

# Perennial ryegrass toxicosis in autumn 2002: 2. Solutions and management

by Kevin Reed, Katrina Rainsford, Dion Borg, and Leo Cummins, Department of Primary Industries, Pastoral & Veterinary Institute, Hamilton

*This is the second of a two-part article reporting on the perennial ryegrass toxicosis epidemic in Australia in autumn 2002.*

### Solutions

**Renew pasture:** The solution to perennial ryegrass toxicosis is to eliminate plants and seed of types of perennial ryegrass with toxic potential from the farm environment. Pastures can be replaced with other species or with perennial ryegrass containing either a safe endophyte (one that does not result in toxicosis) or no endophyte. Persistence of endophyte-free perennial ryegrass has not been as good as endophyte-infected material. Safe endophyte cultivars have been developed and produced in New Zealand and are marketed in Australia. Work in

New Zealand has shown that the persistence of some of these may not be quite as strong as for "wild" endophyte material. Development and evaluation of safe-endophyte combinations for Australian conditions is needed.

It is important to have some toxin-free pasture on farms that are heavily reliant on perennial ryegrass pasture. Our findings are supported by research overseas. This research has consistently demonstrated many valuable benefits, not least of which include the liveweight gain of young sheep, from eliminating perennial ryegrass toxins, be that by use of endophyte-free perennial ryegrass or by use of perennial ryegrass containing only a selected safe endophyte. However, a dangerous

threat to pasture renovation may be waiting in the soil. We must determine how best to prevent safe pasture succumbing to contamination from the seedbank of

*Continued on page 9*

## Work commences on control of perennial ryegrass stagers

The Department of Primary Industries (DPI) commenced project development work in January on the control of perennial ryegrass stagers. A project proposal will be developed by May 2003 with a range of options for possible research and extension activities. The proposal will be submitted to the DPI budget managers for consideration of funding in the next financial year.

A series of consultations with all stakeholders will be held, so as to identify priority areas in the control of perennial ryegrass stagers. This will enable DPI efforts to be directed to the areas with the greatest impact.

*Further information can be obtained by contacting project officer Tony Ciavarella at the Pastoral and Veterinary Institute, Hamilton, Victoria, on (03) 5573 0900.*

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## President's Report: February 2003



Could I wish all members a happy, healthy and prosperous New Year. It does seem rather glib to be hoping for prosperity when most of southern Australia is in the grip of drought and much of it is affected by bushfires, but I believe it is always best to be positive and to hope for the best while continuing to follow the plans you have set in place to overcome the current adversities.

The Grassland Society of Victoria enters the new year in good shape. The newsletter is going from strength to strength, and I would like to thank our capable editor, Liz Jacobsen, and her assistants. The society's website is being further developed, and we are hoping to take the next step in conjunction with The University of Melbourne in expanding the Pasture Web Database. I would like to thank all those involved on the database committee. The Mac Troup lecture was very well attended last year, and our thanks go to 2001 Past President Sandy Macmillan for organising it. The 2002 annual conference, with the theme "Facing the Future", presented a great program, thanks to the joint effort of members from the East Gippsland and Gippsland branches. This year's conference planning is well under way under the direction of a joint committee from the GSV's Albury/Wodonga branch and the Grassland Society of New South Wales with Hugh Watson sharing the chair. Please mark your new calendar with the 2003 conference dates of 11 to 13 June. Could I also thank our hard-working executive officer, Linda Bennison, who does a marvellous job quietly behind the scenes keeping the ship on course. Thank you to all members actively involved in what is a great and worthwhile society.

Looking back to last year's January issue of the newsletter, I was interested to read the abstracts from Foundation President

R. D. Croll's address to the society in 1960. In précis, he said, "the society should not tackle a programme beyond its means and that, once established with a reasonable membership, it should grow naturally as a result of its achievements". Also, he said, "the major aim of the society should be the dissemination of grassland farming knowledge wherever possible via publication so that even members who could not attend meetings would benefit from membership of the society". Forty-three years on, I think we could safely say we have adhered to Bob Croll's beliefs with some success.

I look forward to another exciting and challenging year as an active member of the Grassland Society of Victoria, and I wish all members the same.

**Rosemary Irving  
 President**

## A reminder from Rosemary

The currently proposed name change for the society comes about due to our success in reaching members beyond the Victorian border.

Could I implore those members who have not voted yet to please do so. We need a quorum of 75% to be successful with the name change, so, please, don't leave it to someone else. If you have not had your vote, get in touch now and do your bit. The name 'Grassland Society of Southern Australia' will be a step forward for the society in that our Tasmanian and South Australian branch members will not be compromised and our members in New South Wales and Western Australia will perhaps feel more included.

### Letter to the Editor

Dear Editor,

Recently I received the attached item (see box at right), which comes from a NSW Agriculture newsletter called *Plant Slants*.

I am sure it will interest many of our members who are concerned with the evolving story on liming pastures.

The observation that pasture and animal responses appear to lag behind the soil chemical changes is particularly important, as this affects the economics.

**Jack Hosking**  
"Jindalee", Greta West, Victoria

## Help wanted!

Lisa Miller, compiler of the Pasture Points column and able procurer of feature articles for the newsletter, is 'retiring' to have a second child. The newsletter committee is now seeking a new 'commissioning editor' to fill her role.

The job involves receiving e-mails of items for Pasture Points and compiling them into a column and finding (and chasing) authors for feature articles suggested by the newsletter committee or the editor.

Lisa says the best person for the job will have a current involvement in pasture and grazing research and application. She said she found the position difficult to fulfil after she returned to work following the birth of her first child and was no longer working as a pasture agronomist.

Newsletter editor Liz Jacobsen says this position is vital to keep the contents of the newsletter relevant and current.

Please contact Linda Bennison on (03) 5974 4066 or [office@grasslands.org.au](mailto:office@grasslands.org.au) if you are interested.

**Grassland Society of Victoria  
Annual General  
Meeting  
Now to be held at the  
annual conference  
Albury, New South Wales  
Thursday, 12 June 2003**

### Focus on soil acidity - Southern Tablelands and Monaro

Acid Soil Action staff at Queanbeyan, Canberra, and Yass were involved in running and presenting a series of five field days in conjunction with the Sustainable Grazing Systems Regional Committee.

In total, 150 people attended these sessions, which ranged from 2-hour farm walks to full-day field days. The principal focus was on the management of soil acidity in permanent pasture systems, but phosphorus management and grazing management were also discussed.

Some of the main messages to come out of the days were:

- Surface-applied (as opposed to incorporated) lime will slowly ameliorate the soil. The rate of movement will depend on soil type, rate and quality of lime, and rainfall. On the sites in the Southern Tablelands, soil was ameliorated to a depth of 5 to 7.5 cm 3 years after liming.
- The pasture and animal responses to surface-applied

lime appear to lag behind the soil chemistry change. Pasture and animal responses are becoming evident after 4 years on those sites with enough data.

- Soil phosphorus levels have been a much bigger driver of pasture and animal production than surface-applied lime.
- Liming has resulted in a change in the composition of the annual grass component. Brome has been favoured by the liming at the expense of vulpia species.

As these sites enter their fourth year after liming, it is expected that pasture and animal responses to surface-applied lime will become more apparent.

For more information, contact **Bill Schumann**, Extension Specialist, Acid Soil Action, NSW Agriculture, Queanbeyan, NSW, on (02) 6297 1861 or [bill.schumann@agric.nsw.gov.au](mailto:bill.schumann@agric.nsw.gov.au).

## Start thinking now about the student bursary

Once a year, the Grassland Society of Victoria awards the Joyce Gillespie bursary to a final-year Agricultural Science student. The aim of the bursary is to assist young agriculturalists to enter the grazing industry. This year is the fourth year of the bursary, and we are once again searching for final-year Ag Science students who are planning to pursue a career in the grazing industry.

The applicants, or their family, must be a current financial member of the Society and must not be in receipt of any other scholarship, grant, or cadetship (see the GSV website or call the GSV office for a copy of all the eligibility criteria and an application form).

The bursary is an opportunity for cash-strapped university students to lift their profile as they complete their final year of study

and to meet many potential employers at the annual GSV conference in June.

Also, if you are currently studying Agricultural Science but are not yet a final-year student, please take note of this bursary and contact us when you begin your final year of study.

### GSV's e-mail address has changed

You can send e-mail to the Grassland Society of Victoria's office or to the newsletter editor at [office@grasslands.org.au](mailto:office@grasslands.org.au).

Please update your e-mail program's address book. The previous address no longer works.

# VIC/NSW joint conference heads for space

by Hugh Watson, Conference Convenor

Mark your diary now so you can be at an exciting and informative conference in Albury on 11, 12, and 13 June. Your conference committee, made up of members from both Victorian and NSW Grassland Societies, has been meeting on a monthly basis; and much hard work and planning has been done to bring you the latest in grassland farming.

The joint conference will be held in the purpose-built Albury Performing Arts Centre, located in the centre of town and within walking distance of a range of accommodation options. The venue can seat up to 900 people, and we're told new seating will be installed in time for the conference. The GSV annual conference held in Albury in 1995 was also at this venue.

Expect to be enthralled by the program and quality speakers. We are awaiting confirmation from our preferred key note speaker – from NASA – who has been invited to speak on US satellite technology as it could be applied to Australian agriculture. Find out what could be available in Australian agriculture in the months and years ahead.

Come and hear a practical farmer who is implementing the current satellite technology to help his whole-farm pasture budgeting.

The action-packed schedule will feature other luminaries of Australian agriculture. (See the flyer enclosed with this newsletter, which gives more detail.)

The Albury-Wodonga GSV branch committee has been busy planning an interesting range of bus tours. As an added feature of this conference, we are giving conference participants the opportunity to participate in more than one bus tour.

The structure of the conference means bus tours run in the afternoon of both Wednesday, 11 June, and Thursday, 12 June. Thursday morning will be the opening of the conference and the key note speaker, then presentations continue until lunchtime. The conference dinner and special guest speaker feature on Thursday evening and Friday, 13 June, will present a diverse and exciting range of speakers. The program wraps up mid-afternoon on Friday.

To give keen conference participants the option to take part in two separate bus tours on two separate days, the Albury-Wodonga GSV committee offered to take on the extra workload of organising two days of bus tours. So why not organise your carload to arrive in Albury by Wednesday afternoon so you can visit more of the district's agricultural features.

Your joint conference committee has faced the tyranny of distance with most of the committee members facing a lengthy commute to meetings. Phone, fax, and e-mail communication has partially overcome the problem, but with the added stresses of the enduring drought and now bushfires, it has required extra special commitment to get the job done. Some committee members have also had to move house, and committee member John Francis has just become a proud father for the first time! But the show must go on...

*For more information, contact Linda Bennison from GSV on (03) 5974 4066 or conference convenor Hugh Watson on 0408 025 523.*

# Mac Troup lecture to be held in Ballarat on 21 March

The 2003 Mac Troup Memorial Lecture will be held on Friday, 21 March, at Sovereign Hill in Ballarat.

This year's Mac Troup lecturer is Andrew Campbell, executive director of Land & Water Australia. Land & Water Australia's mission is to provide national leadership in generating knowledge, informing debate, and inspiring innovation and action in sustainable natural resource management.

Andrew will discuss the value of water in Australia and its use; tackle some thought-provoking issues, such as the water requirement of different crops, including rice and cotton; compare the water requirements of crops and grasslands; and comment on the reality of continuing with the current style of farming and water use, including the sustainability of grassland-based meat and milk production across a range of rainfalls.

Andrew will challenge the audience with his thoughts on how agriculture will be practiced and financed in the future.

The Mac Troup Memorial Lecture is held in honour of William Macgregor Troup, OBE (1909–1982), who was regarded as a visionary in his time, especially in relation to grassland farming and pushing the boundaries of current knowledge. The event provides an opportunity for the society to invite the Mac Troup Lecturer to comment on his or her vision for the direction of agriculture and especially grassland farming in the future. Each year, the immediate past president of the society selects the lecturer and hosts the evening. This year, Tony Fleetwood will be the host.

Members will receive their invitation to the Mac Troup lecture soon, but mark this event in your diary today!

**Grassland Societies  
of Victoria and  
New South Wales  
Joint Conference  
2003**

**11 to 13 June 2003  
Albury, New South Wales**

# Challenging the criteria for drought declaration

by Tom Morgan, Ararat

Currently, the main, or only, criterion for drought declaration and, hence, drought relief appears to be based on rainfall. This implies that pasture and crop growth are directly proportional to rainfall. This may be axiomatic to politicians and others. Nevertheless, this is the notion that I wish to challenge.

In 1993, I developed a pasture growth model for the Ararat district primarily based on monthly rainfall and evaporation and a cluster of other factors that are implicit rather than explicit. The model is a simulation model, so the results need to be checked against independent experience from local farmers and, when necessary, corrected. In this way, the model continues to evolve. The model was developed before I became aware of CSIRO's GrassGrow program. I do not claim that the model is perfect, but we now have enough experience to claim that it is a good approximation of reality. This will be the basis of my challenge.

### Measuring association

If pasture growth is directly proportional to rainfall, one of the best ways of measuring the association is to regress the pasture growth with respect to rainfall. Once the analysis is completed, an inspection of the coefficient of determination will give us an explicit measure of the association between the two factors. The coefficient of determination is easily

interpreted, and that is one of its great virtues.

Suppose we complete the above regression and find that the coefficient of determination (commonly abbreviated to  $r^2$ ) is 0.95. This means that 95% of the variation in pasture growth can be explained by the corresponding variations in rainfall. This would be considered an extremely good fit.

### Regression results

Over a 23-year period, monthly pasture growth has been regressed against monthly rainfall. The months chosen are the normal growing season months for Ararat (i.e., from April to October). The annual pasture growth has also been regressed against annual rainfall.

Pasture growth that is directly proportional to rainfall suggests that the values of the two factors expand along a straight line (i.e., a linear expansion). I suggest that, if we are to use rainfall as an indicator of pasture growth, then  $r^2$  should be no less than 0.5. The left-hand side of Table 1 shows the  $r^2$  values for each of the seven months plus the annual value. The only months with satisfactory values (i.e., values no less than 0.5) are April, May, and October. For the other months and annually, the association between growth and rainfall is weak and unsatisfactory.

By repeating the regression and choosing the best model for each month and annually, we are able

to improve the overall agreement between rainfall and pasture growth. Unfortunately, only in June does the  $r^2$  value increase to 0.5 or greater, and the value for the annual is well below the cutoff value of 0.5.

Although not critical to my argument, in the right-hand side of Table 1 I have included for your information details about:

- The minimum effective rainfall for each of the growing-season months.
- The maximum effective rainfall for each of the growing-season months (i.e., rainfall beyond that critical level will have a negative effect on pasture growth, but only on duplex soils).
- Rainfall that corresponds to maximum pasture growth.

The notation "nd" refers to "not determined" or "not determinable".

### Interpretation of the analysis

I suggest that declarations of drought made only on the basis of rainfall are likely to produce iniquitous effects among the farming community; viz, some deserving farmers will not be entitled to drought relief and, conversely, some farmers who are not seriously affected by drought will be entitled to drought relief.

### Future action

I was under the impression that the federal government had made a serious attempt to get away from government drought assistance; it looks as though I was in error. If

*Continued on page 6*

Table 1.  $r^2$  and other values for the normal growing season months (April to October) in Ararat based on 23 years of data

Month	Linear model		Best model			Approx. monthly rainfall (mm) corresponding to		
	$r^2$	n	Type	$r^2$	n	Minimum effective	Maximum effective	Maximum growth
April	0.917	23	Log	0.956	13	25	nd	108
May	0.621	23	Sq. root quadratic	> 0.95	16	22	155	78
June	0.132	23	Sq. root quadratic	0.8 < $r^2$ < 0.9	20	11 to 22	125	49
July	0.174	23	Sq. root quadratic	0.1 < $r^2$ < 0.2	20	11 to 22	87	55
August	0.280	23	Sq. root quadratic	0.3 < $r^2$ < 0.4	20	25	125	61
September	0.026	23	Quadratic	0.4 < $r^2$ < 0.5	23	30	nd	75
October	0.832	23	Linear	0.832	23	45	nd	115 to 137
Annual	0.270	23	Power	0.360	23	--	--	--

# Sweet vernal grass the cause of cattle haemorrhage?

by Helen Sheather, Dairy Farmer, Bunyip

In June 2002, on a property owned by Helen and Winston Sheather, on the flat out of Bunyip, Victoria, a number of springing three-year-old purebred Friesian heifers began dying.

Seven showed signs of illness, and five of these died in the period between Tuesday of one week and Monday of the next.

The first signs noticed were slight limping and soreness. This progressed to high stepping as they walked; and their skin had small eruptions, like a big pimple, that would burst and emitted a thin stream of blood. They also had a bit of bloody discharge near the tail, which at first gave the impression of abortion.

The first heifer to die was seen lame Tuesday afternoon and was dead by Wednesday morning. Her twin had blood around the tail, and the vet was called at 8 a.m. and gave her an injection to abort the calf. This second heifer was dead by lunchtime. In the meantime, another one went lame; and the vet took blood samples and notified the Department of Agriculture. The local vet said the signs were those of RatSak (warfarin) poisoning.

The third heifer was showing signs by the next day; and as they became sick, they would walk through fences (later it was realised that they were lacking blood to the brain). By Sunday, five had died, and the two left were showing signs of the sickness, so the local vet (who called in or rang on a daily basis or more, quite a bit of it in his own time) came out and took more samples and contacted the Department of Agriculture vet at Box Hill (in whose area Bunyip falls).

The two vets met at the Sheathers' farm on Monday and examined the remaining animals. One was showing signs of being a day off dying, while the other heifer was swollen with blood under the

skin and losing blood. Her heart rate was so bad, the vets thought she had only a short time to live; and she was put out to die. She hadn't died by nightfall, but everyone was sure she would be dead the next morning. However, she started to get better; and approximately 2 weeks later, these two heifers had healthy calves on their own and are now in the milking herd with a normal production, although the one that had been put out to die is very jumpy and nervous.

The vet from Box Hill made a point of asking around and found that a farm in the Western District had had a similar situation and that it had been caused by the cattle eating silage that contained fermented sweet vernal grass (*Anthoxanthum odoratum*). The Sheathers' heifers had been having silage in a ring as their major source of feed for two to three months, and this silage was made from a paddock predominantly containing sweet vernal grass and bent grass. Unfortunately, all of this silage had been eaten, so tests could not be done; and no gut samples were taken from the sick heifers.

The Sheathers' milkers had been fed silage from the same row of bales and showed no signs of illness. However, the silage formed only about one-third of their diet, the remainder being pasture. Thus, the cause of the heifers' death remains undetermined, but the strong suspicion is that it was the sweet vernal grass in the silage. Sweet vernal grass contains coumarin, which can change to dicoumarol (commonly called warfarin) if affected by mould. Dicoumarol is an anti-coagulant, and the signs shown by the Sheathers' heifers seem to be consistent with the action of an anti-coagulant.

Helen is willing to discuss this with graziers or others who may

have encountered a similar situation. She can be reached by e-mail at [ant@sympac.com.au](mailto:ant@sympac.com.au).



Sweet vernal grass seedheads

Photo © Lindsay Herrera, [lindsayherrera@yahoo.com](mailto:lindsayherrera@yahoo.com)

## Drought criteria

Continued from page 5

we are to continue with government drought relief, I suggest the following two options:

1. That, in Victoria, we return to the procedure used for the declaration of drought areas that was used in 1976; viz, an assessment of the following factors: soil bareness, wind erosion, the amount and value of standing feed, farm fodder reserves, the numbers of livestock already sold at salvage prices, the classes and numbers of remaining livestock, the number of paddocks already without water, and the amount of water available.
2. That, through experienced agrostologists, we establish a system of pasture models to cover the state and use pasture growth estimates as the basis for assessing drought status.

Personally, I would prefer the first option, as, on reflection, I believe the second option may be just too difficult.

# Honours projects offered in sustainable soil management

The Centre for Rural Sustainability conducts applied research into a range of land management issues from a strong biophysical and ecological perspective.

The Centre has been successful in gaining funding from the NSW Department of Land and Water Conservation to conduct applied research into aspects of the sustainable use of soil under the typical cropping and grazing systems found in the central west of New South Wales. The aim of these projects is to develop reliable indicators of the impact of farming practices on soil structural characteristics and soil biological health. The projects will involve field experimentation at selected sites in the central west.

Applications are invited from suitable candidates who have completed, at a superior level, a relevant degree with an appropriate major, such as soil science, soil management, agronomy/crop sciences, soil microbiology, etc.

Each project will receive a funding grant of up to \$5,000. Details of each project are as follows.

**Project A:** The use of image analysis to detect soil structural change under conventional cultivation and controlled traffic cultivation systems. Supervisor: Mr Neil Southorn, Lecturer in Agricultural Engineering and Soil Management, Faculty of Rural Management; southorn@orange.usyd.edu.au; (02) 6360 5662.

This project will conduct a field experiment in the Cowra district (approximately 1 hour's travelling time from the campus) in which undisturbed soil sections are subjected to image analysis to yield new information about pore size distributions and structural form. Samples taken from different cultivation treatments will be compared. Data from the image analysis will be used to assess the effects of cultivation practices on the structural dynamics of soil and the implications for soil productivity and sustainability.

**Project B:** Assessment of the relationship of diversity in soil biota and the pasture species in grazed and ungrazed sites at

*Continued on page 8*

## Looking for drought information or assistance?

*The following sources of information, compiled by Beth Taylor, rural youth support worker with Victorian Young Farmers, may be of help to you during the drought.*

1. New drought assistance website launched at [www.affa.gov.au/droughtassist](http://www.affa.gov.au/droughtassist): Details of Commonwealth Government assistance for drought-affected farmers and communities plus links to state and territory government drought-assistance information can now be found at the AFFA web site. Telephone enquiries can be directed to the Commonwealth Regional Information Service on 1800 026 222 (Monday to Friday, 9 a.m. to 6 p.m.).

2. Drought discussions on YARN (Young Australian Rural Network) at [www.yarn.gov.au/forum](http://www.yarn.gov.au/forum): It's a place to share ideas and information about drought. How do you cope with drought? How do you plan and implement strategies to deal with drought? YARN was established for young people working in rural industries. To get involved, register for the discussion forum and start posting messages. You can establish a discussion thread of your own on any rural issue.

3. Australian Crop Report (Special Drought Issue): ABARE has revised its production forecast for winter grains in a special edition of the Australian Crop Report. A media release and a full copy of the report can be found at [www.abareconomics.com](http://www.abareconomics.com).

4. Australian Broadcasting Commission's Drought Page at [www.abc.net.au/rural/drought2002/](http://www.abc.net.au/rural/drought2002/). An information source that includes news stories relating to drought, web links, and images.

5. The Bureau of Meteorology's Drought Statement: This information page outlines the current state of the drought in Australia. Visit [www.bom.gov.au/climate/drought/drought.shtml](http://www.bom.gov.au/climate/drought/drought.shtml).

6. What is El Niño and how does it affect Australia? [www.bom.gov.au/lam/climate/levelthree/analclim/elnino.htm](http://www.bom.gov.au/lam/climate/levelthree/analclim/elnino.htm).

7. Current status of El Niño: <http://www.bom.gov.au/climate/enso>.

8. Farmhand Foundation: The Farmhand Foundation has been formed to provide immediate relief to people suffering the effects of drought. Visit the foundation's website at [www.farmhand.org.au](http://www.farmhand.org.au),

or visit the Red Cross website at [www.redcross.org.au/howyoucanhelp\\_appeals\\_farmhand.htm](http://www.redcross.org.au/howyoucanhelp_appeals_farmhand.htm).

9. Receive a free sample of the Water Report, a weekly publication by EWN Publishing, at [www.erisk.net/pdf/twr20020902.pdf](http://www.erisk.net/pdf/twr20020902.pdf). It includes information on such issues as water rights, drought, and drought assistance from commonwealth and state governments. (Note that this is a commercial site.)

10. Victoria: [www.nre.vic.gov.au/drought](http://www.nre.vic.gov.au/drought).

11. New South Wales: [www.agric.nsw.gov.au/reader/883](http://www.agric.nsw.gov.au/reader/883).

12. NSW Rural Adjustment Authority: [www.raa.nsw.gov.au](http://www.raa.nsw.gov.au).

13. Western Australia: [www.agric.wa.gov.au/adverse\\_season/advice.htm](http://www.agric.wa.gov.au/adverse_season/advice.htm).

14. Queensland: [www.dpi.qld.gov.au/drought](http://www.dpi.qld.gov.au/drought).

15. South Australia: [www.pir.sa.gov.au/drought](http://www.pir.sa.gov.au/drought).

16. Northern Territory: [www.dbird.nt.gov.au](http://www.dbird.nt.gov.au).

17. Australian Capital Territory: [www.act.gov.au](http://www.act.gov.au).

18. Tasmania: [www.dpiwe.tas.gov.au](http://www.dpiwe.tas.gov.au).

# What is the potential carrying capacity of grazed pastures in southern Australia?

by Geoffrey Saul and Gavin Kearney, Pastoral and Veterinary Institute, Hamilton

Current benchmarks for potential productivity of grazed pasture are based on average rainfall. The well known "French" equation used for these benchmarks results from nine experiments in South Australia and predicted that 1.3 dse/ha could be carried for every 25 mm of rainfall in excess of 250 mm. A limitation of this data is that highest rainfall at the sites was only 650 mm, and so stocking rates should not be calculated above this figure. Also, the data reported was collected from small plots, and their relevance to farm paddocks is unclear. Such factors as soil fertility, soil type, and rainfall distribution may also influence herbage production.

From 1993 to 1997, the Grassland's Productivity Project (GPP) was conducted on farms in South Australia, Victoria, New South Wales, and Tasmania. We have used data from this project to determine benchmarks for the carrying capacity of paddocks in the region. In GPP, farmers compared Productive Pasture Technology (PPT) on one paddock with normal farm practice (Control) in an adjacent paddock. PPT is a package of increased fertiliser application to correct nutrient deficiencies, improved pasture management, and higher stocking rates to use the additional pasture produced. The average stocking rate was calculated and converted to dry sheep equivalents per hectare (dse/ha). Only results from the PPT paddocks were used to calculate potential carrying capacity.

A range of information about the paddocks was available, including soil analyses, physical characteristics, (paddock size, topography), and pasture type. Average rainfall was included, and average length of the grow-

ing season (months) was estimated for each paddock, based on when the opening seasonal rains normally occurred in the area and when pastures dried off in late spring. While the opening and closing rains occur at the same time in a particular locality, we considered when *the particular paddock* stopped active growth, taking into account soil type, aspect, topography, pasture type, etc. The estimated carrying capacity was influenced by the length of the growing season, paddock size, and Olsen P as shown in Table 1.

There was a much better relationship between the average length of the growing season and carrying capacity than between average annual rainfall and carrying capacity. Given the subjective assessment of the length of the growing season, it indicates that growing season is very strongly related to pasture production and, hence, carrying capacity of grazed pastures. While at first it may appear difficult to estimate the length of the growing season, it is not that hard. The average time of the autumn break is usually well known in a locality. It is then only a matter of considering when the particular farm or paddock dries off in spring. This will vary depending on soil type, pasture type, topography aspect, etc.

Soil phosphorus was also an important factor, even though all PPT paddocks received at least 18 kg/ha/yr of P. Some paddocks had a low fertiliser history prior to implementation of PPT, and Olsen P was still below the optimum levels. This highlights the importance of improving soil fertility if potential carrying capacity is to be achieved. The lower carrying capacity of large paddocks is as expected, as it is

Table 1. Estimated carrying capacity (dse/ha) for different paddock sizes, Olsen P levels, and length of the growing season.

Olsen P (mg/kg)	Growing season (months)									
	5	6	7	8	9	10	11	12		
<i>Less than 20-ha paddocks (dse/ha)</i>										
10	11	14	17	20	24	28	31	34		
20	12	16	19	23	26	29	33	36		
<i>More than 20-ha paddocks (dse/ha)</i>										
10	8	11	15	18	21	25	28	32		
20	10	13	16	20	23	27	30	33		

difficult to achieve high pasture utilisation in large paddocks or where topography and pasture type vary within a paddock.

A full report can be obtained in *Wool Technology and Sheep Breeding, Volume 50(3), pages 492-98*. Alternatively, e-mail [geoff.saul@nre.vic.gov.au](mailto:geoff.saul@nre.vic.gov.au) for a copy of the paper.

## Honours scholarship

*Continued from page 7*

Narrambla property in Orange. Supervisor: Dr A. Raman, Lecturer in Environmental Management, Faculty of Rural Management; [dhodgkin@orange.usyd.edu.au](mailto:dhodgkin@orange.usyd.edu.au); (02) 6360 5521.

A site on the university's Orange Campus Farm will be used for this project. The experimental site is a part of a long-term grazing trial to compare the effects of different grazing practices on soil health. The aim of this project is to examine more closely some aspects of the relationships between pasture growth, under different grazing systems, and soil biodiversity, as well as to explore links with the inorganic properties of the soil profiles concerned.

For further information about the faculty's Honours Program, contact Ms Heather Hicks, Client Services, on (02) 6360 5511 or [hhicks@orange.usyd.edu.au](mailto:hhicks@orange.usyd.edu.au) or visit the faculty's website on [www.orange.usyd.edu.au](http://www.orange.usyd.edu.au).

## Ryegrass staggers

*Continued from page 1*

old perennial ryegrass. In most cases this will be quite a challenge. A pre-establishment, double-cropping program maintained for two years with adequate use of grass herbicide may be effective. Attention to other aspects of paddock hygiene will be essential to avoid contamination arising from unsuitable perennial ryegrass seed and for the investment in safe pasture to be worthwhile.

### Management of old pasture:

Eliminating all the old naturalised perennial ryegrass from farms will take many years. Therefore, a scientific research program is required to develop and evaluate products and management for use in livestock systems where stock may be exposed to toxic perennial ryegrass. Across the perennial ryegrass zone, pasture is resown at 5% per annum, and it is probable that our feedbase will, for many years yet, include a large area of pasture with toxin potential. Young stock especially should not have to rely on such pasture in summer and autumn.

Apart from evaluating pasture systems based on cultivars with only low or zero ergovaline and lolitrem B toxin potential (a task that may be supported by seed companies), multi-disciplinary scientific research could address underlying scientific questions including

- Identifying causal factors: Overseas work has identified 24 other metabolites – indole-terpenes, ergot alkaloids and lolines (lolines are well known to be toxic to insects) – produced in endophyte-infected perennial ryegrass, especially grass under stress. Some of these are known tremorgens (that is, they induce nervous disorders); their production and role in the Australian environment is unknown.
- Toxin production in perennial ryegrass requires the presence of endophyte in the grass and is controlled by the grass genotype; the endophyte genotype; and environmental factors, such as soil fertility, temperature, and soil

moisture. The interaction of these factors needs to be carefully studied if we are to understand and predict toxin production.

- The development of toxin-absorbing feed additives or other work-around strategies is needed along with development of therapies to assist affected livestock.
- Genetic diversity for resistance to toxin has been demonstrated in some animal species and could be exploited by breeding. Some animals may have higher activity of the liver enzymes that are effective in detoxification.
- Knowledge is required about the kinetics and dynamics of toxins in animal tissues.

### Management of affected animals

From the experience of the recent epidemic, it is appropriate to summarise management options.

**Advance or delay husbandry/management procedures:** Initially, this is the preferred management tool. In an average year, by leaving stock alone while they are suffering low levels of perennial ryegrass toxicosis, we should reduce the number that go down and require nursing or destruction.

**Change paddocks:** Removing sheep from toxic pasture is vital when severe toxicity is apparent. Removal may take several days as it can be counter-productive to use dogs and vehicles. If excited many more sheep go down so a patient gentle drift is required. Detoxification takes from 1 to 4 weeks. The time for recovery may be proportional to the period of exposure to toxin. Sheep may suffer ill-thrift and heat stress despite the receding tremor/stagger syndrome.

**Confinement:** Where removal from toxic pasture is not an option, we can reduce exposure by confining sheep to a small area and feeding them. Of the hundreds of thousands of sheep that enter feedlots in preparation for embarkation each year, only a small proportion suffer from shy feeding. Consider preparing a feedlot in small paddocks or laneways or with temporary fencing across corners of paddocks with a safe

water supply (see below). Mobs can be boxed, and the period of feedlotting may be just weeks, allowing a detoxification period and assessment of how the season is progressing.

**Safe water supply:** Water supply is most important for stock suffering heat stress. However it is often necessary to fence off dams and creek/river frontages. Heat stressed animals crowd into water and many have drowned. Staggery stock may also fall and drown. While affected animals also sometimes get into water troughs the numbers lost will be less than where dams/creeks are relied on.

**Train weaner sheep to grain:** In 2002, due to the excellent spring feed, many producers had not fed grain to sheep by the onset of the perennial ryegrass staggers period. Attempting to supplement young, untrained sheep reduced the effectiveness of alternative feed sources as a management tool during the epidemic.

Plan alternative weaner paddocks and provide a diversity of pasture types across the property: Our two main pasture grasses (perennial ryegrass and phalaris) can exhibit periods of toxicity; and we need some safe pasture, particularly for young stock. This year, a number of farmers in the Coleraine and Cavendish districts suffered stock losses on perennial ryegrass in autumn, then suffered further losses due to toxicity problems with phalaris pasture in winter (Phalaris toxicity was exceptionally severe this year).

**Therapy:** Hamilton veterinary consultant David Rendell advised that an idea of Coleraine farmer, Cecil Wall, was successfully adopted by a number of producers. They found that the use of a Ditch Witch (small trencher) to dig deep V-shaped trenches of various widths proved a most efficient and effective means of nursing sheep of various ages. The trench enabled sheep to be kept upright, cool, close to other sheep, and away from toxic pasture. The trench was sufficiently deep so that sheep could not stand/push up and escape. They were watered twice a day and tested for

*Continued on page 10*

# Ryegrass staggers

Continued from page 9

mobility once per day. If able to stand, they were then removed to yards for less-intensive management. Mr Wall claimed that 90% of badly affected sheep were recovered within 1 to 4 days in the trench, provided they were moved into trenches soon after they became recumbent.

A number of mineral, organic, vitamin, and toxin-binding products were advertised as preventing or controlling perennial ryegrass toxicosis. We do not have evidence of their efficacy. Epsom salts may provide relief in the short term, as toxin-containing digesta is voided from the tract. Some products, e.g., magnesium, may reduce complications to the primary condition, as a range of secondary vitamin and mineral deficiencies quickly develop where stock are not able to eat. Domperidone has been found to provide relief for horses and cattle by blocking the action of ergovaline. However, it requires frequent dosing and has not been shown to prevent the action of lolitrem B. In Australia, its use is registered for horses only. Research is needed before recommendations can be given about treatment of stock. Research conducted overseas was considered for any evidence to support advice that might either ensure the safety of stock on toxic pasture or detoxify perennial ryegrass. Some local claims were made that products reduced toxin concentrations in late autumn/winter. However, toxin concentrations in perennial ryegrass naturally revert to a non-critical level after the new season growth begins.

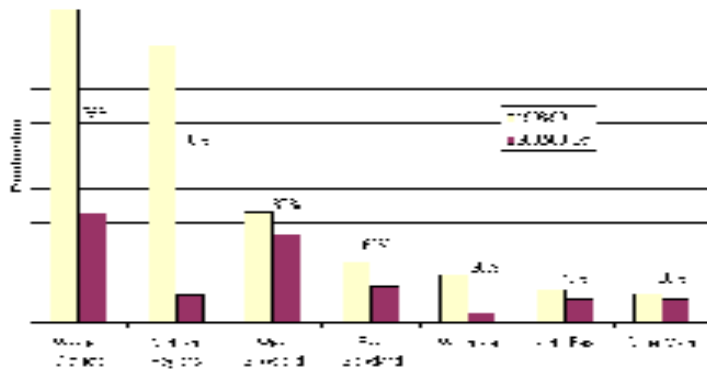
Feeding affected sheep, via a carefully inserted stomach tube, with approximately 2 litres of water per day containing electrolyte and a soluble feed additive has proved valuable. Ms Jane Shennan of Hawkesdale, Victoria, has successfully demonstrated this practice.

### Subclinical effects: how great a loss?

Most intoxications in animals result in loss of production. Many fungal toxins affect several systems simultaneously. As described in the January 2002 GSV newslet-

# Fodder: a picture is worth 1,000 words

This graph compares estimated 2002/03 Victorian regional fodder production to 1998/99 production (the most recent data available from the Australian Bureau of Statistics).



Graph courtesy of the Australian Fodder Industry Association.

ter, the subclinical (or masked) effects of prolonged exposure to perennial ryegrass endophyte toxins cause ill-thrift. That is, every year, even when the toxin concentrations in perennial ryegrass are too low to cause staggers, animal production is held back. The endophyte-produced toxins upset all the important systems in the animal. The effects include suppression of intake, reduced liveweight gain and milk production, and heat stress. Such effects can lead to scouring and nervy or agitated cattle. Male and female fertility can fall. These effects are known through research in Australia with ewes and dairy cows and from reviews of work in New Zealand, Europe, and the Americas. Our climate is the harshest of the large regions of the world where perennial ryegrass is widely used. Our hot summers result in high toxin production relative to that observed in more temperate climates.

A number of factors need investigation and quantification. Impaired reproductive performance and milk production may be significant. As a consequence of reduced weight gain to weaning, the ability to survive over summer is lowered, vulnerability to parasites is increased, wool cut is reduced, and the marketing of prime lamb is compromised. Crutching costs may be greater, and other penalties may result from delays to drenching, shearing, mating, etc. Wool strength may be affected and foot diseases may be aggravated due to reduced blood circulation in the wool follicles and feet.

Our earliest work on endophyte focused on the benefits it gave the grass. There are also negative effects for pasture. The endophyte fungus can produce metabolites that leach from the mature grass and suppress other plant species, particularly clover. Clover is a unique and valuable source of organic nitrogen; but in addition, it is the most nutritious component of pasture and a vital determinant of the rate of liveweight gain.

### More information

Outcomes from relevant research have been extended via Department of Primary Industries (DPI) Agnotes ([www.nre.vic.gov.au/notes](http://www.nre.vic.gov.au/notes)), by the Animal Welfare Centre ([www.animal-welfare.org.au/comm](http://www.animal-welfare.org.au/comm)), and in the proceedings of the Grassland Society of Victoria, e.g., 2000, 2002 ([www.grasslands.org.au](http://www.grasslands.org.au)). New Zealand studies can be accessed via the New Zealand Grassland Association ([www.grassland.org.nz](http://www.grassland.org.nz)). A list of relevant Australian research reports is available on request.

### Acknowledgements

We are indebted to all the farmers who reported their observations about the epidemic. The GSV, McKinnon Group of The University of Melbourne, newspapers (Weekly Times, Stock and Land, and Western District Farmer), Ace and ABC radio, the DPI call centre, and regional animal health staff all kindly assisted us to circulate information and questionnaires.

For further information, contact Kevin Reed at [reedk@nre.vic.gov.au](mailto:reedk@nre.vic.gov.au) or (03) 5573 0911.

# Pasture species database and GSV website redesigned

At the GSV central committee meeting in February, Professor David Chapman demonstrated the most recent version of the web-based pasture species database, a project developed by representatives of the Grassland Society of Victoria, The University of Melbourne, the Victorian Farmers Federation, the United Dairyfarmers of Victoria, and the Seed Industry Association of Australia.

The database now allows you to search for pasture species by selecting information about the desired group (grass, legume, or forage herb), the minimum rainfall

on your property, whether the species you need must be acid tolerant (based on the pH of your soil), and the preferred lifecycle of the species (annual or short-rotation, perennial, or hybrid).

The database now contains information on 222 cultivars of 37 pasture species commonly used in southeastern Australia.

(See the enclosed brochure 'The Web-based Pasture Species Database'.)

The redesign of the GSV website home page was also demonstrated at the meeting by developer Ken Shaw. The redesign is

intended to help you navigate around the site and also provides a 'members only' section.

Two versions of the site will be available: one for those with relatively high-speed access to the Internet and a second version, with fewer graphic elements, for those with slower access. The new website will require you to enter your postcode the first time you use the menus (fast version) or links (slower version) so that the society can develop information on where viewers are located.

Go to [www.grasslands.org.au](http://www.grasslands.org.au) to access the website or the database.

## What farmers said...

*Some of the comments farmers wrote on the ryegrass toxicosis questionnaires regarding the impact of the epidemic are quoted below.*

- \*Couldn't sell lambs on time.
- \*Could not shear weaners – delayed 3 months, then lost 150 due to inclement weather in June.
- \*My health has suffered, bending over too many fly-blown sheep.
- \*Only able to crutch 40% of the ewes coming up to lamb.
- \*Unable to muster for drenching and crutching.
- \*Unable to sell cull sheep off shears due to staggers.
- \*Affected growth rates and still seems to be affecting animal health.
- \*Problems with fly strike and can't handle the sheep.
- \*More important than the deaths was weight loss in wethers at critical time of year for staple strength.
- \*Foxes are stressing them and they drop and are eaten.
- \*Unable to drench young cattle on time.
- \*We have a bit of staggers in sheep every autumn; not cattle. We have never lost any before!
- \*Second summer drench abandoned; we are now paying the price with high worm burdens.

\*Staggers and heat stress affects behaviour in shed and yard, mainly at PM milking, causing stress to staff and chance of injury. Not unusual for a 10% drop in [daily milk] production.

\*Capsule program delayed.  
\*Feeding grain to stock had to stop in some paddocks.

*From a farmer who lost more than 700 sheep:* \*Most of our Merinos are autumn shorn; therefore, double the economic loss. Easily cast. Outbreak occurred in the middle of joining.

***\*In a few weeks, staggers has claimed more sheep than ovine Johne's disease ever did.***

\*In the last 35 years, this was the worst staggers I have ever seen. We shear early May, had to stop midway.

\*The last few have just stopped dying (20 May 2002).

\*Much time spent removing dead animals from creeks.

\*Very difficult to remove rams. Took 3 days rather than usual 1 day.

\*Some fly-struck sheep not treated for fear of disturbing mob. More cast sheep as a result.

\*Not able to class out surplus culls.

\*Got 1,100 weaners out...feedlotted on 9 ha.

\*12 calves lost that had been weaned 2 weeks.

***\*Problem severe, research needed.***

\*Cannot muster any sheep currently.

\*Cattle caught in troughs & in liquid feed tanks.

\*It took [sheep] about 2 weeks in feedlot to fully recover. [Then] after shearing they were returned to paddocks and would be badly affected again in 2 weeks. Cattle were allocated to worst affected paddocks.

\*About 200 [sheep] deaths, many drowned. Drenching postponed. Could not remove rams. Never had cattle affected before. Worst seen in sheep in 35 years. Suspect good pasture paddocks worse.

\*Could not get cattle in to milk or pregnancy test.

\*Quite a number of losses in dairy cows, dairy and beef heifers, and ewes and prime lambs.

\*My husband risked his life in a creek to save a staggering heifer.

\*Pregnant 2-year-old heifers particularly difficult to handle.

\*Mating of ewes was affected. With one mob of 800 ewes, we were not able to finish our second summer drench or to jet. The flystrike got going in these mobs. We got behind with crutching and classing.

\*We moved the first mob affected into a predominantly phalaris paddock. They are still [April 22] badly affected.

# Perennial grasses evaluated for southern mixed farming systems

by M. R. Nortort, E. A. Koetz, and G. Stewart, NSW Agriculture

Research in southern Australia has shown that the use of pastures dominated by perennial species assists in maintaining the sustainability of agricultural systems by reducing waterlogging, soil acidification, and weed infestation and by protecting and improving soil structure.

Lucerne is often the species of choice but is poorly adapted to acid and waterlogged soils, requires rotational grazing to persist, and competes poorly with many annual weeds.

We believe that pastures that are dominated by a mixture of perennial legumes and grasses will provide the greatest benefits for animal production and subsequent cropping, and it therefore essential that well-adapted species are available.

Few grasses have been available that can persist well over hot, dry summers. Most grasses will break dormancy in response to incidental summer rain and then deplete their carbohydrate reserves during the following dry period, causing the plants to die. Some recent claims of improved persistence in a number of grasses, therefore, initiated a trial at Barellan, NSW (34°17'S, 146°34'E, 442-mm average annual rainfall), to test the validity of these claims.

The trial was sown in May 1998, was located on a red-brown earth, and comprised small-plot evaluation of a number of populations and cultivars of cocksfoot (*Dactylis glomerata*), phalaris (*Phalaris aquatica*), tall wheatgrass (*Thinopyrum ponticum*), and various waltzy grasses (*Austrodanthonia* spp.). Single superphosphate (SSP) and nitrogen were applied at sowing and annually thereafter at 100 kg SSP/ha and 50 kg N/ha. Frequency counts were used to assess persistence, and productivity was measured by taking herbage cuts.

Rainfall for the year from May 1998 to April 1999 and for the 10-month period from May 1999 to February 2000 was 496 and 436 mm respectively. Although the rainfall over the summers of 1998/99 and 1999/00 was somewhat higher than normal, results still indicated (Table 1) that genotypes that exhibited summer dormancy (e.g., Kasbah cocksfoot and Perla retainer (bulk) phalaris) had high levels of persistence.

High persistence had also been recorded by Kasbah cocksfoot in July 1999 (data not presented). Kasbah and Perla retainer (bulk) phalaris were also highly productive early in the season, which is advantageous, as this is a time of

low feed availability. Kasbah cocksfoot is strongly summer dormant, requiring both moisture and a drop in daytime temperature to break dormancy.

The high productivity and persistence of *A. caespitosa* indicate good adaptation, although the unavailability of seed precludes commercial use. The *A. caespitosa* in this study was not summer dormant and appeared to use incidental rainfall for growth. However, it flowered early and at any time of the year, and results of a July assessment indicated that palatability to sheep was lower than other genotypes.

Future research should occur in a mixed sward, as little is known about the compatibility of these grasses with perennial legumes, and this will aid development of the 'model pasture'.

## Acknowledgements

We thank the Grain Research and Development Council for financial support and L. McDonald for palatability scores.

For further information, contact Eric Koetz at (02) 6938 1954 or [eric.koetz@agric.nsw.gov.au](mailto:eric.koetz@agric.nsw.gov.au).

An earlier version of this article appeared in Volume 16, Number 2, 2001, of the Grassland Society of NSW Inc. newsletter.

Table 1. Productivity in July 1999, persistence in February 2000, and mean palatability scores (1 = most palatable, 5 = least palatable) in July 2000 of a range of cultivars and populations of cocksfoot (Dg), phalaris (Pa), tall wheatgrass (Tp), *Austrodanthonia richardsonii* (Ar), *A. linkii* (Al), and *A. caespitosa* (Ac) at Barellan, NSW.

Genotype	Yield (kg/ha)	Frequency (%)	Palatability (1-5)	Genotype	Yield (kg/ha)	Frequency (%)	Palatability (1-5)
Dg (Tas1714)	1,744	42.0	3.3	Pa (Sorolan)	2,180	41.0	2.0
Dg (Tas1703)	1,861	38.7	3.3	Pa (Atlas PG)	1,874	40.3	1.7
Dg (Tas1715)	1,711	39.7	3.0	Pa (Perla bulk)	2,145	49.3	1.7
Dg (Tas769)	1,946	32.7	2.3	Tp (Tyrell)	1,641	34.0	3.0
Dg (Kasbah)	2,368	55.3	3.3	Tp (Dundas)	2,024	30.0	2.7
Dg (Currie)	2,036	51.3	2.3	Ar (Taranna)	1,479	35.0	3.7
Dg (Vic#79)	1,909	28.3	1.7	Al (Bunderra)	1,135	18.3	2.7
				Ac (Dc1)	2,592	50.0	4.7
LSD 0.05	454	13.1			454	13.1	

## 2002 AFIA conference proceedings available

A limited number of copies of the conference proceedings of the Australian Fodder Industry Association are available for sale. The speakers and topics are available in a PDF file from the AFIA website at [www.afia.org.au](http://www.afia.org.au). Click on events and then select 2002 Conference Program. The price is \$35.

To order a copy, contact the AFIA secretariat on (03) 9890 6855 or [anne@afia.org.au](mailto:anne@afia.org.au).

# Journal article reports on grazing management for cocksfoot-based pastures

The following news of research and development in grass and forage production has been extracted from *Grass and Forage Science*, Vol. 57, No. 3, September 2002. This publication is the journal of the British Grassland Society and the official journal of the European Grassland Federation.

R. P. Rawnsley, D. J. Donaghy, W. J. Fulkerson, and P. A. Lane. *Changes in the physiology and feed quality of cocksfoot (*Dactylis glomerata* L.) during regrowth.*

A glasshouse study was undertaken to determine the physiological and morphological changes in cocksfoot (*Dactylis glomerata* L.) during regrowth after defoliation. Individual plants were arranged in a mini-sward in a randomised complete block design. Treatments involved harvesting each time one new leaf had expanded (1-leaf stage), up to the 6-leaf stage, with the plants separated into leaf, stubble (tiller bases), and roots. Stubble and root water-soluble carbohydrate (WSC), stubble and leaf dry matter (DM), tiller number per plant, and leaf quality (crude protein (CP), estimated metabolisable energy (ME), and mineral content) were measured to develop optimal defoliation management of cocksfoot-based pastures. WSC concentration in stubble and roots

was highest at the 5- and 6-leaf stages. Mean WSC concentration (g/kg DM) was greater in stubble than roots ( $32.7 \pm 5.9$  vs.  $9.4 \pm 1.5$  respectively). There was a strong positive linear relationship between plant WSC concentration and leaf DM, root DM, and tillers per plant after defoliation (Adj  $R^2 = 0.72, 0.88,$  and  $0.95$  respectively). Root DM/plant and tiller DM/tiller decreased immediately following defoliation and remained low until the 3-leaf stage, then increased from the 4-leaf stage. Tillers per plant remained stable until the 4-leaf stage, after which they increased (from  $9.9 \pm 0.5$  to  $15.7 \pm 1.0$  tillers/plant). Estimated ME concentration (MJ/kg DM) was significantly lower at the 6-leaf stage ( $11.01 \pm 0.06$ ) than at any previous

leaf regrowth stage, whereas CP concentration (g/kg DM) decreased with regrowth to the 6-leaf stage. Both the levels of ME and CP concentrations were indicative of a high-quality forage throughout regrowth ( $11.37 \pm 0.04$  and  $279 \pm 8.0$  for ME and CP respectively). Results from this study give a basis for determining appropriate criteria for grazing cocksfoot-based pastures. The optimal defoliation interval for cocksfoot appears to be between the 4- and 5-leaf stages of regrowth. Delaying defoliation to the 4-leaf stage allows time for replenishment of WSC reserves, resumption of root growth, and an increase in tillering and is before herbage is lost and quality falls due to onset of leaf senescence.



Cocksfoot (or orchardgrass)

Photo: Oregon State University website at www.brages.ccs.orst.edu

## Where did your hay originate?

The following note from the Department of Natural Resources and Environment (Victoria) is adapted from the newsletter of the Australian Fodder Industry Association. Similar cross-border movements of fodder may apply in other states. Check with your agricultural department.

Due to the continuing drought conditions, demands for hay and other stock feed are increasing. Considerable quantities of hay are entering Victoria from South Australia and, more recently, Western Australia. Note the following con-

ditions regarding fodder entering Victoria.

**Annual ryegrass toxicity:** The Department of Natural Resources and Environment considers that all areas of South Australia and Western Australia are affected by annual ryegrass toxicity (ARGT). Hence, cereal, pasture, and lucerne hay from these states must be tested and found to be free of ARGT.

**Branched broomrape:** Hay from the branched broomrape (BBR) quarantine area of South Australia

requires certification for absence of BBR.

**Lupins:** Hay from Western Australia and the southern Eyre Peninsula of South Australia must be free of lupin plant material.

**Green snail:** Hay from Western Australia must not be sourced from within 25 km of a known green snail infestation.

**Weeds:** All hay must also be free of noxious weeds.

A Plant Health Certificate should accompany each load of hay entering Victoria.

## Howard Trust calls for 2003 nominations

The A. W. Howard Memorial Trust Inc was established in 1964 to acknowledge the vision of Amos Howard, a South Australian farmer who, in the 1930s, widely promoted benefits from introduced subterranean clover into farming systems in Australia. The objective of the trust is to 'encourage and promote research and investigation in the fields of natural science and social science (including economics) which relate to the development, management and use of pastures'.

The trust now calls for nominations for the A. W. Howard Memorial Research Fellowship and the A. W. Howard Memorial Trust Inc Travel Grants 2003-2004.

The A. W. Howard Memorial Research Fellowship will be awarded on a competitive basis, and applications are open to post-graduate students enrolled or intending to enrol at any tertiary institution located in Australia. Applications close on Friday, 28 March 2003.

The trust annually awards A. W. Howard Memorial Trust Inc Travel Grants of up to \$3,500 to scientists to undertake overseas study tours or participate in international conferences related to aspects of pasture research within the aims of the trust. Candidates must be a member of staff of a recognised public research organisation and must have been resident in Australia over the past 3 years. The awards represent a career development opportunity. Preference will be given to scientists who have had little opportunity to travel overseas. Applications close on Friday, 28 March 2003.

*Further information and an application form for either award can be obtained from the website ([www.sardi.sa.gov.au](http://www.sardi.sa.gov.au)), by email ([dnprowyi.oksana@saugov.sa.gov.au](mailto:dnprowyi.oksana@saugov.sa.gov.au)), or by phone ((08) 8303 9433).*

### Salinity

## Wool and sheep meat producers: there's something in the research for you

Land, Water & Wool is a new initiative of Australian Wool Innovation Ltd. (AWI) and Land & Water Australia (LWA) that includes a subprogram called Sustainable Grazing for Saline Land (SGSL).

This program, which includes financial support from Meat & Livestock Australia and the Department of Primary Industries (DPI), offers an exciting opportunity for wool and sheep meat producer groups to experiment with saltland practices that they consider need testing or developing in their district.

The SGSL program will financially support producer groups across southern Australia by helping them identify key salinity issues that affect productivity. Producer groups will actively work with researchers to look for productive and profitable solutions for their issues. The producer groups will be supported by science to observe, test, and measure their own trials in their area.

In Victoria, this program will be overseen by a producer-majority coordinating committee chaired by Christine Forster, Chair of the Victorian Catchment Management Council.

Other members include Ken Lamb (BeefCheque Board), Andrew Dufty (BESTWOOL 2010), Warren Mason (LWA), Ralph Behrendt (DPI Wool Program), and Banjo Patterson (DPI Meat Program). The project officer is Trevor Pollard from DPI.

The SGSL program has been designed to deliver three main outcomes:

- Profitable and sustainable grazing systems for saline land.
- A reduction in the negative environmental impacts from salinised land.
- Pride for participating producers in their property, production system, and product.

To achieve these outcomes, the program has been broken up into three separate components:

- The producer network of research and demonstration sites as described above.
- A national saltlands systems R&D program that includes a site at Dunkeld in western Victoria.
- A packaging and products component that will initially publish the second edition of a technical manual called "Saltland Pastures in Australia".

The need for a program like SGSL is highlighted by the findings of a recent survey undertaken by LWA of wool producers across southern Australia in which 41% responded that they had areas of salinity on their property and 79% said that they believed that saline land could be made more productive or profitable.

*The producer network has just commenced in Victoria, and more details will be made available to GSV members in the near future. However, if you have any queries, contact Trevor Pollard, SGSL Project Officer, on (03) 5573 0907.*

## New mycotoxin report released

Ross Gould of Canada via the GRAZE-L mailing list tells us that the Council for Agricultural Science and Technology (CAST) of Ames, Iowa, USA, has released an updated version of their report on mycotoxins, first published in 1979 and then revised in 1989. The report addresses mycotoxin risk in plant, animal, and human systems, Ross says. Mycotoxins are toxic metabolites of fungi.

The 217-page report, which includes a glossary and index, is available via the Internet as a PDF file. The address is <http://www.cast-science.org/pubs/mycotoxins.pdf>.

# Pasture Points

*Pasture Points has been compiled by Lisa Miller, NRE Geelong. It aims to keep members up to date with the latest news in pasture-related research and timely information. This is our last column from Lisa (see 'Help wanted!' on page 3). The column will continue. Please send your contributions to office@grasslands.org.au until we find a new compiler.*

## Thinking of winter feed

One very successful winter feed crop, Winfred forage brassica (sown at 1.5 kg/ha) and Progrow short-term ryegrass (sown at 6 kg/ha), was featured in last year's bus tours held by the Central West branch of GSV and Sustainable Grazing Systems. The crop was sown into a bent grass-dominant pasture that was low in fertility and highly acidic with a rainfall above 700 mm at Alan Smith's property, "Mt Mercer". The total cost of the treatment was \$185/ha, which included lime at 3.3 t/ha. What would normally run 2.5 dse/ha over winter with supplementary feeding ran 43 dse/ha from mid May to late October without additional feeding. This allowed other paddocks to be spelled and built up a feed bank for spring-lambing ewes and August-shorn sheep. The key to success was sowing early in March and conserving moisture the previous year by spraying out the paddock in November and cultivating in February. Winfred forage brassica was chosen because of its ability to tolerate and grow in areas subject to frosts.

## Aerial-seeding clovers

Aerial-seeding clovers are those that can be harvested above ground and include most legume species except subclover. Examples of aerial seeders are balansa, arrowleaf, persian, and white clovers. Pedro Evans, PVI Hamilton, explained at a Central West branch field day that aerial seeders are small-seeded species that must be sown shallow, covered no more than 1 cm. Even broadcasting seed onto cultivated ground will give good results, although direct drilling is preferred. Redlegged earth mites must be controlled with insecticides, normally applied with a knock-down herbicide before

sowing. If only the clover seed is treated with insecticide, then only those earthmites that come in contact with the seed are killed, so it is not as effective as spraying the paddock with insecticide. Superphosphate and potash are important nutrients when sowing aerial-seeding clovers, but no nitrogen fertiliser is needed to kick off the clovers. The seed, however, must be inoculated with the correct rhizobium strain.

Pedro also reported that aerial-seeding clovers require special management. They should be spelled for a period of about 6 weeks once flowering starts in spring to obtain maximum seed set and good regeneration the following year. This should not be a problem, as at this time of the year it is essential to maintain subclover pastures relatively short to maintain quality and to encourage good subclover seed set. This requires about three times the stocking rate that is used in winter. If alternative legumes with different flowering times are used, such as Paradana balansa clover, Leura subclover, and Arrotas arrowleaf clover, the flowering could start early October, mid to late October, and late November respectively. This would allow different "lock-up" times for the aerial seeders, and all species can be grazed again as soon as seed sets to utilise the pasture before quality is lost.

## Taxation incentives for landholders with approved land management plans

In addition to the normal taxation incentives available for primary producers for the treatment and prevention of land degradation, there is an extra incentive for landholders with an approved land management plan. Fencing may be fully deducted or claimed as a rebate under the Income Tax Assessment Act 1997 where the fence separates different land classes. As a guiding rule for defining land classes or land types, if it needs to be managed differently then it is a separate land class (e.g., steep hill country versus river flats). A land management plan consists of a whole-farm plan showing the different land classes and proposed fencing and includes supporting documentation that briefly de-

scribes the land classes to be separated and how they will prevent further land degradation. An authorized farm consultant or departmental officer must give certification approval of the land management plan. An information note, available from either the Department of Primary Industries (DPI) or its website ([www.nre.vic.gov.au](http://www.nre.vic.gov.au)), explains more about land management plans and who is eligible to approve them. The reference is Cummings, D., and Findlay, G. (1999), "Who can approve land management plans for taxation purposes?", NRE Landcare Note Series LC0014.



# Question & Answer

*At a recent GSV central committee meeting, the suggestion was made that we have a question and answer column in the newsletter. The idea is that members ask questions and members who know the answer respond.*

Barbara Johnson, chair of the Gippsland branch, has submitted the first question. The answer will be published in the next newsletter.

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## What is the value of sweet vernal grass (*Anthoxanthum odoratum*) in pasture; and if it is no good, how do you get rid of it?

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Your editor finds this question of particular interest because a member of her Beefcheque group lost five springing heifers, most likely by feeding them silage that contained sweet vernal grass (see article on page 6). Under certain circumstances, the coumarin in sweet vernal (also found in many other plants, such as strawberries) can change into dicoumarol, which is the same as warfarin, the active ingredient in many rat poisons. Sweet vernal growing in the paddock or baled in hay apparently does not form dicoumarol.

*Send your answer to this question or a new question to the editor by mail, fax, or e-mail (see the first column on page 2 of the newsletter for details).*



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## Branch Contacts and Coming Events

**Albury-Wodonga:** Branch contact: Jeff Hirth, (02) 6030 4500.

**Central West:** Branch contact: Lisa Miller, (03) 5226 4607.

**East Gippsland:** Branch contact: Leo Hamilton, (03) 5156 8261.

**Gippsland:** Branch contact: Mark Thompson, 0429 425 236.

**Limestone Coast:** Branch contact: Danielle England, (08) 8767 6077.

**Loddon-Campaspe:** Branch contact: Tim Demeo, (03) 5430 4427.

**Mid-Goulburn:** Branch contact: Gary McLarty, (03) 5735 1240.

**Tasmania:** Branch contact: Konrad Chung, (03) 6393 1688.

**Western District:** Branch contact: Bruce Lewis, (03) 5574 6261.

### Dates for the grassland farmer's diary

**ABARE Outlook 2003.** 4 to 5 March 2003. National Convention Centre, Canberra. Contact: (02) 6272 2019 or [www.abareconomics.com](http://www.abareconomics.com).

**South-west Farmers Day.** 11 March 2003. Permorming Arts Centre, Brown Street, Hamilton, Victoria. Jointly arranged by the Western District branch and the Pastoral and Veterinary Institute, Hamilton. Contact: (03) 5573 0900.

**Mac Troup Memorial Lecture.** 21 March 2003. Sovereign Hill, Ballarat, Victoria. Mr Andrew Campbell of Land & Water Australia will discuss 'Farming the

real Australia: water use and climate implications for grassland farming'. Contact: (03) 5974 4066.

**GSV and GSNSW Joint Annual Conference.** 11 to 13 June 2003. Albury Performing Arts Centre, Albury, New South Wales. Contact: (03) 5974 4066.

**Weed Society of Victoria Biennial Conference.** 20 to 21 August 2003. Bendigo, Victoria. Contact details in a later edition.

**27th International Seed Testing Association Congress.** 13 to 25 May 2004. Budapest, Hungary. Contact: [www.seedtest.org/27congress/27istac.cfm](http://www.seedtest.org/27congress/27istac.cfm).

### Branch Event

## South-west Farmers Day to be held at Hamilton

by Geoff Saul, Central West Branch Member

'Sow What Where?' is the title of this year's South-west Farmers Day jointly arranged by the Grassland Society of Victoria's Western District branch and the Pastoral and Veterinary Institute. The day will be held at the Performing Arts Centre, Brown Street, Hamilton, on Tuesday, 11 March, with registration from 1.00 p.m. The afternoon will feature talks by experts about how the different cultivars of perennial grasses and clovers suit different situations, comments and hands-on experience from farmers using new pasture cultivars, and trade displays by companies involved in seed and fertiliser.

The evening session will feature a talk by Professor Tim Reeves titled "Better Pastures and Crops: the Role of Genetic Modification and Biotechnology". Tim has just completed several years based in

Mexico, as Director General of CIMMYT, a worldwide research centre for improved crops. Prior to this, he was Foundation Professor of Sustainable Agricultural Production at Adelaide University and Director of Rutherglen Research Institute in northern Victoria. We are very fortunate to be able to have Tim come and speak about the role of genetic modification and biotechnology, as he has worldwide experience and a good knowledge of local conditions, needs, and issues.

The afternoon session will include talks on tall fescue by Mike Gout of Wrightson Research, perennial ryegrass by Malcolm Anderson of PVI Hamilton, and phalaris by Richard Culvenor of CSIRO in Canberra. Rex Clements from Glenormiston College will explain how the GSV pasture web database can be used to select cul-

tivars; Pedro Evans from PVI will talk about annual clovers; and Kevin Reed will cover niche species, such as lucerne, chicory, and cocksfoot. Ewan Price and Charles de Fegely will outline their hands-on experience at Heywood and Ararat respectively in using new species and what they hope to achieve from these sowings.

The cost of the day is \$35 and registrations must be received prior to 4 March to allow for catering arrangements. This cost includes seminar attendance, afternoon tea, hot evening meal, and notes. Attendance at the evening session from 7.30 p.m. without a meal is \$10.

Registrations can be sent to South-west Farmers Day, c/o Private Bag 105 Hamilton, Vic 3300. Further enquires phone (03) 5573 0900.