris did not address individual varieties but talked about the different legume classes available, their attributes and how they may be utilised. The role of hardseeded legumes and their importance in our environment was also discussed. Hard seededness is a dormancy mechanism as the seed coat is impervious to water. This mechanism delays germination and protects the legume population from run down in false starts. It is desirable to have a range of seed maturities in the soil seed bank as some seed is then able to

germinate each year as opposed to the boom and bust seasons most producers have experienced with some temperate annual legumes such as arrowleaf clover.

There have been tremendous gains in animal genetics in the last 30 years, but have pastures been able to keep up with the animals feed and nutritional requirements asked Hutton Oddy, Senior Principal Research Scientist with NSW DPI. Animal feed needs have gone up, that is cows have gotten bigger and growth rates have increased for young stock therefore they eat more. On average intake has increased 0.9 kg/hd/d and 0.7 kg/hd/d for cows and young stock respectively. Pasture growth and feed management have not kept up and this could be climate. To manage this lack of feed optimal stocking rates optimal stocking rates are lower, but production is still maintained said Dr. Oddy.

Tropical grasses are extremely responsive to nitrogen, but we do not

fully understand their requirements for phosphate and sulphur. The last speaker of the day Bill Manning, Mixed Farming Officer, North West LLS detailed some trial work being undertaken in the Horton Valley. The initial results in this dry year (2017-18) indicate a small response to phosphorus, but it is early days and further results will be presented at future events.

The Moree Pasture Update was held on February 15 and the Grassland Society was very grateful to the 37 delegates who attended as well as the support of the North West Local Land Services to hold this our first Pasture Update in Moree and thanked Kate Pearse, Mixed Farming Officer, with North West LLS for her hard work in pulling it together.

The Grassland Society also thanked MLA for the funding they receive to conduct 5 Pasture Updates across the state and keep the latest research and adaptation of science in front of producers.

## Livestock Productivity Program Expanded

A major collaborative research partnership aimed at lifting the productivity of Australia's livestock industry has been expanded – with the potential for up to \$50 million worth of projects over the next five years.

The Livestock Productivity Partnership (LPP) was initially announced in February 2017 between MLA Donor Company (MDC) and NSW Department of Primary Industries (NSW DPI) and featured a \$17.5 million commitment from NSW DPI over five years, to be matched through MDC, for research projects that address key red meat and livestock priorities.

The LPP has now been expanded with the addition of research partners the University of New England (UNE) and CSIRO, with the potential for more partners to join.

The MDC Board recently approved the LPP Strategic Plan as well as co-investment for the partnership of up to \$50 million over five years, with 50% of funds coming via MDC.

The LPP aims to develop and demonstrate, by 2022, region- and system-specific feedbase options, new animal phenotyping and farm management tools with quantified potential to reduce the cost of production (\$/kg liveweight) in commercial grazing enterprises in the improved pasture

regions of NSW and southern/central Queensland by at least 5% in real terms. MDC CEO Dr Christine Pitt said \$6.5 million had been committed to commence the first set of LPP projects.

“The LPP will provide a vibrant, collaborative environment that will leverage the expertise, reach and depth of the partners to advance research to improve productivity for the red meat industry. It will also foster early career researchers and help build long-term capacity for the industry,” Dr Pitt said.

“LPP will focus on research that addresses key industry challenges and the early development of viable commercialisation and adoption models.

“This collaborative model of engagement with universities, other research providers and state departments is a key focus for MDC and we'd like to encourage more of these types of partnerships.”

Dr Pitt said the LPP would complement and extend MLA industry-funded investments in livestock productivity R,D&A, without duplicating the work being undertaken in those projects and is closely aligned to the Meat Industry Strategic Plan 2020 and R&D priorities identified by the Southern Australia Meat Research Council (SAMRC) and North Australia Beef Research Council (NABRC).

NSW DPI Director General Scott Hansen welcomed the additional partners to the LPP while reaffirming NSW DPI's commitment over five years.

“This is a pivotal investment that will boost the sheep and cattle industries, which have been key contributors to the record-breaking returns for the primary industry sector in 2016-17,” Mr Hansen said.

“Sustaining these returns over a long period benefits not only producers, but people working throughout the processing chains and in local regional communities.”

The LPP Management Committee has now been formed to steer the partnership and an interim program leader, Dr Ian Johnson, appointed. A search has commenced for a full-time coordinator.

The committee said benefits will arise from the LPP through the sharing of skills, infrastructure, assets and research data. “The alignment of expertise, data and resources provides an ideal springboard for accelerated research, development and adoption, and has the potential to bring transformational change to the industry,” the committee representatives said.

## New drought indicator safe-guarding farmers

The NSW Government has unveiled new technology that will allow faster and more detailed seasonal conditions information enabling our farmers to make better-informed farm and stock management decisions.

Minister for Primary Industries, Niall Blair said the new Enhanced Drought Indicator System (EDIS) draws on the latest remote sensing, satellite and climate data to provide a more detailed assessment of seasonal conditions. “We want our farmers to be as informed as possible when challenging times hit. Making the right decision early, based on solid information, is key to minimising the potentially crippling effects of drought,” Mr Blair said.

“This technology allows farmers to have more power and more certainty when

making those on farm decisions.” EDIS is powered by a new machine-learning platform, built by NSW DPI scientists, which combines many types of data gathered in overlapping timeframes to provide a more accurate picture of seasonal trends.

EDIS is the backbone of the NSW Government's new State Seasonal Update (SSU), released in prototype today, which replaces the previous seasonal conditions reports with a more detailed analysis of conditions across the State.

Mr Blair said the new report will include a drought indicator, powered by EDIS, which signals deteriorating conditions earlier than previously possible, giving farmers and regional communities more lead time to prepare.

“EDIS will become even more detailed next month with the release of a new app to allow farmers to record and share information about conditions on individual properties,” Mr Blair said.

“The app will, for the first time, allow farming communities and agronomists to ground-truth the state data. That information will automatically sync with EDIS, providing the most up-to-date information we have ever been able to circulate.”

More information on the EDIS is available at <https://edis.dpi.nsw.gov.au>

The monthly reports on seasonal conditions are available at <https://www.dpi.nsw.gov.au/climate-and-emergencies/droughthub/information-and-resources/seasonal-conditions>

# Understanding combined drought indicator phases

Seasonal variability is tracked through five phases based on percentile thresholds calculated from historic rainfall, soil moisture and plant growth information, as well as the trend in rainfall conditions. Primary producers can use this information to prepare for changing conditions, and to operate effectively in current conditions.

The CDI comprises of four indicators:

- Rainfall Index (RI)
- Soil Water Index (SWI)
- Plant Growth Index (PGI)
- Drought Direction Index (DDI)

The movement of seasonal conditions through the five phases is based on the thresholds detailed in Table 1. These thresholds can be used by primary producers to plan their drought management accordingly.

Briefly the phases can be defined as;

**Non drought phase:** At-least one indicator is above the 50th percentile.

**Recovering phase:** Drying trend and at least one indicator below the 50th percentile.

**Watch phase:** At-least one indicator is between the 5th and 30th percentile.

**Drought Onset:** At-least one indicator is below the 5th percentile.

**Drought phase:** All indicators are below the 5th percentile.



For more information go to <https://edis.dpi.nsw.gov.au>

To prepare and manage for drought go to <https://www.dpi.nsw.gov.au/climate-and-emergencies/droughthub>

Table 1. Description, definition and suggested producer response to the five phases of seasonal variability

Phase	Description	Definition	Farmer Response
Non-drought	Rainfall deficits are non limiting to production. Economic yields have been achieved in 1 season & prospects are good for coming season.	RI is above the 50% threshold or SWI is above the 50% threshold or PGI is above the 50% threshold.	Prepare for dry periods. Mange risks spread investments, long-term planning. Build fodder reserves. Build financial reserves. Invest in water infrastructure. Update plant & equipment. Expand into more property. Change enterprise.
Watch	Conditions have deteriorated, but are not at critical levels yet. This may be driven by a mild rainfall deficit, or tight production conditions given the effectiveness of climatic conditions for production	RI is between 10% and 30% thresholds or SWI is between 10% and 30% thresholds or PGI is between 10% and 30% thresholds.	Update plans, monitor and wait. Arrange necessary finance planning. Undertake short term trading and agistment. Talk to other farmers and network. Engage with support workers and advisors about management decisions.
Drought onset	Conditions have further deteriorated and an area is under acute meteorological, hydrological or agronomic stress.	RI is below the 5% threshold or SWI is below the 5% threshold or PGI is below the 5% threshold.	Sell surplus stock. Manage crop inputs. Assess fodder reserves. Assess fodder costs. Fine tune drought plan. Monitor conditions and forecasts.
Drought	Conditions have further deteriorated and an area is under acute meteorological, hydrological and agronomic stress.	RI is below the 5% threshold and SWI is below the 5% threshold and PGI is below the 5% threshold.	Destock. Retain breeders stock if possible. Hand feed core breeders. Cart water. Use Farm Management Deposits. Organise bank debt mediation. Engage with support services. Undertake fire risk planning.
Recovering	Falls of rain have occurred over a production cycle. Soil moisture is available. Production is underway, but not realised in economic yields.	RI is between 30% and 50% thresholds or SWI is between 30% and 50% thresholds or PGI is between 30% and 50% thresholds. DDI is positive.	Plan, rebuild and expand. Restock, increase breeding, restructure herd. Undertake fodder, pasture and grain cropping including opportunity cropping. Strengthen and expand water storage. Fire risk planning



Department of  
Primary Industries



## How many farm injuries result in hospitalisation?

For those living and working on a farm there are a range of dangers and hazards they can encounter. These hazards include exposure to vehicles such as off-road motorcycles, all-terrain vehicles such as quad bikes, and agricultural vehicles such as tractors and harvesters. Even standard vehicles can pose a greater risk to their occupants when used on unsealed and poorly maintained roads. There is also a higher risk of contact with large farm animals, such as cattle, as well as falls from or contact with horses. Unfenced dams, ponds and rivers present a risk of drowning for children. Unfortunately each year there are a number of accidents that can result in people being hospitalised or fatalities.

A report by the Australian Institute of Health and Welfare published in 2018 provides an analysis of people hospitalised in the period from 2010–11 to 2014–15 as a result of an injury sustained in a farm setting. The Australian Institute of Health and Welfare is a major national agency whose purpose is to create authoritative and accessible information and statistics that inform decisions and improve the health and welfare of all Australians.

The report delivers some sobering numbers with almost 22,000 people hospitalised in the period from 2010–11 to 2014–15 as a result of injury which occurred on a farm; over three-quarters (77%) of them were males. The number of hospitalisations was highest in the 20–24 year age group for both males and females. Just over 9% (2,006) of those hospitalised due to farm-related injury were children aged 0–14. Seventy one per cent (15,693) of people hospitalised as a result of farm-related injuries lived in inner regional or outer regional remoteness zones.

### Children aged 0–14

Injuries involving motorcycles and quad bikes were prominent in children aged 0–14, accounting for nearly 42% (836) of farm-related hospitalisations in this age group. Boys accounted for over 87% of hospitalisations involving motorcycles and 66% of hospitalisations involving quad bikes. Around four-fifths of injuries involving motorcycles were sustained by the rider, while for quad bikes, 69% of injuries were sustained by the driver. Injuries involving horses were also common in children aged 0–14, resulting in 16% (321) of hospitalisations in this age group. Girls comprised almost 80% of those injured while riding a horse and 57% of those injured as a result of being bitten or crushed by a horse. Other mechanisms of injury leading to hospitalisation in this age group involved other forms of transport (8%), contact with other animals and plants (7%), fall-related injury (7%) and contact with machinery (6%).

### People aged 15 and over

Injuries involving motorcycles and quad bikes were also prominent among people aged 15 and older, accounting for 21% (4,202) of hospitalisations in this age group. Males accounted for over 90% of hospitalisations involving motorcycles and 80% of hospitalisations involving quad bikes. Around four-fifths of injuries involving motorcycles were sustained by the rider, while for quad bikes, almost 90% of injuries were sustained by the driver.

Other common mechanisms of injury leading to hospitalisation in people aged 15 and over involved horses (12%), contact with other animals and plants (15%), contact with machinery (13%) and fall-related injury (10%).

For males hospitalised as a result of a farm-related injury, almost 51% were working for income and a further 9% were engaged in other types of work at the time the injury was sustained. The equivalent percentages for females were 33% and 10%, respectively. These figures may be an underestimate of the true number of people who were working for income due to the significant proportion of cases (33%) for which activity at the time of injury was not specified.

### Age and sex

As stated before just over three-quarters (77%) of people hospitalised as a result of farm-related injuries were males. Hospitalisations for males were higher than for females across all age groups. The number of hospitalisations was highest in the 20–24 year age group for both males and females. Fifty-six hospitalisations ended in death while in hospital, nearly all in people aged 15 and older. The number of males hospitalised as a result of farm-related injuries rose from 3,092 in 2010–11 to 3,451 in 2011–12 and remained relatively steady to 2014–15. The number of hospitalisations for females fluctuated to some degree, but showed no apparent trend over time.

### Nature of injury

Fractures were the principal type of farm-related injury in close to 40% of hospitalisations in both children aged 0–14 and people aged 15 and over. Injuries involving open wounds were also common, being the principal cause of hospitalisation in 19% of children aged 0–14 and 17% of people aged 15 and over.

For more information and the full report go to <https://www.aihw.gov.au/getmedia/279bb48f-d2fe-47b9-823c-63cdb2a1a3cf/aihw-injcat-189.pdf.aspx?inline=true>

### Grassland Society of NSW TRAVEL GRANTS

Travel grants are open to financial members of the Society with at least two years of continuous membership prior to the date of application. Funding is available to attend conferences, symposiums or other activities and events associated with grassland science.

More details can be found on the membership tab of the Grassland Society of NSW website [www.grasslandnsw.com.au](http://www.grasslandnsw.com.au) - or by contacting the Secretary ([secretary@grasslandnsw.com.au](mailto:secretary@grasslandnsw.com.au))



## NSW seeds in doomsday vault

Late at night, Australian time, on February 28 pasture and grain seeds from NSW were sealed in Svalbard Global Seed Vault (SGSV) in Norway, as part of a worldwide project to safeguard our future.

NSW Department of Primary Industries (DPI) pasture systems director, Mark Evans, said seeds originally from NSW DPI collections at Wagga Wagga, Glen Innes, Grafton and Tamworth are now part of the doomsday seed collection.

“Pasture seed of 956 species from the NSW DPI collection are sealed in the vault and an iconic grass species, phalaris, was included in the SGVS 10-year anniversary celebration ceremony” Mr Evans said.

“Phalaris was chosen to represent NSW, as it was selected for improvement here 100 years ago and has become one of the most widely grown temperate perennial grass species in NSW.”

Grain seeds from 1260 Australian bread wheats from the NSW DPI Australia Winter Cereals Collection (AWCC) in Tamworth and representing the history of early wheat varieties bred in Australia, were also deposited in the SGSV.

Other significant seeds from NSW DPI now in the SGSV are native Australian Glycine species, unique to our environment.

Mr Evans said glycine species were selected due to their strong potential for application in local grazing industries, now and into the future, and their environmental significance.

“Temperate and tropical pasture legumes, including commercial white clover cultivars - the main legume driving livestock production in NSW’s high rainfall zone were part of our contribution,” he said.

Australia's involvement with the SGSV began in 2014 when a delegation travelled to Svalbard and deposited 1500 oat genotypes from the AWCC.

A new national approach means NSW DPI seed collections are currently curated by the Australian Grains Genebank (AGG) and Australian

Pastures Genebank (APG), and their representatives delivered the seed to Norway.

Carefully selected seeds stored in the SGSV give future generations the ability to draw upon a vast array of genetic variability within major crops, which may offer potential food source solutions to possible and unknown extreme climatic and environmental conditions.

For more information on the Australian Pastures Genebank go to [http://www.pir.sa.gov.au/research/australian\\_pastures\\_genebank](http://www.pir.sa.gov.au/research/australian_pastures_genebank)

For more information on the Australian Grains Genebank go to <http://www.seedpartnership.org.au/associates/agg>



## 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.*

### Use of sensor-determined behaviours to develop algorithms for pasture intake by individual grazing cattle

P. L. Greenwood\*, D. R. Paull, J. McNally, T. Kalinowski, D. Ebert, B. Little, D. V. Smith, A. Rahman, P. Valencia, A. B. Ingham and G. J. Bishop-Hurley

\* Corresponding author. Email: [paul.greenwood@dpi.nsw.gov.au](mailto:paul.greenwood@dpi.nsw.gov.au)

**Abstract:** Practical and reliable measurement of pasture intake by individual animals will enable improved precision in livestock and pasture management, provide input data for prediction and simulation models, and allow animals to be ranked on grazing efficiency for genetic improvement. In this study, we assessed whether pasture intake of individual grazing cattle could be estimated from time spent exhibiting behaviours as determined from data generated by on-animal sensor devices. Variation in pasture intake was created by providing Angus steers ( $n = 10$ , mean  $\pm$  s.d. liveweight  $650 \pm 77$  kg) with

differing amounts of concentrate supplementation during grazing within individual ryegrass plots ( $\leq 0.22$  ha). Pasture dry matter intake (DMI) for the steers was estimated from the slope (kg DM day<sup>-1</sup>) of the regression of total pasture DM per plot on intake over an 11-day period. Pasture DM in each plot, commencing with  $\leq 2$  t DM ha<sup>-1</sup>, was determined by using repeatedly calibrated pasture height and electronic rising plate meters. The amounts of time spent grazing, ruminating, walking and resting were determined for the 10 steers by using data from collar-mounted, inertial measurement units and a previously developed, highly accurate, behaviour classification model. An initial pasture intake algorithm was established for time spent grazing: pasture DMI (kg day<sup>-1</sup>) =  $-4.13 + 2.325 \times$  hours spent grazing ( $P = 0.010$ ,  $r^2 = 0.53$ ,  $RSD = 1.65$  kg DM day<sup>-1</sup>). Intake algorithms require further development, validation and refinement under varying pasture conditions by using sensor devices to determine specific pasture intake behaviours coupled with established methods for measuring pasture characteristics and grazing intake and selectivity. Quantifying the interactions between defoliation

interval, defoliation intensity and nitrogen fertiliser application on the nutritive value of rainfed and irrigated perennial ryegrass

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*This paper is from a Special Edition of Crop and Pasture Science comprising of papers from The third Australian Grassland Association symposium “Livestock Productivity from Pastures” recognising the vital role that pasture, and grassland have in grazing-based livestock production systems. Key reports from the symposium held at the University of New England in 2016 are presented in this special issue and present new information on seasonal variability, grazing management, the impact of extreme weather and technological advances at the pasture-livestock interface.*

# Factors to consider before sowing a temperate pasture

*Editors Note: This article and "Pasture establishment budgets" on page 9 have been modified from the Temperate perennial pasture establishment guide - steps to ensure success published by the NSW Department of Primary Industries.*

*The high cost associated with sowing permanent pastures means that establishment must be successful. This manual focuses on the main factors that must be considered in the planning process and the establishment of perennial pastures to ensure successful pasture establishment.*

*The Temperate perennial pasture establishment guide is available at [www.dpi.nsw.gov.au/\\_data/assets/pdf\\_file/0004/679126/temperate-perennial-pasture-establishment-guide.pdf](http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/679126/temperate-perennial-pasture-establishment-guide.pdf)*

## Planning and assessing pastures

Assess the potential of a paddock in relation to its significance within the whole farm, the specific benefits to the operation and constraints that must be overcome. Four aspects are worth considering:

### 1. Personal goals, farm goals and resources

What are your goals regarding lifestyle, enterprises, costs and returns, debt and risk? You need to determine the required level of income to meet your personal and farm goals.

### 2. Proposed enterprises and feed requirements

The periods of high feed demand will depend on the enterprise. For example, in a breeding enterprise adjusting the joining, calving/lambing and weaning periods will shift the point of peak feed demand. Most sown temperate species have good winter and spring forage quality and production, but there may be a shortage of high quality feed in summer and early autumn. You may decide to grow a special purpose pasture to fill the feed gap. For example, in a temperate pasture system, lucerne is capable of producing high quality feed during summer and autumn.

Alternatively, you may be able to conserve fodder in the spring as silage or hay to fill a summer or autumn feed gap.

### 3. Assess the current pasture for species composition and ground cover

It is essential that you learn to identify the species present in your paddock so that pasture assessments can be made. Keep in mind that composition will change throughout the year, so it is best to assess a paddock several times during the year, across a range of seasons, in periods of peak growth and times of critical feed supply.

Paddock assessment allows you to gauge the contribution each component of the pasture is making to ground cover, feed supply and quality. It also provides an indication of the condition of key species (and weeds) across seasons. The assessment will help guide decisions on, for example, weed control, fertiliser inputs and grazing strategy.

One of the quickest methods to assess pasture composition is to measure the species composition and ground cover. Identify useful pasture species and the plants considered weeds.

Some plants such as barley grass (*Hordeum leporinum*) and capeweed (*Arctotheca calendula*) can be useful pasture components while they are in a vegetative stage, provided the proportion of space they occupy is within your accepted limits.

The composition of perennial grass-based pastures will vary across seasons and targets will depend on your production and environmental goals.

Using the pasture assessment methods the botanical composition of a balanced, perennial grass-based pasture in spring would be:

60–70% perennial or sown grass  
20–40% legume  
Less than 20% annual grass  
Less than 10% broadleaf weed  
Near 100% ground cover

If you are not satisfied with your current pasture composition then there are many techniques that can be used to improve it. A pasture assessment will not only provide you with valuable information on

composition and the condition of the pasture, it will also help to determine the suitability of the various improvement options.

### 4. Review current management

Before investing in pasture improvement, determine whether the paddock can be rejuvenated by changing the way it is managed. In some circumstances improvement can be concentrated in affected areas of a paddock.

Consider the following:

- How much of the paddock is degraded?
- What issues should be managed, e.g. weeds, ground cover?
- Why has the pasture degraded? For example, are the sown species suited to the climate, aspect and soil constraints of the site?
- What desirable species are persisting?
- Can the existing pasture be either improved or rejuvenated by other means such as tactical grazing, the use of selective herbicides or fertiliser?
- Can production be increased using a simple, less costly, non-destructive technique such as oversowing legumes into the existing pasture or fertilising?

Answers to these questions in combination with a visual assessment will help you to decide how good your pasture is, whether you need to take action; and, if action is warranted, whether it is preferable to rejuvenate the existing pasture or completely re-sow.

### Reasons for pasture degradation

Whatever your plan for improvement, it is important to identify reasons that the existing pasture has degraded. Doing this will inform future management and improve persistence of the new pasture. There is often a combination of reasons for pasture degradation or low productivity, which may include: low soil fertility, drought, overgrazing, site factors such as limited soil depth, aspect, inappropriate species or variety choice, pest damage and weed invasion.



## Techniques to improve pasture composition

Techniques aimed at improving pasture species composition and productivity range from simple and inexpensive options, such as grazing management to favour desired species, to total replacement. Although it may take several years for some management options to achieve a significant change in pasture composition, they may result in the largest return on investment. The following options and combinations of these may improve pasture composition and productivity sufficiently to avoid the need for costly re-sowing.

### Fertiliser

Deficiencies of nitrogen (N), phosphorus (P), sulfur (S), potassium (K) and molybdenum (Mo) are common in many pastures. Fertilising to address nutrient deficiencies will ensure that desirable pasture species grow to their potential. In low fertility situations, useful pasture species tend to decline and low production weed species, such as vulpia species, catsear/false dandelion (*Hypochaeris radicata*) and sorrel (*Acetosella vulgaris*), can invade and dominate.

A vigorous, effectively nodulated legume component will provide N to the grass component and improve the persistence and production potential of the pasture. Without a vigorous legume component grasses will require N fertiliser in order to persist and produce to their potential. Legumes have a higher requirement for P, S and Mo than grasses.

### Over-sowing an existing pasture

Many degraded pastures can be improved or rejuvenated by sowing new species into the existing pasture. This non-destructive approach can be the best option when you want to increase the proportion of the desired legumes or useful perennial grasses, but do not want to re-sow.

Legume and grass seeds can be broadcast or direct drilled into existing pasture. The success of such a technique is mixed and lower establishment often results from broadcasting legume seed, compared with drilling the seed into the soil. Depending on the situation, before over-sowing appropriate herbicides can be used to suppress the already established, useful species. Seek advice from an agronomist before using this technique.

### Selective weed control

Unwanted species such as vulpia or Paterson's curse (*Echium plantagineum*) can be removed using appropriate herbicides. Before using herbicides, it is important to assess paddocks for species composition to determine the most appropriate herbicide option and the likely impact of removing the target weeds on ground cover.

A herbicide treatment may result in bare ground once the target weed is removed and make the pasture susceptible to weed re-invasion. If the pasture is made up of a large proportion of the target weeds, herbicide use is best combined with another change in management, such as grazing or over-sowing.

### Grazing management

Assessing your grazing strategy may give clues as to why some species have thinned or disappeared from your pasture. Knowledge of phenology of the species (i.e. seasonal growth and development) is important in order to understand how your grazing system affects different pasture plants (both perennials and annuals) and how they respond to grazing pressure throughout the season.

## Pasture Establishment Budgets

Sowing a new pasture or improving an existing pasture should be considered as an investment of resources over a predetermined period of time. Significant gains in productivity and profitability can be realised in grazing systems by sowing or improving pastures to achieve a desired outcome.

### Factors influencing the economics of new pasture sowings

The amount of time required to obtain a return on an investment in pasture establishment depends on many factors including:

#### Climatic variables

Rainfall and temperature will influence the reliability of seasonal production, the amount of pasture grown (dry matter per hectare) and subsequently the number of additional stock that can be supported.

#### Landscape variables

Soil moisture levels and potential pasture production will vary across the landscape, depending on variables such as soil texture, soil depth and aspect.

#### Livestock enterprise

The time to recover the cost of sowing a pasture will vary, depending on the profitability of the livestock enterprise. When planning to sow pasture you need to consider:

- the type of enterprise being run or planned. (Will the planned new pasture match the livestock enterprise feed requirements and production targets?)
- the additional livestock or dry sheep equivalents (DSEs) that will be supported by the improvements to the pasture. (What is the estimated return on the investment?)

#### Carrying capacity

A new pasture should have the potential to support more stock. Therefore,



the initial years following pasture establishment may result in lower cash surpluses or even deficits as more stock are either purchased or retained on farm.

#### *Other factors*

Pastures are often sown for more than just economic reasons and may not provide a clear financial advantage. For example, a new pasture may be sown for environmental reasons, specifically to reduce erosion or ground water recharge. These additional benefits need to be considered in conjunction with economics to make the best possible decision, with the available information.

#### **Pasture establishment costs**

Pasture establishment costs will vary from year to year. A cash flow development budget is also needed to determine the time to recover the cost of establishing pasture. This will provide a comparison of extra costs versus extra income, over a number of years (typically 10 for permanent pasture) and take account of varying stocking rates. The stocking rate is zero in the first year (from the time the paddock is not available for grazing), rising to the expected potential by the fourth year. Interest charges on borrowed money, the cost of additional inputs (e.g. fertiliser) and the cost of purchasing the extra stock must all be taken into account.

#### *Insecticides*

In 'at risk' areas the budget should include two earth mite treatments before pasture emergence – one in the spring the year before an autumn sowing and possibly another after sowing.

#### *Herbicides*

Budget for a minimum of two herbicide applications prior to sowing; one in the spring the year before sowing and one just prior to sowing. The choice of herbicide and associated costs will depend on the weed spectrum and the

level of infestation. For example, a tank mix of the broadleaf herbicide (e.g. dicamba) and a knockdown spray (e.g. glyphosate) can provide effective control of a wide range of hard-to-kill weed species.

**Caution:** When using herbicides before sowing pastures check the herbicide labels for the recommended interval between herbicide treatment and sowing (i.e. the plant back period). Legume species are particularly sensitive to some residual herbicides and failure to observe plant back periods will result in establishment failure of sensitive species.

#### *Seed prices*

Seed prices fluctuate from year to year and season to season, depending on availability. Ensure the species and varieties you are purchasing are the best possible choices for your paddock. Avoid sowing pre-mixed, cheap blends as these often contain varieties or species that may not be suited to your soil types, location or the enterprise you wish to run.

Whenever possible use seed that comes with a current seed analysis certificate. Certified seed meets strict standards including germination rate and purity (e.g. weed seeds, damaged seed and other contaminants).

#### *Seed treatments*

Many retailers include seed treatments (coatings) in the price of the seed. These coatings may include fungicide, insecticide, inoculant and/or lime. Seed coating can add significant weight to the individual seeds and may require seeding rates to be adjusted to achieve the desired plant population. If using pre-coated seed check the labels of all seed lots to ensure they comply with the industry code of practice. More information is available on the Australian Seed Federation website: <http://www.asf.asn.au/>

Inoculation of legume seed is a relatively very small cost in the whole budget and is recommended when sowing legumes – unless you are confident that the background population of effective rhizobia is adequate. If, in the last five years, a paddock has not had reasonable densities of legume species infected by the same inoculant group as needed by your chosen legume, then inoculation is required.

#### *Fertiliser*

Fertiliser prices can also fluctuate greatly from year to year, depending on supply. Do not try to save money by reducing rates of fertiliser at sowing as this may compromise establishment and development of the new pasture. The nutrients most commonly applied to pastures are N, P and S. Mo is a micro-nutrient that is required by legumes for the N fixation process and is not included in most commercial fertilisers.

#### *Contractors*

Contractor prices vary depending on the size of the paddock to be sown, travel and the cost to haul equipment. It will generally be cheaper per hectare to sow a larger area.

#### *Machinery*

Machinery costs can be variable, depending on the size of tractor. Factors such as fuel, oil, filters, tyres, batteries and repairs need to be included in budgets.

*Next issue of the newsletter we will continue to explore the planning and paddock preparation for pasture establishment covering soil testing, soil issues affecting pasture and pasture species selection.*

### ***Australian Society of Animal Production***

The 32nd Biennial Conference of the Australian Society of Animal Production, Animal Production 2018, will take place from July 2-4 at Charles Sturt University in Wagga Wagga, New South Wales.

The conference theme, "Fostering innovation through the value chain" will deliver a cross-species focused program sourcing international and national speakers on topics such as:

- Opportunities for innovation in animal production – a cross-species view
- Understanding the consumer: social, economic & animal welfare in animal production
- Mixed farming and grazing systems: integration, management, innovation
- The value of big data and its potential as a resource



For further information or to register go to <http://www.asap.asn.au/2018-conference/>

## From the President

Welcome to 2018. With a dry winter and limited spring in 2017 in many parts of the state, feed is fast disappearing as the heat and extended dry continues into 2018. Pockets of the grazing areas of NSW, I hear, are still ok, but many are looking skywards. Cattle and sheep numbers at regional selling centres are rapidly increasing, with jumps of over 1000 cattle per week at the likes of Dubbo, Carcoar and Wagga. I can only imagine that this will continue while the heat and lack of rain persists through February. With any luck, the reduced falls of January and February are 'banking themselves' and will fall in March and April and give us all some relief and a good run into Autumn.

I rarely look at the 12 month forecasts, and given the 2017 predictions, I know why. November 2016 I looked for the Central Tablelands of NSW, and at that time, forecasts for 2017 were for a very dry March (1/10) and a wet June (8/10). As it turned out, both were 100% wrong! We had one of the wettest March's on record, and didn't trouble the rainfall chart

in June! Make of that what you will, but I must say I was very thankful for the feed that grew on the March rain.

With the Grassland Society of NSW Inc now convening biennial conferences, this year, 2018, is an "off year". No state conference will be held this year, as we look to plan the program and location for 2019. However, plenty of society activity continues.

The 'Pasture Updates' will continue, and have been very successful in extending much research and pasture 'goings on'. So far for 2018, Moree has already had a Pasture Update, and the next will be on 20 March, 8.00 am - 12.30 at Berrembed Station between Wagga and Narrandera. Other Pasture Updates will be organised throughout the year, so please keep an eye on the society website for the dates and locations of other 2018 Pasture Updates.

Farming and grazing, and agriculture in general, is a wonderful industry. However, it constantly throws challenges from many

different directions. In keeping us all 'fit and well' please make the effort to call, visit or offer to help in any way, your own family, friends, work colleagues or even strangers. Don't underestimate the value of that contact, and "how are you".

All the best, and I hope you can get to a Pasture Update near you in 2018.

Regards,  
David Harbison,  
President.



### Disclaimer

While every effort is made to publish accurate information the Grassland Society of NSW does not accept responsibility for statements made or opinion expressed in this newsletter.

Inclusion of an advertisement in this publication does not necessarily imply an endorsement of the company or product of the Grassland Society of NSW.



***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](http://www.grasslandnsw.com.au) or contact the Secretary at [secretary@grasslandnsw.com.au](mailto:secretary@grasslandnsw.com.au) or at PO Box 471 Orange 2800

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David Harbison (Central West Slopes and Plains)  
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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](mailto: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 2018. 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](mailto: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 25 2018.



**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](mailto: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](http://www.grasslandnsw.com.au)**

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