Grassland Society of NSW Inc

Newsletter

What an amazing year 2010 has turned out to be for rainfall in NSW with most areas in the state receiving average or above average rainfall over winter, spring and early summer. The old adage "it never rains – it pours" has been very apt this year.

Although this is great news for the rivers, dams and pasture production, in many areas the unseasonable rain has led to severe flooding, damage and downgrading of many grain crops in western areas. The three month forecast from the Bureau of Meteorology for summer indicates that this overcast and rainy weather will continue in most areas of NSW.

A recent trip to Western Australia highlighted to me how tough this country can be. Much of Western Australia has experienced a very dry spring and in some cases the driest on record. However, despite the dry conditions it was good to see tropical perennial grasses green and persisting in many farmer paddocks.

In this issue of the newsletter we have three very interesting articles. The first by Anthony Leddin & Rojino Da cuhna from Valley Seeds on page 2 comparing the germination vigour of a range of short term and perennial grasses. The second by Grassland Society of NSW state committee member John Ive discussing how he has been assessing and modelling soil moisture changes on his property and the implications of climate change (page 6). Lastly we have an article by a producer from Tumbarumba, Geoff Daniels who presents an interesting point of view on profitable farm management (page 9).

I am not sure about you, but to me 2010 seems to have passed by in a flash, why does each year get quicker and quicker? I hope you and your families find time to rest and relax over the Christmas and New Year period before we start the rush all over again in 2011.

Carol Harris
Editor

Claim the Date

2011 Annual Grassland Society of NSW Conference

Bathurst - July 26-28

Further details in the next newsletter

In this newsletter

The germination vigour of grasses

Anthony Leddin and Rojino Da cuhna
Valley Seeds, 295 Maroondah Link Hwy, Yarck, Victoria 3719.

Introduction

The germination vigour of which a grass can emerge after sowing is important for the establishment of a dense pasture. During establishment grasses compete with weeds, insect attack and for resources such as sunlight, moisture and nutrients. The faster a seedling can emerge and establish, the greater the chance for it to survive. There has been little work done on the comparison of the germination of different grasses. This is due to the difficulty in obtaining seed from different species grown at the same site and in the same year. This has been made possible through the breeding program that Valley Seeds are running in Australia on a number of different pasture species. This experiment looked at the germination vigour of 14 grasses to determine if there was any difference in their early vigour.

Materials and Methods

Seven short term grasses (Table 1) and 7 perennial grasses (Table 2) were evaluated for germination vigour in May 2010.

The grasses were germinated on a single acid free germination paper and sealed in a plastic container after watering. Water was applied each day from the initial sowing of the seed on 08/05/2010.

The experimental design was a row x column design replicated 10 times. There were two seeds for each species in each replicate to allow for any seeds not germinating. The fastest germinating seed within each replicate for each species was scored. The root growth was scored either 0 for no germination or 1 for germination. When all replicates for a species had germinated the species would achieve an overall germination score of 1

Measurements were taken every 1-3 days. The temperature of the germination plate was at room temperature which varied from an average of 10°C at night and 20°C in the day. The germination scores were concluded after 19 days with most species having germinated by then.

Results were analysed in Genstat using a row column analysis and predicted means were used for the values on the graphs.

Table 1. Short term grasses used in the experiment

Scientific name	Ploidy level	Common name
Lolium rigidum	Diploid	Wimmera ryegrass
Lolium multiflorum var westerwoldicum	Diploid	Annual ryegrass
Lolium multiflorum var westerwoldicum	Tetraploid	Annual ryegrass
Lolium multiflorum	Diploid	Biennial ryegrass
Lolium multiflorum	Tetraploid	Biennial ryegrass
Lolium hybridum	Diploid	Hybrid ryegrass
Lolium hybridum	Tetraploid	Hybrid ryegrass

Table 2. Perennial grasses used in the experiment

Scientific name	Ploidy level	Common name
Lolium perenne	Diploid	Perennial ryegrass
Lolium perenne	Diploid	Perennial ryegrass
Festuca arundinacea	Hexaploid	Continental tall fescue
Festuca arundinacea	Octaploid	Mediterranean tall fescue
Phalaris aquatica	Tetraploid	Phalaris
Dactylis glomerata ssp glomerata	Diploid	Continental cocksfoot
Dactylis glomerate ssp hispanica	Diploid	Spanish cocksfoot

Results

The germination of the grasses were separated into 2 groups according to their life span, short term grasses (1-3 years) and perennial grasses (>3 years).

The short term grasses were all similar in emergence vigour (Figure 1). There was no significant difference ($P<0.05$) between the germination vigour of the different short term grasses over time. Most species achieved complete germination between 10 to 16 days after sowing.

There was a significant difference ($P<0.05$) between the germination vigour of the perennial grasses (Figure 2). Most perennial grasses achieved complete germination after 16 days.

Conclusion

There was no significant difference in the emergence vigour of the short term grasses. This would indicate that there is no advantage in the larger size of the tetraploid seed for germination vigour compared to a diploid seed. There was no advantage of annual ryegrass over biennial or hybrid ryegrass for emergence vigour, but this may change with later growth as annual ryegrasses have greater

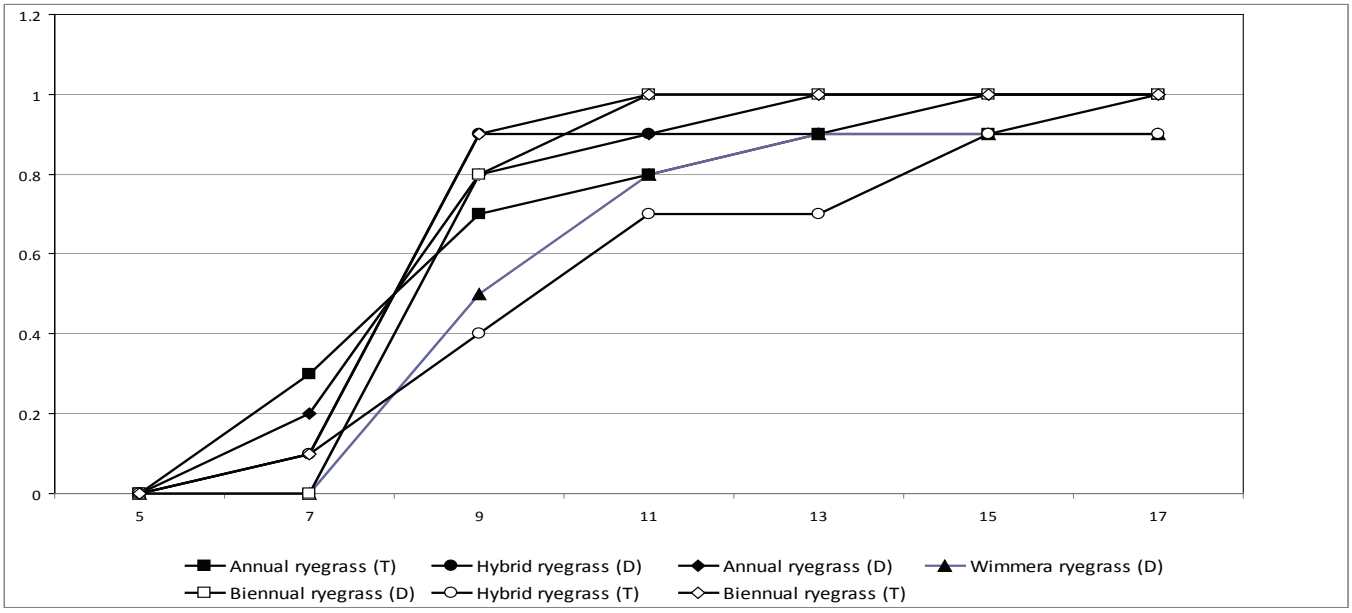


Figure 1. The root germination vigour score (0=no germination, 1=all replicates germinated) of short term grasses over time

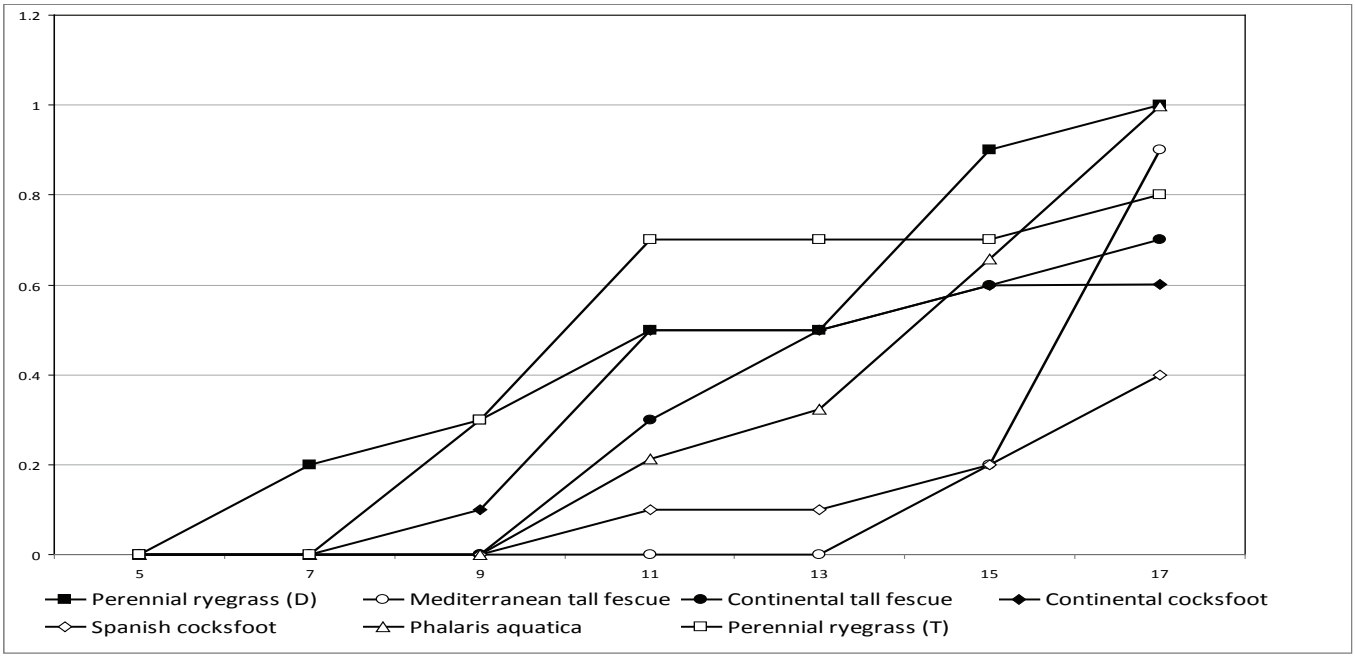


Figure 2. The root germination vigour score (0=no germination, 1=all replicates germinated) of perennial grasses over time

winter growth than biennial or hybrid ryegrasses (Lowe *et al*. 2008).

Perennial ryegrass was shown to have a faster initial emergence vigour than the other perennial grasses ($P<0.05$).

Phalaris was the next fastest to germinate followed by Mediterranean tall fescue, continental tall fescue, continental cocksfoot and then Spanish cocksfoot.

For species with slower germination greater care needs to be taken to calculate the correct sowing rate (especially in mixtures) and to use the correct sowing depth to prevent failures at sowing. The faster germination of the perennial ryegrass shows why it is often chosen when early vigour and feed is required.

Reference

Lowe K, Bowdler TM, Casey ND, Nolan SD (2008) Evaluation of temperate species in the subtropics - 2007. Project Series PR08-3577. (Department of Primary Industries & Fisheries. MS 825, Peaks Crossing QLD 4306)

This article was submitted to the newsletter by the authors, but was also published in the 51st Annual Conference Proceedings of the Grassland Society of Southern NSW in 2010.

For more information contact Anthony Leddin at aleddin@valleyseeds.com

The Grassland Society of NSW would like to thank the following sponsors for their support in 2010/2011

Central West catchment management authority

INTEGRATED PACKAGING
'we go to greater lengths'

Valley Seeds
Australian Seed Breeders

New Pasture Books

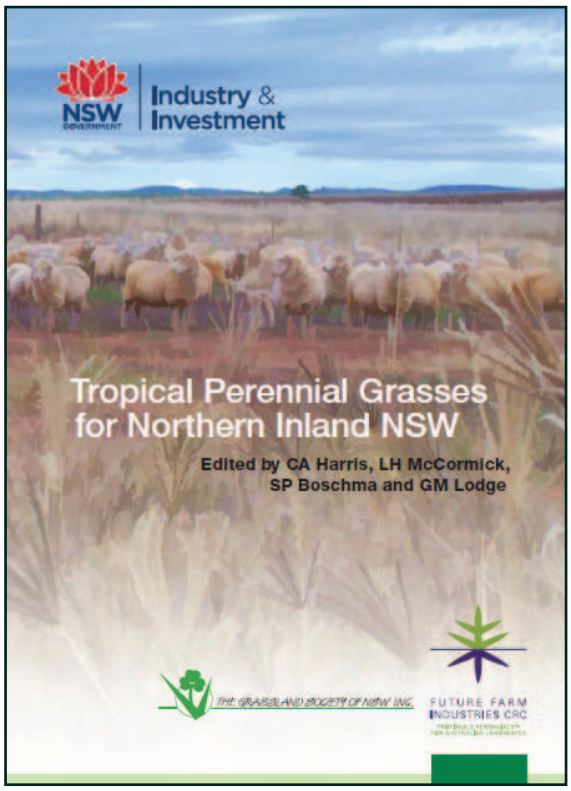
Tropical Perennial Grasses for Northern Inland NSW

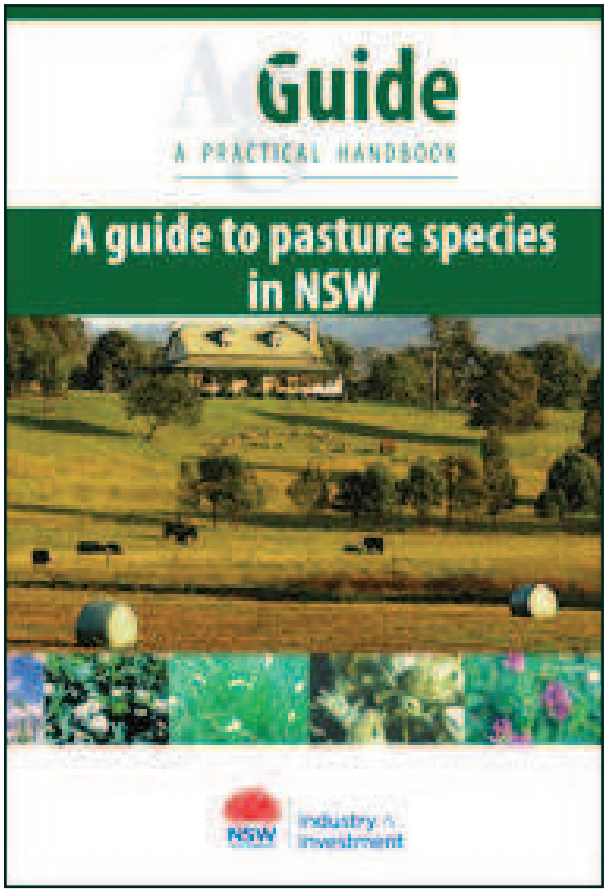
Edited by CA Harris, LH McCormick, SP Boschma and GM Lodge

This publication launched by Industry & Investment NSW in November and supported by the Grassland Society of NSW provides a comprehensive guide to sowing and managing tropical grasses in Northern Inland NSW.

Chapters include; Planning and preparation, Pre-sowing weed control, Getting species selection right, Seed quality, Sowing rates, Sowing machinery, Sowing time & depth, The role of fertilizers and nitrogen, Grazing management, Pasture quality and Root depth, growth and water use efficiency.

For a copy contact Lester McCormick at lester.mccormick@industry.nsw.gov.au





A guide to pasture species in NSW

Edited by David Brouwer

This publication published by Industry & Investment NSW and supported by the Grassland Society of NSW is an updated version of the well known but now unavailable *Guide to Better Pastures in a Temperate Climates.*

This new book *A guide to pasture species in NSW*, includes comprehensive descriptions and colour photos of useful temperate and tropical legume and grass species.

Chapters include; Pasture types suitable for NSW, Legumes for soil, pasture and crop improvement, Fertilisers for pastures, Pasture establishment, Grazing management, Selecting species, cultivars and mixtures for pastures, Pasture grasses, Pasture legumes, Fodder and forage crops and Seed quality.

A guide to pasture species in NSW is available for purchase for $30 plus postage and handling. Orders can be placed at www.dpi.nsw.gov.au/aboutus/resources/bookshop/agguide-pasture-species-nsw or by phone on 1800 025 520

Soil moisture under climate change

John Ive, Talaheni Yass

Part 1: The setting

(The following scene-setting extract is from a paper 'Achieving production and environmental benefits in a challenging landscape' delivered to the Grassland Society of NSW Annual Conference in July 2007)

"After nearly seven years of well below average rainfall (at Talaheni), all vegetation types are showing increasing signs of stress. For example, an estimated hundred-plus mature trees, (some no doubt spared decades ago during the original clearing), have died. Deaths have been particularly noticeable in the last six months, whether isolated paddock trees or members of remnants from which stock have been excluded for many years. In the past *Microlaena stipoides* coverage has increased, but this is now also in decline, even in areas with little grazing pressure. The poor seasons have seen a decline in the germination of subterranean clover, due to poor seed set and false or late autumn breaks. Phalaris-dominant pastures have so far persisted on more favourable flats but have retreated on slopes to drainage lines and depressions where soil moisture is augmented by runoff from upslope areas. Finally moisture-needy Yorkshire fog grass, once a common volunteer in drainage lines, has disappeared with the series of dry seasons.

These observations, although anecdotal, suggest vegetation types and management, despite having halted and reversed the detrimental and production-limiting effects of the environmental decline, are at their limit under prevailing conditions for this challenging landscape. With increasing evidence of climate change bringing higher mean temperatures, higher evaporation and more episodic (although possibly increased) rainfall, current management practices will have to be seriously re-evaluated.

We recognise that we will need new and improved tools to cope with increasing climate variability. For example, there is an urgent need for regionally-relevant synthetic weather data sets that reflect expected increase in climate variability and change conditions. The soil-water balance model which provides a powerful tool for evaluating consequences for future vegetation and management options can be used then to improve the reliability of predictions and evaluate further options.

The following is a current day response to these previous comments.

Part 2: Comparing predicted conditions with historical records

Predictions have been made of the weather conditions that can now be expected under a number of climate change scenarios and are now available as regionally-relevant synthetic weather data sets. These predicted data sets contain convention weather variables i.e. temperature, rainfall and evaporation. However, changes in these variables do not convey an agriculturally meaning-ful impact that climate change may have upon future farming operations. For instance, an average rise of 2°C may be looked upon favourably in a region subject to heavy frosts for about six months of the year.

The central driver of agricultural productivity is available soil moisture including, quantity, timing and seasonal continuity and reliability. Soil moisture is the integration of weather (e.g. rainfall, evaporation) and landscape (e.g. soil type, landform and vegetation) factors. The effect of climate change can be explored using pasture growth models although uncertainity over the persistence of current perennial pastures under the predicted hotter and drier extremes from climate change remains a question-mark to their current value. Along with other components of the farming system, pastures will of neccessity require further innovation and adaptation. Future pasture systems will require a suite of species with enhanced persistence under declining soil moisture and increasing periods of drought, higher water-use efficiency and a phenological response more attuned to soil moisture than daylength to maximise growth response to a lower and more variable pattern of soil moisture even allowing for the production boost that enhanced CO_2 levels will deliver.

A more informative approach involves establishing the expected soil moisture conditions under climate change before identifying the farming systems that best suit these predicted conditions. It remains to be seen to what extent future farming systems will involve further evolution of current practices and-or totally new farming practices.

A daily soil water balance model (WATERBANK) has been developed and calibrated over a decade to Talaheni (Yass Valley, NSW) conditions. The model provides a daily picture of soil moisture status and how long that moisture will last in the absence of further rain. The daily weather inputs for WATERBANK are rainfall and evaporation. Rainfall is measured on Talaheni and evaporation (for Canberra) is taken from Bureau of Meteorology Website as daily evaporation does not vary significantly in nearby landscapes. WATERBANK partitions a daily rainfall event into runoff, evaportranspiration, increase in soil storage and deep drainage subject to preceding conditions (Figure 1). WATERBANK has also been used with historical weather records from 1889 to the present time that has allowed comparisons of previous droughts, identification of high recharge periods, the progress in managing elevate saline watertables and long-term soil moisture trends.

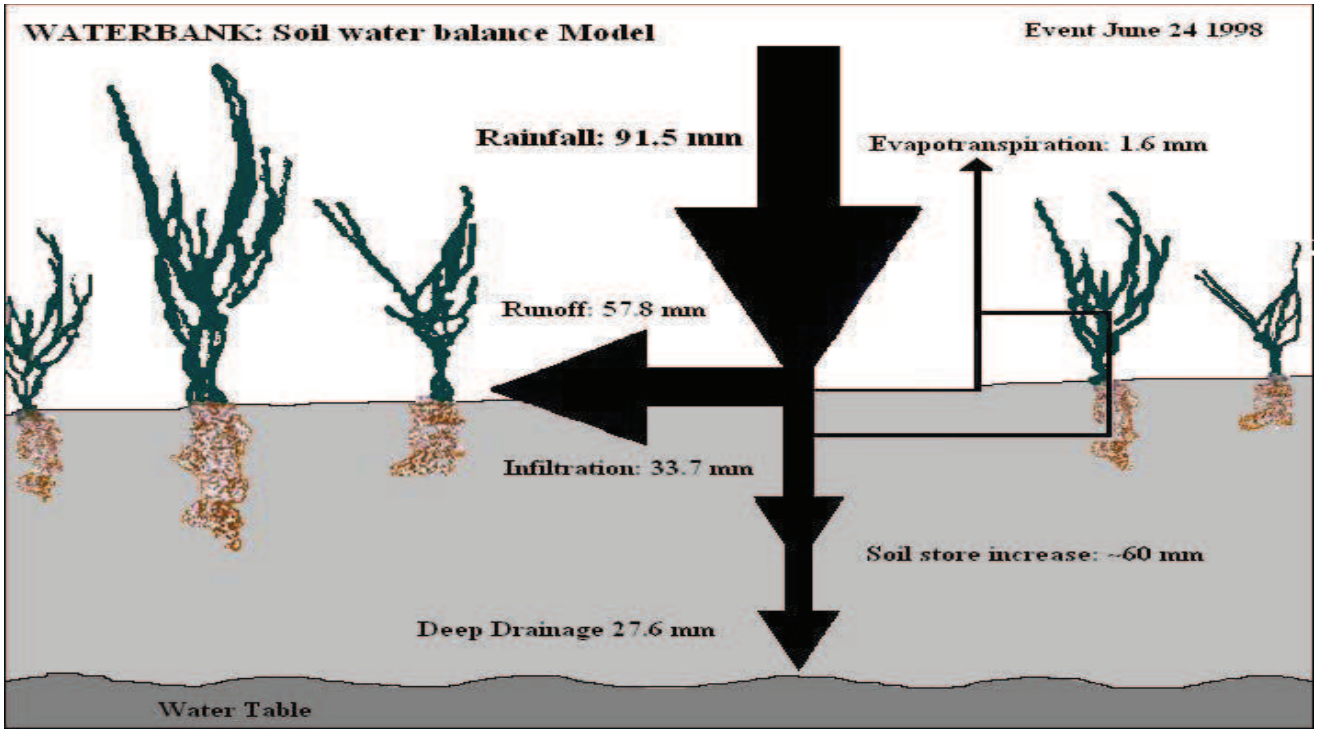


Figure 1. A graphic example of the partitioning of rainfall from a significant single day rainfall event achieved by use of WATERBANK.

The availability of daily weather records expected under climate change enables the implications of climate change upon soil moisture to be explored. Data sets from ten international global climate models (GMC) are available for various scenarios including, B1 (mean warming of 1.8°C) and A2 (mean warming of 3.4°C) for periods of 22 years (i.e. 2046 to 2065 and 2081 to 2100).

The analysis reported here is for the A2 scenario for the period 2081 to 2100. Each data set in turn was run through WATERBANK. In the absence of future runoff relationships, the mean runoff relationship established at Talaheni over the previous decade was used . This in effect implies that future rainfall intensity and vegetation cover will be similar to that over recent decades. A soil profile moisture holding limit of 60 mm was retained (average figure established for Talaheni), providing 7300 daily values for soil moisture for each GCM's twenty-year data set. To overcome the anticipated difference between the GCM's in soil moisture (on any particular day) in the period 2081 to 2100, the cumulative frequency distribution of soil moisture values were created for each GCM. An overall mean distribution was also created. The cumulative frequency distribution (Figure 2) shows the proportion of time (but not specific timing) at or below nominated soil moisture levels - the permanent wilting point is the critical level.

The distributions for the models are very uniform with a consistent trend; the GCM - CSIRO2 (Australia) model is least conservative (driest) and the GCM- GISSR (USA) model is the most conservative (less dry). The uniformity of the models' distributions, results in a relatively small standard deviation about the mean line giving confidence in the trend of mean response (Figure 2). However, the climate change frequency distribution response does not show the difference expected from current or past conditions. For this comparison, analysis was undertaken priming WATERBANK with historical weather records to give soil moisture conditions from 1889 to 2009 while retaining the runoff relationship and soil characteristics.

This analysis indicates that the climate change scenario will on average result in lower average soil moisture than previously experienced. From an agricultural perspective, permanent wilting point is crucial as it is the soil moisture level below which plant growth ceases and non-perennials usually die. The time at or below permanent wilting point defines the potential non-growth period. For example, taking 7 mm soil moisture storage as permanent wilting point (PWP) for Talaheni, then the proportion of time over a twenty year period that conditions are at or below PWP will increase from 51% to 62% (Figure 2). For further comparison the driest and wettest twenty year periods (i.e. same length of time as the GCM data sets) were identified from the 1889 to 2009 soil moisture time series. The driest perod (in terms of soil moisture) December 1989 to 2009 had 57 % of time at or below PWP. The wettest period, November 1944 to 1964 had a low 45% of time at or below PWP. Interesting the driest twenty year period is the immediate past - or on the other hand, it is 50+ years since the wettest period - is this a telling omen for the future?

Part 3 "The capacity of management practices to counter climate change impacts" of John's article will appear in the first issue of the 2011 newsletter

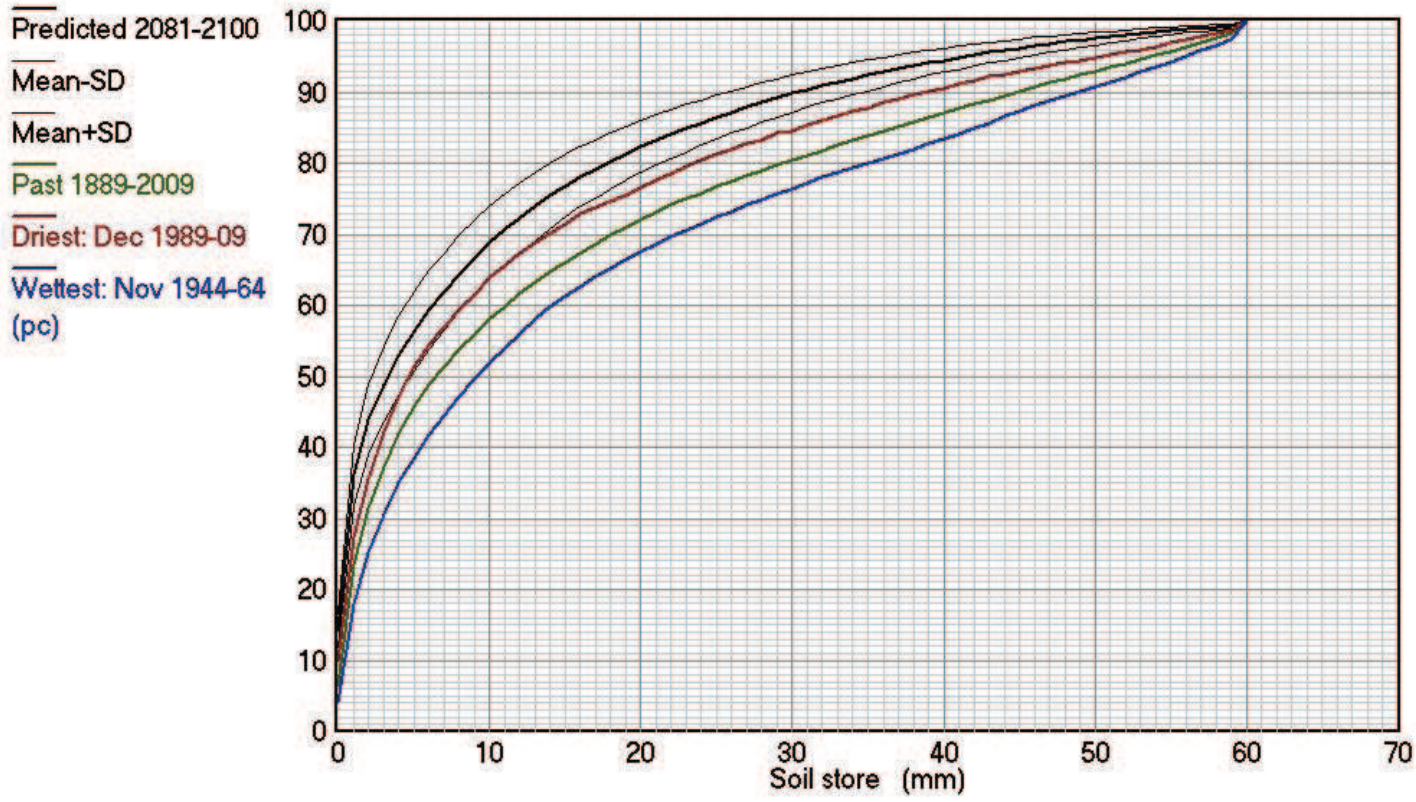


Figure 2. Comparison of soil moisture conditions (cululative percentage) predicted under climate change (2081-2100) with the average conditions for the period 1889 -2009 and the wettest and driest twenty year period in the past.

The Grassland Society of NSW would like to thank the following sponsors for their support in 2010/2011

Disentangling management from farm ownership

Geoff Daniels, Tumbarumba

Introduction
Some wit coined the phrase that "the more things change the more they stay the same". This paper describes the author's observations on some of the constants and some of the major trends emerging in Australian agriculture, and how these various factors have moulded the shape of his farming businesses.

Profitable farm management - what does it take?

Farming is tough. If the basics of farm management are not heeded it does not matter how a farming business is structured – it will fail. Two examples that we have seen recently are the collapse of the Managed Investment Schemes industry and the losses suffered by many farmers who have leased farms under poorly-structured arrangements. The current influx of corporate money into agriculture will create some great opportunities for major stuff-ups through lack of appreciation of the basics.

So what constitutes a good manager?

It is essential that a good farm manager fully understands the importance of the following issues, and that this understanding permeates all aspects of decision making on the farm.

1. The nature of the business. We are commodity producers and so must understand the rules of successful commodity production:

- Produce at competitive cost of production;

- Strive to continually reduce real cost of production. Productivity gain is crucial;

- Real prices of commodities decrease over time. It is a fact of life.

2. Understand the role of technological change in productivity improvement:

- The ability to choose between good and bad ideas – discrimination takes some education in scientific method, some knowledge of the disciplines involved, and of course, a nose for the shonk.

- The ability to place good ideas within a profitable system.

3. The ability to implement cheaply, effectively and in a timely fashion. All the knowledge in the world is pointless if the manager cannot implement effectively.

These factors seem simple; however, many farmers and some industry groups still don't seem to fully understand them. They are the foundation stone of my farming businesses.

Trends and opportunities in Australian agriculture
Trends emerging in Australian agriculture over the past few years include:

- A large and widening gap in the financial performance between low and high performing farmers.

- An ageing population of farm owners, many of whose children have chosen off-farm careers, necessitating a transition in management (and ownership structure) of farms.

- A move away from the traditional family farm towards a more 'corporatised' model where, increasingly, ownership of the land and business is separated.

- A belief within the world investment community that agriculture is an interesting investment. This seems to have been brought about by a number of factors including;

(i) the aftermath of the global financial crisis, and a consequent rethinking of the value of agricultural land as an asset class,

(ii) a perception that Malthus was correct, and that the world is finally running out of resources by some more speculative players, and

(iii) the food security concerns of some nations.

Opportunities arising from these trends include:

- Expansion opportunities for the high performers, some of whom are seeking new capital sources to help fund that growth.

- The arrival of large-scale corporates who require first-class farm managers if their investments are to have any chance of meeting performance hurdles.

Scale
1. A certain minimum scale is necessary to ensure viability – to house and educate the family, to provide for reinvestment into the business, to generate the surpluses that underpin growth and to do this through bad times. If we presume that $150,000 average surplus is the minimum to allow this, then minimum scale for an owner-operated grazing enterprise, given a profitability of $10 per DSE plus owner labour allowance of $50,000, will be a minimum of 10,000 DSE.

2. If the business is not managed by

the owner, and is of a purely investment nature with a manager cost of say $70, 000 per annum (it is hard to imagine getting anybody decent for less than this) and a target yield of 4% then the business will need to make a profit of $14 per DSE. If pre-manager costs are $15 per DSE and income is $32 per DSE, then the business will need to be 25,000 DSE to get management costs to a reasonable level and meet target returns. If the manager is on $100,000 per year, the enterprise will need to be 33,000 DSE.

It is clear that farms need to be much bigger than they currently are if they are to be even moderately acceptable uses for capital.

However, this is only part of the story.

For farm businesses to attract the best people, prospective managers need the enticement of a decent salary and an interesting career path. In my family business, it takes my brother and I two-three man-days per week to manage about 50,000 DSE. The rest of the time we are either skilled laborers or concentrating on other businesses. However, in a well organized enterprise of sufficient scale, a full-time manager can be responsible for 100,000 DSE or more. The cost of management per unit output can be low, but the manager well remunerated.

Years ago, we came to the realisation that this was the core problem of our enterprise, and perhaps that of the industry as a whole. We were simply too small to efficiently utilise and therefore reap the rewards of our management expertise. At an industry level, virtually all enterprises are too small to attract the best people. We, as an industry, cannot attract good people, because we are not competitive in the job market place. We are not competitive in the market place because our businesses are poorly structured and therefore cannot afford good people.

Without the best people, how can individual enterprises, or the industry as a whole, hope to come up with the ideas that will ensure its survival?

This problem can be largely explained by one major historical fact – the link between farm ownership and management. I cannot think of another major industry that insists on having at least 70% of its capital tied up in real estate, and where most of its managers spend at least 90% of their work hours laboring.

Growth Farms Australia

Through the 1990's the partners of what is now Growth Farms Australia were grappling with the above issues within their individual family businesses. In order to expand we were purchasing farms (too slow) and leasing farms, and thinking through other potential ways to expand our businesses. It became clear to us that if we wanted to build a seriously large enterprise we needed to work together and that we needed access to skills beyond farm management.

To this end we joined forces to form the business, Growth Farms Australia. Amongst the directors we now have access to not only superior farm management skills, but also legal, business management and corporate skills. This combination has been essential to enable us to access land and to develop the systems that allow us to manage that land efficiently.

Conclusion

Agriculture is changing; however prudent application of technological change to create productivity improvement remains the key ingredient of success in any farm business.

Aggregation of management is occurring and will continue to do so, driven by the needs of retiring farmers and investors requiring an acceptable return. This will present many opportunities.

This paper is reprinted from the 50th Annual Conference Proceeding with permission of the Grassland Society of Southern NSW

Australian Farm Journal
THE NATION'S FARM BUSINESS MAGAZINE

From the President

The year is rapidly coming to yet another end, and fortunately the general seasonal picture across NSW is better than for many years.

The downside continues to be rainfall in the cropping areas that has already caused significant delays with winter crop harvest resulting in inevitable grain quality problems.

To all our cropping members, we hope for some fine weather, at least until the headers have finished the job.

Livestock producers have enjoyed what some people describe as the best spring for at least 10 years. This was very welcome after a generally dry autumn that threatened to continue the protracted dry weather of recent years.

The Society continues to prosper, with a membership over 400 and prospects for interesting new projects planned for 2011. We are currently planning to put together a series of localised meetings across the state, designed to provide updates on new pasture varieties from all seed companies. When firm plans are available, including dates and venues, details will be posted on the internet site. In addition the newsletter will give members information on this and other activities.

As many of you will now be aware, next year's conference will take place at Bathurst. This will be the first time at Bathurst and the emphasis of the conference will focus on improved pasture development and management for sheep and cattle producers. A number of interesting and novel farm tours are in the planning stage for what is likely to be a very stimulating conference. The convenor for the conference is David Harbison, ably assisted by an enthusiastic committee.

As this is the last newsletter for 2010, I would like to wish our members, all the best for a safe and restful Christmas period with hopes high for continuing good seasonal conditions.

Mick Duncan

The Grassland Society of NSW wishes all its members a

MERRY CHRISTMAS

and a

VERY PROSPEROUS 2011

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

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

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

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

Office Bearers of the Grassland Society of NSW – 2010-2011

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

Grassland Society of NSW News

Website Calendar of Events: Visit the events calendar at the website (www.grasslandnsw.com.au) for upcoming events and activities. If you have a relevant event you wish to add to the calendar please contact either Linda Ayres (linda.ayres@industry.nsw.gov.au) or Carol Harris (carol.harris@industry.nsw.gov.au)

New Committee Member: We welcome Hayley Rutherford to the State Committee - Hayley currently lives and works near Deniliquin but grew up in the Blayney/Bathurst area. Hayley is enthusiastic and eager to get involved in Grassland activities - we look forward to her input.

Next Newsletter: The first issue of the newsletter for 2011 will be circulated in late February. If you wish to submit an article, short item or letter to the editor for the next newsletter please contact the Editor - Carol Harris at carol.harris@industry.nsw.gov.au or I&I NSW 444 Strathbogie Road Glen Innes NSW 2370. The deadline for contributions to the next newsletter will be January 31 2011.

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

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