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NEWSLETTER

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Our deepest sympathy goes out to our colleagues in Eastern Victoria who have had to endure the worst bushfires ever with at least 210 killed and heavy stock and property losses. The response, not only in Australia but in other countries has been most impressive. In complete contrast to the Victorian situation our sympathy also goes out to our colleagues in northern Queensland who have been deluged by floods leading to very heavy losses in the beef cattle industry. We all hope that the rest of 2009 will be a far better season than the years we have endured recently.

It was good to learn that despite the financial turmoil in USA, Europe and Asia that the Agricultural component of Gross Domestic Production was up in the last quarter despite heavy reductions in mining and manufacturing... Also prices for cattle and sheep remain good. We would all like to see increases in the price of wool.

I was interested to read in the latest issue of "Grass and Forage Science" articles on "Managing Grass for Horses' and "Grass Fed Venison." Two possible topics for future conference!?

The next meeting of the Southern NSW branch of the Australian Society of Animal Production will be at the Community Technology Centre, Bowler Street,

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Holbrook on Wednesday, April 1. The theme is "Silage solutions for forage resolutions". Among topics that will be presented are "Silage for cattle", "Silage for sheep", "Animal health problems" and "Drought feeding using silage".

Despite the very disappointing large reduction in Wool Research by CSIRO it was interesting to learn that the Sheep CRC is continuing to finance research for the sheep industry, particularly in sheep genetics meeting key requirements for wool consumers including handle and softness, next-to-skin comfort and natural whiteness and photostability.

An issue continually mentioned in the media is the Emissions Trading Scheme (ETS). There is concern that carbon pollution reduction schemes may have serious cost effects on agriculture. Recently the Australian Bureau of Agricultural Research Economics following some modelling, has suggested that ETS may slow beef production but have a good effect on crop production. ABARE suggests that the effect of the scheme will not be felt until after 2020! The ETS is a system which needs considerably more investigation before imposing it upon the agricultural industries.

Haydn Lloyd Davies
Editor

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EH GRAHAM CENTRE
for Agricultural Innovation
An alliance between
Charles Sturt University and NSW Department of Primary Industries

The Grass is Greener in the Manning Valley

Ray Johnston, NSW DPI, Taree, Livestock Officer - Dairy

NSW DPI and the Mid Coast Dairy Advancement Group, in conjunction with the Grassland Society of NSW, will host the 24th Annual Grassland Society Conference on 5th and 6th August 2009 at Taree.

The conference theme "***The Grass is Greener***" will explore the advantages of coastal dairy and beef production pastures. The impacts and implication of climate change on pasture systems as well as on livestock and personal health will be discussed. The conference will also include exciting tours to some of the largest dairy farms on the coast to explore their production systems.

International and local speakers, including local dairy and beef producers, will deliver presentations at the conference.

Key note speaker for the conference is Dr Jim Gibbs from Lincoln University in New Zealand. Jim is a senior researcher in livestock health and production from the New Zealand South Island. He will discuss the impact of high pasture intake on dairy cow health especially the role of rumen pH and function and its implications for lameness.

Peter Notman from Walcha Dairy will compare large scale dairying on northern NSW to the Gippsland area and discuss developing pastures on new frontiers.

At the conference dinner Heath Francis, gold medal winning Para-Olympian will share his experiences about farm safety.

At this year's conference we will be holding a Hay and Silage Feed Quality competition which is open to any commercial producer. Thanks to sponsorship we can offer discounted feed analysis and **$5000** worth of prizes to be presented at the conference dinner. Entry forms and instructions are available from NSW DPI offices.

A large number of poster and trade exhibits will be available with the capacity for interactive experiences and displays.

It is fully expect the grassland conference will be the major dairy event for NSW in 2009 and encourage interested people to register early.

Further information on costs and early registration are available from
* NSW DPI, Ray Johnston or Tracey (02) 6552 7299
* Michelle Blakeney on (02) 6552 1886

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Alternative fertiliser options

Lisa Warn, The Mackinnon Project, The University of Melbourne, Werribee, Vic

Part 2

Issues with manures

There are a couple of potential health issues that you need to be aware of when using manures, although the risks are relatively low and need to be kept in context.

1. Poultry litter and manure may include spilled feed that contains meat meal. It is illegal to feed meat meal to ruminants, or to allow them to have access to it, to prevent the possible spread of exotic diseases such as 'mad-cow disease' or BSE (Bovine Spongiform Encephalopathy). Thus, you should ensure that stock do not have access to stockpiled litter or manure.

2. Poultry litter (manure and bedding) can contain feathers and bird carcasses (or parts thereof), which is illegal to feed to stock. Ensure that all feathers and/or bird parts are removed from the litter before it is spread onto pastures. This will reduce the risk of botulism in grazing stock.

3. Ideally manure should be composted, prior to spreading, to kill most human and animal pathogens (e.g. *Salmonella).* Research conducted by the former Ministry of Agriculture, Fisheries and Food in Britain found that if compost heaps are turned and mixed regularly to promote and maintain temperatures of at least 55°C, most pathogens are killed after one month.

Otherwise solid manures should be stored for at least three months prior to spreading. However, composting will reduce the quantity of the original material as well as its N content. And if manures are composted, this adds to the cost of the manure.

In practice, many producers are spreading non-composted manures onto pastures, as pathogen numbers do decline over time, particularly with dry, sunny conditions as the pathogens are killed more rapidly by exposure to UV light and desiccation. So it is recommended that you wait for at least two months before grazing the paddock and then only use mature stock, as lambs and calves are more susceptible, to reduce the risk of pathogen problems.

To apply manure onto pastures, Special "muck" spreaders are normally used to apply manure to pastures, because of its moisture content, but some manures from poultry layer-cages is dry enough to go through a normal super spreader.

Calcium and cations

Some questions that we are often asked include: "*are products with calcium better for my soil*?" and "*do I need to have the cations balanced in my soil?*"

Calcium (Ca) is one of the 'macro' plant nutrients but most Australian soils usually have more than enough Ca for plant growth. That is, Ca deficiencies are rare. Calcium also plays an important role in maintaining the structure of soils, as it is one of the exchangeable cations measured in soil tests, along with magnesium (Mg), sodium (Na) potassium (K) and aluminium (Al).

A soil's cation exchange capacity (CEC) is a measure of its ability to "hold onto" nutrients when the nutrients are in their soluble, plant-available forms. While your soil type has a major bearing on its CEC value, it can be increased through the addition of organic matter. On soil test reports, the values for five individual cations listed in the previous paragraph, are usually added together to give you a "sum of cations (meq/100g)". As well the percentages of Na and Al will be shown, and ratios of Ca to Mg may also be calculated.

Having more Ca in a soil than Na gives it a more stable structure, although soils contain more than 6% Na, they are at risk of dispersing, or having their structure 'fall apart' when wet or cultivated. For most Australian soils, Ca is already the dominant cation and so it doesn't need to be increased relative to the other cations. While products like guano and RPR contain 27% Ca and 35% Ca, respectively, many producers don't realise that superphosphate contains 19% Ca.

Some soil laboratories promote the concept that an 'ideal' soil must have a 'balanced' CEC of around 65% Ca, 10% Mg and 5% K for maximum plant growth. You might, therefore, be advised to apply lime or dolomite, for example, to adjust these proportions. However, research shows that within the ranges commonly found in soils, the chemical, physical and biological fertility of a soil is not influenced by the ratios of Ca, Mg and K.

Nutrient deficiencies and livestock

Whatever product(s) you are using to fertilise your paddocks, be they manufactured inorganic or organic fertilisers, animal manures or composts, you need to ensure that you are providing appropriate rates of nutrients for plant growth. Products with too low a level of a particular nutrient will restrict plant

growth, while excessive levels of other nutrients can create toxicity symptoms and increase the risk of nutrient losses to waterways. Regular soil (and occasional leaf) analyses will keep your fertiliser program and pasture production on track.

It is important to appreciate that sometimes the nutrient needs of the animals differ from those of pasture plants; for example, cobalt and selenium are essential trace elements for animals but not plants.

Cobalt: coastal calcareous soils are often associated with cobalt deficiencies in sheep. Intra-ruminal cobalt pellets or topdressing cobalt will prevent the development of and correction of these problems.

Selenium: soils in low selenium are usually acidic and found in regions that receive high average annual rainfall. Selenium intake of sheep is very seasonal, with lowest intakes occurring in spring and summer. Clinical expression of the deficiency is most common in years when there are good autumn rains and abundant spring growth of clover. Supplementation of sheep with selenium intra-ruminal pellets, or oral selenium drenches, are the most common methods to prevent selenium-related health problems. Selenium fertilisers are also available and may be a preventative option in regions that have a very high incidence of selenium-responsive disorders.

A frequently asked question is: "*can a soil nutrient imbalance cause animal health problems?*" The answer is yes and some examples involve trace element deficiencies and interactions.

Copper and *molybdenum*: many of the regions that are marginal or deficient in copper are also deficient in molybdenum. Molybdenum applications in these regions can exacerbate the copper deficiency. However, if the recommended rates of molybdenum are used, the risk of inducing a copper deficiency is negligible.

Liming of pastures often results in an overall decrease in copper availability, but increases molybdenum availability, to plants and animals. High dietary intakes of sulphur, cadmium and in particular molybdenum have all been shown to decrease the availability of dietary copper to sheep. Because of these complex interactions, the concentration of copper in pasture herbage is a poor indicator of whether copper deficiencies are likely to occur in sheep.

Pasture topdressing with fertilisers containing copper is the preferred long-term treatment in situations where herbage copper is limiting for sheep.

Selenium: heavy applications of fertiliser decrease the concentration of selenium in pasture (by dilution) and high sulphur levels may also decrease the availability of selenium.

Grass tetany (hypomagnesaemia) in cattle is another example where nutrient imbalances are implicated. Grass tetany can be caused by one or more of the following factors in various combinations; pastures low in Mg and/or Ca, particularly in lush grass pastures, pastures high in K and/or N, and short pastures. You should seek advice about how to manage grass tetany if it is a problem on your property.

Conclusions

While there are numerous nutrients that plants need, the most common nutrient deficiency in Australian soils is phosphorus (and nitrogen for grasses), followed by sulphur and then potassium. Your choice of fertiliser product(s) should be based on supplying the nutrients your pastures need at the least cost. In specific geographic areas, trace elements will also be required periodically for either the plants or the animals. While soil nutrient deficiencies and interactions are known to cause animal health disorders, they generally occur where soil nutrient levels are either not within their recommended ranges or when there are other stress factors affecting the animals, such as a lack of feed.

Reprinted with permission from the Mackinnon Project Newsletter, May 2008. For more information, contact Lisa Warn on 03 9731 2375 or l.warn@unimelb.edu.au. The Mackinnon Project produces a monthly newsletter which is available by subscription; for more information, contact Pam Leslie on 03 9731 2225.

New Members

The Society welcomed the following new members at the Management Committee meeting of May 2009:

Kelly Kellogg (Stanthorpe); Matthew Harrison (Acton);
John Doyle (Woolooma); Peter Singleton (Hernani);
Clive Allison (West Kempsey); Rebecca Byrne (Moree); and
Mid Coast Dairy Advancement Group Inc (Taree)

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Crop Care

NSW DEPARTMENT OF
PRIMARY INDUSTRIES

New hard-seeded pasture legumes for crop-pasture rotations

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Background

In the past 15 years a wide range of new annual pasture legumes have been developed for use in Australian agricultural systems. There are several factors that precipitated the development of these species, but key among them were the need to develop species with wider adaptation potential, better drought tolerance, improved disease and pest tolerance and easier harvestability (Nichols et al 2007). While these species have been widely adopted in Western Australia (Loi et al 2005), a recent survey of farmers in central and southern NSW indicated newly developed pasture legumes were used by less than 5% of farmers (Hackney et al 2008). The same survey however, found that there was significant interest in use of these new legumes for crop-pasture rotations, but that lack of knowledge of their growth and management was impeding their adoption into farming systems. Many of the new annual pasture legume species have very high levels of hard seed (Nichols et al 2007) meaning that when appropriately managed, they are capable of surviving a cropping phase and regenerating without the need for resowing. The length of the cropping phase that can be survived varies within and between species. Compared with traditional crop-pasture phase cropping (3-5 years crop, followed by 3-5 years pasture) where the period occupied by the pasture phase is relatively inflexible, use of recently developed hard seeded annual pasture legumes may allow farmers greater flexibility to switch between cropping and pasture and hence quickly alter the livestock to cropping ratio of their farm. Such strategies may enable farmers to flex more with changing commodity prices and thus remain more economically viable. Additionally, the use of such hard seeded pasture legumes in self-sustaining intensive crop-pasture rotations may allow farmers to reduce their reliance on inorganic nitrogen sources, thereby reducing input costs and improving economic sustainability. Current research is examining the role of these recently developed hard seeded annual legumes in self sustaining intensive crop-pasture rotations. Conventional sowing of scarified seed and use of a new technique called “twin sowing” (Loi et al 2008) are being examined as ways of establishing these new rotations. Note that as twin sowing treatments only commenced last year in NSW, this paper will cover more the concepts of twin sowing as compared with conventional pasture establishment. Ongoing

evaluation of the relative success of twin sowing compared to conventional means of pasture establishment is required to ensure robustness of this system under NSW conditions.

Which new annual pasture legumes are being used and why?

The main pasture legumes under evaluation for use in self-sustaining crop-pasture rotations are biserrula (*Biserrula pelecinus*), French serradella (*Ornithopus sativus*) and bladder clover (*Trifolium spumosum*). These pasture legumes were chosen for use in NSW evaluations as they showed significant promise in a range of field experiments in a number of soil types and rainfall districts leading up to the commencement of this project. These species differ in their hard seed levels and their capacity to survive cropping phases of different durations. These legumes also differ in their tolerance to different soil conditions. Biserrula and French serradella are very tolerant of acidic soils while bladder clover will tolerate a wide pH_{Ca} range of 5-8. Compared with subterranean clover, the hard seed levels of these species is high* and therefore they have the capacity to survive and be able to regenerate following short cropping phases. Other species including gland clover (*T. glanduliferum*) and yellow serradella (*O. compressus*) have hard seed characteristics which lend themselves to intensive crop – pasture rotations and these will also be included in upcoming field evaluation

Conventional pasture establishment versus twin sowing

Conventional pasture establishment

In NSW pastures are generally established in one of two ways and both involve the use of scarified pasture legume seed. The most common method of pasture establishment in the cropping zone is to sow scarified pasture legume (and possibly perennial legume and/or grass) seed using a cover crop of cereal in the final year of the cropping phase. The cover crop rate of cereal is usually one-quarter to one-third of the normal cereal sowing rate. The rationale behind the use of this system is that the return from the cereal grain will assist in off-setting the cost of pasture establishment.

The other method of establishing pasture involves sowing scarified legume (and sometimes grass) seed without the use of a cover crop. Most commonly now this is done via direct drilling. Despite past research showing that pasture establishment can be severely compromised using cover crops (Cregan 1987) a recent survey of 208 farmers in central and southern NSW (Hackney et al 2009, unpublished) found that use of cover crops is still the predominant means of establishing pasture in the mixed farming zone, with 71% of farmers establishing pasture in this way. Interestingly in this survey only 13% of farmers

who used this pasture establishment technique considered it to be a highly successful means of establishing pasture. Compared to 20 years ago however, the incidence of using cover crops as a means of pasture establishment has declined. Pratley and Cregan (1987) reported cover cropping was used by 91% of farmers to establish pastures at that time.

Experiments established in autumn 2008 at Junee Reefs (50 km NE of Wagga Wagga) and Peak Hill (75 km SW of Dubbo) found that use of a cover crop to establish annual pasture legumes resulted in poor seed set of all species except bladder clover (Figure 1). Past research has shown that a seed bank of 150 kg/ha is desirable for regeneration of a dense second year subterranean clover based pasture (Dear et al 2008). From the study presented in Figure 1, it can be seen that at both Junee Reefs and Peak Hill seed set of all legumes except bladder clover are well below this threshold and therefore the probability of having a dense second year stand of pasture from first year seed set is low. At Junee Reefs in 2008, spring rainfall was well below average, but at Peak Hill October rainfall was double the monthly average and in November, rainfall was also above average. The results therefore indicate that even with a higher than average rainfall spring as experienced at Peak Hill, the capacity of this type of pasture establishment technique to set up a successful pasture seed bank for ongoing high productivity pasture production is limited.

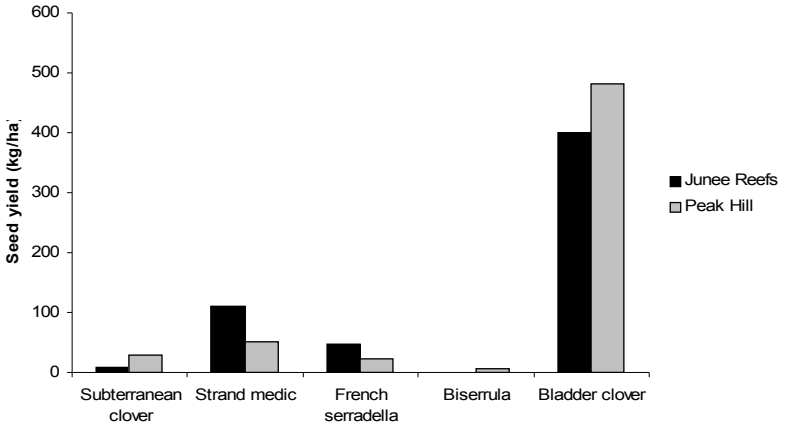

Figure 1. Seed yield (kg/ha) of subterranean clover, strand medic, French serradella, biserrula and bladder clover sown as scarified seed under a wheat cover crop at Junee Reefs and Peak Hill NSW in 2008. Sowing rates of subterranean clover, strand medic, French serradella and bladder clover were 4 kg/ha and 3 kg/ha for bladder clover. Wheat cover crop rates were 20 kg/ha at Junee Reefs and 15 kg/ha at Peak Hill.

Twin sowing

Recently developed pasture legumes mentioned previously in this paper; French serradella (Margurita and Erica), yellow serradella, biserrula, bladder clover and gland clover all have higher levels of hard seed compared with subterranean clover. Further, the rate at which hard seed breaks down is also slower than subterranean clover (Table 1). Due to these differences in hard seed and hard seed breakdown characteristics opportunity exists to exploit these characteristics to cheaply and efficiently establish and maintain new annual legumes in crop-pasture rotations.

Table 1. The percentage of hard seed of various annual legume species in early summer and again in late autumn early winter following exposure of seed to field conditions

Species	Variety	Hardseed (%)	
		Early summer	Late autumn-early winter
Bladder clover	Bartolo	97	56
Yellow serradella	Santorini	98	61
Biserrula	Casbah	99	76
Gland clover	Prima	98	41
French serradella	Erica and Margurita	99	55
Subterranean clover	Dalkeith	88	14

Twin sowing is a one-pass method of establishing pasture without cutting back on crop sowing rates and eliminates competition between crop and pasture for moisture at establishment (Loi et al 2008). How is this possible? Essentially, rather than using scarified seed as is practised with conventional cover cropping or stand alone pasture establishment, twin sowing uses unscarified seed (or in the case of the serradellas, seed that is still encased in pod segments). The scarified seed is sown along with the crop and because the legume seed is very hard, there will be virtually no germination in the crop (Year 1). Rather, this is a year where the legume seed softens. Because there is no (or only very little) germination of the legume in Year 1, crop yield is not affected. In Year 2, the legume seed has softened and will emerge with autumn rain and thus is a pasture year. The seed set by the pasture in Year 2 is virtually all hard, so it is essential to crop again in Year 3 to allow the legume seed to soften. In Year 3 the crop is able to utilise the nitrogen fixed by the pasture legume, thus reducing the reliance on inorganic nitrogen sources. Beyond Year 3, depending on the annual legume used, the length of the crop phase can be altered depending on whether

the farmer wishes to run longer or shorter cropping phases. Such a system is highly complementary; in pasture years, the pasture can be utilised as a high quality grazing resource which also fixes nitrogen and this nitrogen can then be used by the following crop(s). The critical components to ensure the success of the twin sowing system is ensuring legume seed is not sown too deeply in Year 1 and that seed set of the pasture legume in Year 2 is optimised. Additionally it is essential to ensure that a long life inoculant product is used in Year 1 to ensure that the correct rhizobium for nodulation of legume is available in Year 2. Currently only granular inoculants have the required length of life for use in twin sowing.

Twin sowing experiments were established in conjunction with the conventional cover cropping experiment at Junee Reefs and Peak Hill in autumn 2008. Results from 2008 (Year 1) indicated that there was minimal germination of hard seeded pasture legumes in the crop year and consequently there was no difference in yield of wheat between the twin sow treatment and where wheat alone was sown at either site. In 2009 (Year 2) establishment and production of the annual pasture legumes will be monitored. New experimental sites will also be established this year to more comprehensively compare cover cropping, stand alone pasture sowing and twin sowing as a means of incorporating new hard seeded pasture legumes into intensive crop-pasture rotations.

Note that subterranean clover is not suitable to use for twin sowing. When subterranean clover seed is harvested, a large percentage of it gets scarified during the harvesting process. Therefore if attempts were made to use subterranean clover for the purpose of twin sowing, very high percentages of it would emerge in Year 1 under the crop and at full cereal sowing rates there would be little chance of it being able to set seed due competition for moisture. As a result there would not be sufficient hard seed left from Year 1 sowing for regeneration in Year 2.

Choosing a hard seeded pasture legume to suit your pasture-crop rotation
Table 1 shows that there are considerable differences in the rate of hard seed breakdown between pasture legume species and this can be used as a guide for the length of the crop rotation that these pasture legume can withstand.

Legumes for long (3:1 and 4:1) crop: pasture rotations
In Table 1 it can be seen that biserrula and yellow serradella have the highest level of hard seed in late autumn. Biserrula is a very prolific seeder. In New South Wales production of up to 1.5 t seed/ha have been recorded in small plots with rates of 1 t/ha reported in seed crops. With such high seed production

capability and high hard seed levels Western Australian studies have shown it is possible to crop for up to 4 years following a biserrula pasture year and still have sufficient seed in the seed bank for pasture regeneration. Yellow serradella is another species that can support long cropping phases once a seed bank is established. It is possible however to shorten the length of the cropping phase following biserrula or yellow serradella as sufficient seed will soften following one year of crop to allow for very intensive (1:1) crop-pasture rotations. These species have potentially the greatest degree of flexibility once a seed bank is established allowing farmers to budget nitrogen fixation of legumes with nitrogen use by crops and also the ability to readily change between crop and pasture depending on livestock grazing requirements in a given year.

Legumes for shorter (2:1 and 1:1) crop: pasture rotations.
Bladder clover and gland clover have considerably higher hard seed levels in late autumn-early winter compared to subterranean clover (Table 1). However, compared to biserrula and yellow serradella which has only 24% germinable seed in late autumn-early winter, bladder and gland clover have 44% and 59% germinable seed respectively. Because of this both bladder clover and gland clover are capable of establishing reasonable regenerating pasture stands year in - year out. However with this level of hard seed, these species are also able to withstand 1 to 2 years of cropping and still regenerate adequately provided a good seed bank has been established. French serradella (varieties Margurita and Erica) have lower hard seed levels than yellow serradella and therefore cannot withstand long (3 and 4 year) cropping phases but are well suited to 1 to 2 year crop phases. As mentioned in the previous section, both biserrula and yellow serradella can be also be used in these shorter crop-pasture rotations.

Commonly asked questions

If I decide to try twin sowing, how much legume is going to germinate in Year 1 with the crop and is this likely to affect my crops performance?
There will be some germination of annual legumes in Year 1 when you twin sow wheat and hard seeded (or in pod) legumes. However at both Junee Reefs and Parkes last year, the number of legumes emerging in the twin sowing treatment in Year 1 was very low. Additionally as wheat is sown at normal full sowing rate any legumes that did emerge were out-competed by the wheat. At both Junee Reefs and Peak Hill there was no difference in wheat yield between wheat sown alone and wheat sown in the twin sowing treatment. Further, most of these new pasture legumes can be easily controlled by a wide range of broadleaf weed herbicides routinely used in crops.

What about in subsequent crop years once a large seed bank of the pasture legumes is established, is the density of legumes emerging in crop then likely to impact on crop yield?
Again, there are a wide range of options to take out these legumes in crop years if you feel the density emerging is going to negatively impact on crop performance.

Some of these new legumes are very sensitive to some commonly used broadleaf weed herbicides. What happens if I encounter a broadleaf weed problem in the pasture year? What herbicide options do I have?
There are some selective broadleaf weed herbicides registered for use on pastures which can be used on new pasture legumes described in this paper. Contact the authors for advice. There are other strategies that you can use to control weeds in the pasture year. Some new varieties of yellow serradella do not germinate for 2-3 weeks following the opening autumn rain (A.Loi, pers comm.), as a result there is opportunity to use a knockdown spray to control problematic weeds within the 2-3 week window before yellow serradella emerges. It is important to note that not all yellow serradella varieties have this characteristic. Contact the authors for advice. Grazing can also be an effective means of controlling weeds, particularly in biserrula. At flowering biserrula becomes slightly unpalatable, at this point livestock will tend to graze weeds preferentially and this has proved to be an effective means of weed control in biserrula based pastures in Western Australia (Loi et al 2005). After flowering livestock readily graze biserrula and high lamb weight gains have been reported in lambs grazing biserrula pastures over late spring and summer in Western Australia (Loi et al 2005). Large weed wipers (up to 30 m wide) have been developed in Western Australia for use in broadacre pastures. These units are proving very time and cost effective in both pastures and crops in controlling problematic weeds.

Any weed control strategy should include a combination of strategies. Sole reliance on herbicides to control weed problems may lead to development of herbicide resistance in weeds. Wherever possible establish crop-pasture rotations in paddocks that have been kept as weed free as possible. If weed problems are encountered then a combination of herbicide use and grazing will optimise weed control.

If I want to use new pasture legumes to set up self sustaining crop-pasture rotations, which are most suitable and what is the best way to establish these rotations?

The legume you choose for you crop-pasture rotation will depend on your soil chemical conditions, soil physical conditions, the climatic zone you live in and the type of rotation you want to establish. The species discussed in this paper differ in their tolerance of acid soils and also to waterlogging. Some are also better suited to lower rainfall areas than others. It is critical you choose the legume that suits your soil and climate. Further information on the suitability of these species to different soils and climatic zones can be found in Primefacts on the NSW DPI website and also on the Department of Agriculture and Food Western Australia website.

You also need to consider the type of rotation you want to establish. If you wish to have cropping phases longer than two years, then biserrula and yellow serradella are the best suited. If you intend to have cropping phases of only one to two years then French serradella (varieties Margurita and Erica), gland clover, bladder clover, yellow serradella and biserrula should all be suitable.

Conventional cover cropping should not be used as a means to establish these rotations as seed set of the legumes is likely to be severely compromised using this method. Failure to set up an adequate seed bank will result in poor long term performance of pasture and inability of the pasture phase to supply adequate nitrogen for crop growth. Twin sowing has been shown to be a very effective means of establishing crop-pasture rotations using serradellas in Western Australia. Preliminary research has also shown that biserrula and bladder clover can also be established by this method. However extreme care needs to be taken when establishing biserrula in this way as it is a very small seeded species and if sown too deep in Year 1, germination in Year 2 will be very poor. So far twin sowing has not been widely evaluated in NSW as a means of establishing crop-pasture rotations and is still in the experimental stage. Experiments were sown at two locations in 2008 and results will be available soon. Further experiments will commence in 2009.

All pasture legumes discussed in his paper have been successfully established at a number of sites in NSW over the past 10 years by sowing scarified seed and treating the pasture in the establishment year as a crop. Using this method, high seed yields have been achieved resulting in the development of a good seed bank. All pasture legumes could be established in this manner and then cropped in the following year thus setting up the crop-pasture rotation. No mater which method is chosen to establish the crop-pasture rotation, it is essential that

legumes are inoculated and that the inoculant chosen is appropriate for the method of sowing used.

Conclusions

Many of the new pasture legumes developed over the past 15 years have significant potential for use in crop-pasture rotations. The high hard seed characteristics of these legumes mean that they are able to regenerate following cropping phases. The length of the cropping phase legumes can survive varies from species to species and this enables farmers to choose a legume which best fits their cropping rotation program. Use of new pasture legumes in this way may significantly decrease reliance on inorganic nitrogen sources as crops can utilise nitrogen fixed in the pasture year. Research into the use of these new legumes and the best methods to establish crop-pasture rotations in NSW are ongoing. The twin sowing technique of establishing crop-pasture rotations is still under evaluation in NSW and further evaluation is required to ensure it is a reliable pasture establishment technique.

*Note that hard seed levels can vary between varieties within a species. For example Erica and Margurita French serradella have high levels of hard seed and are therefore well suited to intensive pasture-crop rotations discussed in this article. Cadiz French serradella however has very low levels of hard seed and as such is highly susceptible to false breaks and not suited to use in intensive pasture-crop rotations.

Acknowledgements

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Rural Scene - Managing Pastures

Nathan Ferguson

Investment into perennial grass pastures is an expensive exercise, costing at least $300/ha. It is therefore important that these perennial pastures are managed in a way that will maximize the persistence of the pasture. As the 'big' dry continues and the Bureau of Meteorology predicts a 50% chance of exceeding median rainfall for the next three months, managing and maintaining your pastures becomes increasingly important.

Maintaining a minimum grass height of 2-5cm for dry sheep and 5-15cm for dry cattle is ideal for both the grass and livestock production as leaf area is maintained and availability to grazing livestock is not restricted. Pastures in the South West Slopes of NSW have hardly grown since December, therefore minimum pastures heights will have been determined before now. Monitor paddocks over the next month or so and move livestock accordingly. If heights are above 15cm in paddocks with low clover content eating them down to the required height is essential to maximize clover germination.

In trying to maintain plant height there is a compromise with ground cover. Over the summer and autumn month's ground cover is essential, to minimize the risk of soil erosion. Aim for greater than 70% ground cover, remembering the steeper the slope the greater the minimum. Ground cover levels are starting to be run down and paddocks should be inspected regularly for changes. Storms around the Jugiong/Harden area a month ago moved large amounts of topsoil off paddocks, maintaining ground cover is essential to minimize these loses.

Dry conditions during summer and autumn leads to weaker plant root anchorage leaving plants susceptible to being pulled out by livestock. If livestock are pulling plants out of the ground it is time to remove them before too many plants are lost.

If minimum groundcover threshold has been reached or the minimum height range has been hit or plants are being pulled livestock should be moved to a suitable paddock. If a suitable paddock is not available confinement areas should be used to feed stock and therefore protect pastures from degradation.

Pasture management involves manipulating the pasture to create an environment favoring the persistence and productivity of useful species. Over grazing useful

species leaves gaps in the pasture to be filled by weeds such as Paterson's curse or vulpia.

A primary aim of pasture management must be to make the best use of seasonal feed supply to satisfy livestock needs and meet production targets. Traditionally the autumn period is dry therefore production targets should be set lower, decreased livestock numbers or lower growth targets.

The NSW DPI PROfarm short course Prograze® provides skills for participants to assess pasture characteristics influencing pasture and animal production and to develop pasture and livestock management plans.

For further information on management of pastures or to enroll in a Prograze® course contact your local NSW DPI office.

Call for Papers - Grassland Society of NSW Conference, Taree

To anyone interested in pastures ...

As mentioned before, the NSW Grasslands Society annual conference will be held in Taree on 4 - 6 August 2009. The conference will follow the usual 2-day format , with AGM and early registration on the afternoon of 4 August and invited speakers and contributed poster papers.

The theme of the conference is "**The Grass is Greener**" which is a broad topic including production and environmental issues. Contributions to the conference take two forms, 'invited theme papers' and 'contributed poster papers'.

If you would like further information about submitting papers and/or guidelines for the papers, please contact:

Neil Griffiths (NSW DPI - Tocal)
Telephone: 02 4939 8888

The Rural Scene - Getting clover back into pastures

Nigel Phillips, District Agronomist, NSW DPI,Wagga Wagga

One of the outcomes of the ongoing drought has been the decline of sub clover in most perennial based pastures. This represents a significant loss of highly digestible legume pasture in the short term plus a loss of nitrogen to drive grass production in the longer term. Getting clover back into these pasture systems needs to be a major consideration. In many cases the best way to achieve this is not always clear and there is limited evidence to guide producers.

Farmers are often advised to spread sub clover seed with fertilizers as a cheap way of establishing clover. Trials suggest that this is not a particularly reliable means of establishment. A 2008 trial in the Monaro showed that from a broadcast rate of 8kg/ha less than 10 plants/m^2 were established. The addition of a knock-down herbicide to reduce weed competition improved broadcasting results to 22 plants/m^2. In comparison, direct drilling clover seed with a knock-down herbicide established around 90 plants/m^2 and 40 plants/m^2 without the herbicide. Under reasonable conditions you can expect only ten percent of broadcast seed to establish. This will be less if soil moisture conditions during establishment are poor or if there is significant competition from existing perennial plants and other annual species. Given the high cost of sub clover seed this option may not be worth the risk.

If clover seed can be drilled with minimal disturbance into pastures that still have a good level of perennial plants then this is probably the best option. A knock-down herbicide will often not be possible without affecting the perennial species so be wary of sowing paddocks that have a high annual weed burden. Every circumstance will be different so consult your adviser to determine the best plan of attack for each paddock.

Once the clover seed has established then you must ensure it survives and maximises seed set. Controlling pest such as earth mites is essential as well as managing any potential competition from other species through appropriate grazing management and herbicides. If you are fortunate enough to have sufficient remaining sub clover seed then adopt the same strategies to build up the legume component of the pasture. Don't undo all this good work by poor grazing management over the next summer. Keep adequate ground cover levels to minimise erosion losses and then reduce cover to below 1000kg DM/ha in following autumn to prevent establishment losses from shading when the clover seed germinates.

Tamworth Conference, Bus Tour C - "Emmie-R Farms"

John Coughlan

Bus tour C took us to the 134ha dairy farm of Jamie and Michelle Drury just on the northern outskirts of Tamworth. With a 675mm rainfall the main enterprise is a 300 cow dairy herd producing 3 million litres of milk per year. A centre pivot irrigation system is used to water pastures and a cement feed pad was set up to supplementary feed cows in a high input system.

Irrigated pasture was predominately ryegrass with arrowleaf, persian and berseem clovers. The use of annuals over perennial species was chosen because of better results with yield and quality, with the emphasis on the grass component. The dryland pastures were based again on ryegrass with oats also sown in some paddocks.

Jamie's approach to profitability is maximising production per cow. He puts all of his effort into extracting as many litres of milk per cow as possible which involves grazing and supplementary feeding with corn silage, cereal grains, protein meals, pasture silage and straw. He undertakes weekly close inspection and sifting of manure (poop patrol) to monitor exactly what comes out of a cow so he knows that they are fully utilising what they are eating. It was interesting to note that he said the most important time of the year for cow performance was during their rest period when they go dry. If you take excellent care of the cows when they were not milking that would set them up for their next milking cycle to get the most out of them.

Jamie admitted that there was some room in his stocking capacity under the pivot for more utilisation such as taking on store lambs for example. He has decided not to compromise his milking herd in any way, saying it was not worth the risk to his core business by trying to get 100% utilisation.

One area of concern for the future for the high input system was availability of labour, with a full time employee being used it would be very difficult to replace either labour unit with the same knowledge and work commitment.

PLEASE NOTE THAT 2009/10 MEMBERSHIP SUBS OF $50 ARE DUE 1 JULY 2009

Join Grassland Society of Southern Australia members on a Tour of New Zealand, November 2009

Our fellow Society, is calling for expressions of interest for a proposed tour group to visit New Zealand in November 2009. The tour would include attendance at the annual conference of the New Zealand Grassland Association (NZGA), to be held in Waitangi on the Bay of Islands from 3 - 5 November 2009. The NZGA conference combines a strong focus on the business of farming with technical papers from the NZ scientific community, and includes a very informative field tour to leading local farms and agricultural enterprises. The conference this year is focussing on new pasture technologies, adapting pasture management and managing enterprises in the current volatile environmental and economic times. After the conference, the tour group will travel down through the North Island with visits to dairy, sheep and beef, and cropping enterprises in the lush Waikato region, the summer-dry Hawkes Bay area and the productive Manawatu district, as well as a large grazing property on the Volcanic Plateau. You will also visit some iconic NZ areas such as the thermal wonderland area around Lake Taupo, the Feilding Stock Saleyards (the largest lamb, cattle and deer saleyard in the Southern Hemisphere, right in the centre of the town of Feilding) and the AgResearch Grasslands Campus at Palmerston North, the centre of grass breeding in NZ. The tour will be for nine days, including travel to and from NZ (ex Melbourne), and is estimated to cost $2,500- $3,000 (ex Melbourne) including all airfares, transport, accommodation, full NZGA conference registration and tour leader fees. Contact the GSSA office if you are interested in: • visiting a wide range of NZ farming enterprises, and seeing how they manage their challenges; • being introduced to the latest NZ pasture technologies and management techniques; • making some great contacts in NZ agriculture.

For further information please contact, as soon as possible:

Melinda Mann
Executive Officer
Grassland Society of Southern Australia Inc
Echuca, Victoria
Ph (03) 5480 3305
Fax: (03) 5480 3033
Email: office@grasslands.org.au

From the President's desk

Seasonal conditions at the time of writing this short note varied across the state quite considerably.

Now is such an important time for rain – for the croppers looking for an early break to facilitate seed bed preparation and livestock producers looking for that late burst of growth before cold temperatures restrict pasture growth.

Useful rain in parts of southern NSW has been very welcome, while the northern tablelands and slopes have missed out recently. Good rain in the north earlier in the autumn, had produced excellent growth east of the Dividing Range, while immediately to the west, producers are now grazing the long paddock and seeking agistment. Quite a contrast, highlighting the variations that occur side by side in NSW.

Preparations for the conference to be held at Taree from 5th to 6th August continue with speakers now confirmed and interesting farm tours also well into the planning stage. The enclosed brochure gives more detail as well as our internet site; www.grasslandnsw.com.au

Our membership, currently just over 400, is healthy but our secretary reports quite a list of "unpaid" members, not included in this number. If you know of any one who has forgotten to renew membership, please give them a gentle reminder. In addition, if you know of someone who you feel would benefit from becoming a member, encourage them to visit our internet site for a membership form. The benefits of membership include four newsletters each year on topical subjects relevant to pasture and livestock production, reduced costs of attending the annual conference and the very comprehensive conference proceedings.

Finally, if members have any suggestions as to improving the benefits of membership, please drop me a line or write to the editor who would be happy to receive your note.

Best wishes to all and hoping for widespread rain for an improved autumn.

Mick Duncan

- Notes -

THE GRASSLAND SOCIETY OF NSW INC.

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 are agricultural scientists, farm advisers, consultants, and 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.

Mick Duncan

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Subscription for 12 months (July to June) is $50. This entitles you to copies of the Newsletters and a copy of the Annual Conference Proceedings.

For more information, please contact the Society's Secretary, Janelle Witschi (telephone: 02 6369 0011).

Send membership application to:

The Secretary
Grassland Society of NSW
PO Box 471
Orange NSW 2800