

January 2006

SUMMER NEWSLETTER

TIME FOR FERTILISER DECISION MAKING



By Bruce Lewis
AGRONOMIST Vickery Bros

REVISITING LESSONS FROM THE LONG TERM P TRIAL

As the time for the summer application of fertiliser approaches it is interesting to review some of the most important research carried out in this region on soil productivity. The long term phosphate trial is an experiment at the PVI near Hamilton that has a 27 year history. During the 1990's when results from the experiment began to appear, it changed the way advisors and farmers made decisions about phosphorus fertiliser applications on pastures. Some of the significant findings which changed our understanding and hence decision making about phosphorus fertilisers in summary are;

- Pastures with higher P fertiliser rates had higher levels of productive species such as clover, ryegrass and phalaris. Pastures with minimal or low P fertiliser applications were dominated by low fertility species such as onion grass, bent grass and wallaby grass.
- The nutritive value of the pastures was higher where more fertiliser was applied. Digestibility and crude protein content of clover and ryegrass was higher than onion grass, wallaby grass, fog grass etc. However the experiment also found that nutritive value also improved for the same species. i.e. Sub clover nutritive value improved with higher rates of P fertiliser.
- Higher profits from higher P fertiliser applications are only achieved through running higher stocking rates to utilise the pastures with higher growth and higher nutritive value. Late Winter Spring lambing produce better results than Autumn lambing as animal demand better matches pasture growth.
- Running more stock per hectare on higher quality pasture does not create other animal health problems such as worms, provided weights and condition scores are not allowed to drop below the normal targets for livestock.

CHANGING PHOSPHORUS FERTILISER APPLICATIONS

Changes in available soil phosphorus levels (Olsen P) can be predicted from the long term phosphorus experiment (Cayley and Kearney 1999). These findings can be transposed to other soil types using phosphorus buffering capacity as a guide. Just as applying capital amounts of P will increase available soil P levels quickly, leaving off P fertiliser for a year will cause a rapid decrease in soil P levels. The reduction in available

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- Grazing by animals showed larger advantages to applying fertiliser than just measuring extra pasture grown. i.e. The animal production response was higher than the previous pasture yield responses measured with lawn mowers. This outcome is probably more significant today with the trend to meat production over wool production.

soil P levels will be highest where soil P levels are highest and hence the largest drop will be in the first year once leaving off P fertiliser. For example if P was left off a soil with an Olsen P of 20 the level would drop by 3.5 units. Leaving P off a soil with an Olsen P of 10 would result in Olsen P dropping by 1.5 units. Leaving P off is not likely to be the best decision to maintain productivity and optimise profit margins. Highest gross margins are achieved with higher stocking rates where P fertiliser applications match the stocking rate (Cayley, J.W.D. and Kearney, G.A. 2000).

OPTIMISING FARM PROFIT'S AFTER LAST WINTER

Although the favourable spring has produced some attractive crops and pastures most farmers will still have the large costs to digest from getting through the winter, with high feed costs and lower livestock reproduction levels. Reducing input costs (of which fertiliser is a dominant one) is the first thought by many managers. Reviewing trial and benchmarking results shows that this is not the best decision in many cases. The key driver of farm profitability is the production of produce per ha. Maintaining or increasing stocking rates, while reviewing lambing or calving dates, will produce a better bottom line, providing productive pastures are maintained.

At present the premium for heavier export prime lambs is absent with many processors taking lambs down to lower weights. Lambing later, increasing ewe numbers, and finishing more, smaller lambs will better match animal feed requirement with pasture growth rates. This system will produce greater profits but requires good quality, well fertilised pastures.

Gross margin analysis of the long term P trial found that even at low wool prices, using 18kg P/ha (200kg/ha super) resulted in large increases in profitability (Saul et al 1999).



Dr Rod Manning rates stocking rate as the most important profit driver in a beef production system. Stocking rate is twice as important as herd fertility, which in turn is twice as important as animal growth rates. This means changing the focus from an animal productionist to that of a grass grower/harvester will have a major impact on profitability (Manning 2004).

OTHER NUTRIENTS — GETTING THE BALANCE

While phosphorus has been shown to deliver wonderful production gains in many cases recent soil and tissue testing results indicate problem paddocks may have other nutrient deficiencies. Important nutrients like potassium, molybdenum, sulphur plus soil pH and aluminium all need to be kept in balance, otherwise good results will not be achieved. Soil and tissue testing to identify nutrient needs, together with the prescription blending service offered by Vickery Bros can keep your soil in the right balance ensuring productive pastures and sustainable profitable grazing.

References:

Cayley, J.W.D. and Kearney, G.A. (1999). Changes in bicarbonate-extractable phosphorus of a basalt-derived duplex soil associated with applications of superphosphate to pasture grazed by sheep. *Australian Journal of Agricultural Research*, 50, 574-54.

Cayley, J.W.D. and Kearney, G.A. (2000). Profitable use of phosphorus fertiliser for temperate pastoral Australia. *Asian-Australasian Journal of Animal Sciences* 13: Supplement July 2000, volume B, 191-194.

Manning, R (2004) The drivers of a profitable beef production system. *Proceedings of the 45th Annual Conference of the Grassland Society of Southern Australia* 2004. 33-41.



NUTRIENT MANAGEMENT SYSTEM TRIAL



By Jane Wilkinson

INTRODUCTION

As times change, more people are interested in seeking out and experimenting with alternative products inoculated with various soil organisms. The attraction to these alternative products is various claims such as healthy crops with high disease immunity, increased water soluble carbohydrates, increased stock carrying capacity, improved soil structure and fertility. Other claims include improved plant uptake of phosphorus, improved soil organic matter levels and animal health improvements.

More than a handful of farmers have asked me for data on these companies claims, with one gentleman interested enough to agree to a trial on farm.

Very little research has been conducted due to many reasons, but mostly due to lack of funding allocated to independent groups such as the DPI or Southern Farming Systems. As a leading soil nutrition company Vickery Bros. are keen to determine the effects of a traditional fertiliser program versus a 'mineral/microbe/humate fertiliser program'.

TRIAL DESIGN AND METHOD

Location

The southeast of South Australia in the Mt Gambier District. The shallow soil over limestone has a range of species including Cocksfoot, Ryegrass, Sub Clover, Phalaris and other annual grasses and clovers.



Setting Up the Trial

Trial Method.

The plot sizes are 2x7 metres and are arranged in a randomized block design, the set of treatments replicated four times. This trial is intended to be run over three years and is currently in its 5th month. Grazing on one site is in the form of techno grazing at approximately 9 grazes a year. The second site is being shut up for pasture measurements then mown to simulate grazing.

Full and half rates of both conventional fertiliser with Nitrogen and Nutri-blend is being assessed, in addition to straight super, Biophos (see related article) and control treatments.

Monitoring and measurement

A number of tests are being undertaken to measure differences between plots and changes over time.

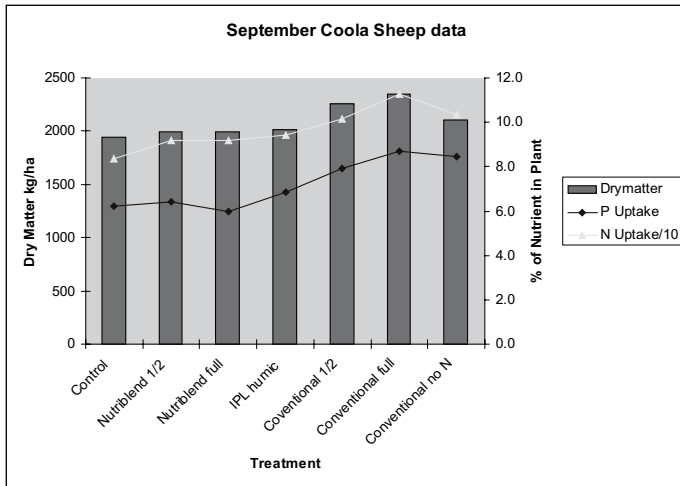
- Before each grazing plots are measured with a pasture meter. Dry matter (DM) is calibrated with pasture cuts.
- Feed test analysis is being carried out to measure pasture quality (digestibility, metabolisable energy Water soluble carbohydrates & protein), and a tissue test is used to evaluate a range of macro and trace element levels.
- Soil fertility tests are taken to measure changes in soil fertility, plant available phosphorus and organic matter. This is to be performed annually in spring.

Agricultural and environmental scientist Dr Albert Rovira (2004) suggests it is difficult to measure soil biomass however measurement of pasture production and phosphorus uptake together with soil structure would be a good surrogate measure.

KEY OUTCOMES – YEAR 1 – 2005

- The conventional fertilisers have produced the highest pasture height and drymatter which is a result of mostly nitrogen and some phosphorus responses.
- Two of the alternative products produced no more pasture growth than the control treatment (Nil Fertiliser). Another treatment using a different alternative product based on RPR produced a pasture response higher than the control.
- Feed Test analysis from the two trials showed similar or higher metabolisable energy and protein from the conventional products.
- Water soluble carbohydrate levels were similar or higher from conventional fertiliser treatments.

- Tissue analysis from treatment samples from 2 trials showed plant uptake of phosphorus and nitrogen to be higher from the conventional fertiliser treatments (See graph below).

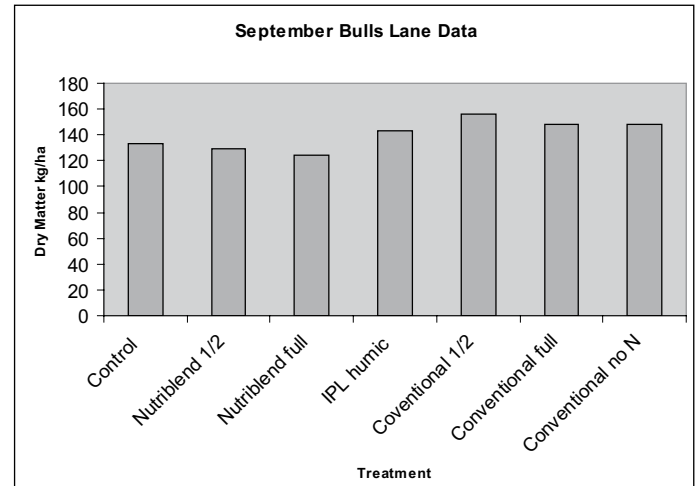


We are quite excited with this trial and look forward to keeping you informed in forthcoming newsletters.

Coming soon: the costs of each system in relation to DM production and other investigated qualities such as Water Soluble Carbohydrates, and actual composition of products in each treatment.

SUMMARY

The trial results to date show that proceed with caution is wise. If trying such alternative products only trial on a small area of your farm. Not all alternative products are the same (some perform better than others). Review independent trials before making large commitments to such products.



Reference:

Rovira, A. (2004) Soil Biology in Agriculture workshop in Tamworth – 'Ways to boost Soil Biota'. Grain flashes – *In brief* grains research news. GRDC, 2004

www.grdc.com.au/whats_on/mr/north/gf_north_sept04 (accessed 7/6/2005)

Prograze / Lambcheck

Clients interested in participating in a Prograze group in 2006 to learn more about animal requirements and pasture production can call:

Tim Leeming
0427 797 242
 or
 Jane Wilkinson
0437 752 707



Dramatic Response at Trial Site

ACHIEVING BALANCED SOILS

By Bill Feely



There is a real issue emerging regarding the need to achieve a nutrient and chemical balance in our soils. Modern agricultural practices are inducing soil acidification. If this acidification is not addressed it will lead to a reduction in exchangeable nutrient cations.

There is no doubt that most producers are addressing their soils macro nutrients requirements, such as Nitrogen (N), Phosphorus (P), Potassium (K) and Sulphur (S). Calcium (Ca) Micro nutrients or trace elements are gradually being brought into the equation, but there are still productivity gains to be made through the correct use of soil ameliorants.

There is a need in some soils for soil ameliorants such as Lime, Dolomite and Gypsum to ensure the well being and sustainability of our soils. They therefore have to be considered when making soil nutrient recommendations.

Soil conditioners have been traditionally applied when a paddock is being renovated, to ensure the successful establishment of a new pasture. This is critical from the point of improving a "run down soil". There is also a need to review their use on our high performance pastures to prevent productivity decline, as a result of Calcium (Ca) removal.

CALCIUM

Calcium and magnesium (Mg) are important cations in the soil solution-cation exchange complex of the root-zone (Fertiliser Handbook (1974)). Calcium is necessary for the proper functioning of the plants root tips and the metabolism of nitrogen.

Its application should not only be considered when the soil pH is low but when other factors which influence Calcium availability such as the Calcium/Magnesium ratio, soil Buffering capacity, Aluminium % and high organic matter indicate its need.

Realistically producers should be looking to apply lime to 10% of the farm each year if testing indicates a requirement for it. Over liming can also have an adverse effect on soil balance in that certain trace elements such as Copper, Zinc and Boron become deficient so a sensible monitored approach is required.

MAGNESIUM

Magnesium like Calcium is an important nutrient in soil health and has a key role in phosphorus transport in the plant. (Fertiliser Handbook (1974)).

In comparison to the macro nutrients such as Ca, N,P,K and S, little work has been done in assessing the Magnesium status of Australian soils. Where data exists Lime and Dolomite (Mg CaCo₄) gave similar responses at most sites. Cropping results from North East Victoria showed that Lime may have inadvertently resolved a Mg deficiency. Due to the fact that most Lime contains some Mg (<3%), the application rates of 1-2 tonnes/acre of Lime would have been applying sufficient Mg to alleviate Mg deficiency. The increased use of Potash and Nitrogen to correct nutrient deficiencies also has had an impact on the availability of Magnesium. One area in which Dolomite has been used to great effect is as a means of reducing the risk of Grass Tetany.

Dolomite and in particular Magnesium has a lot to offer, not only in regards to animal health but also soil nutrition.

LOCAL EXPERIENCES

Over the last six years there have been some terrific responses to Dolomite in the Powers Creek area. Jim Doelle a farmer in the area has been using it almost all of his farming life both at Powers Creek now and previously at Tyrendarra. Having taken soil tests, seeing the need for Potash and not having great Magnesium levels he was concerned about Grass Tetany. Knowing that he still required Potash and trace elements to drive clover production, he commenced a program of Dolomite that he still continues today, gradually working his way around the property. Having seen the pastures there is no doubt that it is doing the job. This program in conjunction with a coordinated trace element regime has produced some terrific results on his pastures in some pretty hungry soil.

Rob Warners interest on Dolomite and Magnesium was triggered when he feed Causmag (MgO) out on some hay to stock that were affected by Grass Tetany. Not long after the hay had been cleaned up he observed vibrant healthy green pasture around the areas where the hay had been spread. Having seen this and the responses that Jim had achieved next door Rob realised that there was a potential need for Magnesium and is also now undertaking a Dolomite program. He has applied it to areas to be cropped and along with deep cultivation and good weed control has grown good crops.

In both cases the results have been striking and with ongoing monitoring of the soil and plants a balance is being achieved.

Reference:

Fertiliser Handbook, Glendinning, J.S. 1990. Incitec, Morningside.

NEW SLOW RELEASE ORGANIC PRODUCT FROM IPL

By *Harry Armstrong*



Incitec Pivot Ltd have released an alternative phosphorus based product designed primarily for the more organic minded producers. It is a reactive rock based fertiliser composted with liquid fish nutrient, natural carbon sources and selected fungi and bacteria.

types of slow release products are applied to soils that don't fit this criteria the phosphorus contained in them may never become available.

Due to the slow release nature of this fertiliser it may have advantages in environmentally sensitive areas where minimisation of phosphorus run off is a major consideration.

Another important point to consider is that reactive rock products do not contain sulphur. Sulphur levels are usually very low in the acidic, sandy, high leaching soils where these reactive rock products are most suited.

Cost per hectare is expected to be comparable to other phosphorus based fertilisers.

Vickery Bros are currently trialling many of the current alternative products, including this one from IPL, that are being offered in the marketplace. (See article *Nutrient Management System Trial*)

Contact the agronomy staff at Vickery Bros if you are interested in this type of product.

Product Analysis

Nitrogen	0.3%
Phosphorus Water Soluble	0.1%
Phosphorus Citrate Soluble	1.8%
Phosphorus Citrate Insoluble	11.6%
TOTAL PHOSPHORUS	13.5%
Sulphur	0.3%
Calcium	33%
Cadmium	23mg/kg
Mercury	<0.1mg/kg
Lead	3.1mg/kg
Water	8%

The product has a consistency similar to beach sand, which has implications regarding spreadability. Vickery Bros would expect spreading widths to be similar to Lime and Gypsum.

The main difference between conventional fertilisers and reactive rock based fertilisers is their solubility.

Conventional fertilisers (for example Superphosphate) are made by adding sulphuric acid to phosphatic rock, this process changes the phosphorus in the phosphatic rock to a **water soluble** form that is readily available for plant uptake. The phosphorus contained in reactive rock based fertilisers are **not water soluble** but can become available to plants over time, although this requires quite specific soil and rainfall environments.

The National Reactive Phosphatic Rock Project conducted some years ago highlighted the roll that non water soluble, slow release phosphorus fertilisers have in our region. Results indicated the use of these fertilisers should be confined to highly acidic (pH water < 5.5) sandy soils in high rainfall zones, where the reactive rock products have the potential to outperform conventional fertilisers. This may be due to phosphorus from the water soluble fertilisers being leached from the root zone and lost, while the phosphorus from the reactive rock products is slowly released at a rate that matches the demands of the plants. It should be noted that if these

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We can also supply mixtures of grain.

contact Jake on

03 5575 2777

HUMATES

Humates or humic substances have appeared on the fertiliser market in recent years. These products are claimed to have the ability to enhance the performance of traditional fertilisers and have a beneficial effect on the uptake of nutrients. When mixed with Urea they could potentially slow down the absorption of applied nitrogen and thus supply a trickle feed of nitrogen over a longer period and potentially have a major impact in reducing nitrogen loss associated with volatilisation.

Vickery Bros have always taken great pride in the fact that our first consideration when making nutrient recommendations to our clients is that the advice we give is based on sound trial data relevant to our region. It is of utmost importance that the advice we give and products we deliver are both profitable and sustainable.

In order to provide cost effective and sustainable guidelines for the use of these new products Vickery Bros would be keen to trial some humate products on farm.

Contact the agronomy team at Vickery Bros if you are interested in becoming involved in such a project.

FERTCARE ACCREDITATION

Vickery Bros. has recently achieved Fertcare accreditation, reinforcing our commitment to the continual improvement of the service we deliver. The Fertcare program has been developed by the fertiliser industry to ensure the appropriate use of fertilisers in the achievement of farm productivity. Staff training ensures that all staff involved in the handling, sale, storage and delivery of fertiliser have an understanding of appropriate fertiliser use, the storage and handling

characteristics of fertilisers and their main environmental and food safety risks. Fertcare also incorporates the Accu-Spread program which is the certification of all spreading equipment to achieve the accurate and efficient application of fertiliser.



Early Delivery Incentives

We currently have available fertiliser and lime, delivery and payment options to suit your productivity and cashflow needs.

Contact the professional team at Vikery Bros. to discuss this seasons early delivery incentives.

Agronomy Team

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