FERTILISER PRICING 2015

Craig Tosetti

As we head into the next summer/autumn fertiliser season, I am reasonably confident that the general overall financial health of our client base has been maintained. I must admit a month ago I wasn't as optimistic as I am now. We didn't get the spring rains to finish off a brilliant seasonal start. We were hearing sad cropping stories from our Northern client base. Cereals were being cut for hay, some paddocks didn't even get to this stage. Late season Red wheat varieties from our Southern croppers wasn't going to make it , and a lot of pasture locked up for hay wasn't going to get there either. Stock had already been turned into some hay paddocks. But as the dust literally settles and I hear the generally positive talk from clients coming into the office; listen to the enthusiasm and positives coming from our agro's at our weekly agronomy meetings and see the early fertiliser orders and work already on the board; my opinion for the upcoming season has changed dramatically. It's not easy when your head is immersed in paperwork all day!!!

Let's look at the current markets:

- Lamb prices are strong.
- Wool prices are steady, coarse wool is especially showing good returns.
- Dairy, although world prices have dropped dramatically, the current set pricing is comfortable and there is optimism out around April that world pricing will kick up.
- Beef is ok, but producers are feeling more comfortable now that a Free Trade Agreement with China was signed recently.
- Grain prices are increasing going into harvest and early reports are most of our cropping customers are happy with the better than anticipated quantities and quality being reaped.

The positives above are fuelling my optimism; but the biggest positive is that after coming out of the dry spring, old and cast for age stock and anything else needing to be off loaded is worth good money. Historically when we have had a poor spring, stock were literally being given away. Farmers needing to off load excess stock coming into summer are being well rewarded this year.

FERTILISER PRICING FOR THE COMING SEASON

It has been a relatively uneventful last few months in the world fertiliser market. The major changes to next year's fertiliser prices have come with the falling Aussie dollar. Every one cent drop in the aussie dollar equates to an extra $5/tonne increase in the local DAP/MAP price.

As expected, DAP/MAP pricing has slowly been falling from its high in July/August of US$510 FOB to currently US$450 FOB ex Tampa, although it is still US$100t up on this time last year. This time of year is typically a quiet period for the DAP/MAP market with minimal world demand. One Australian buyer has product on the water now; bought @ US$15 higher than today's price but set with the currency 3c higher, which equates to the same as if purchased now anyway. Manufacturers inventory levels at this time of year are very high which puts downward pressure on pricing. In a bid to reduce this downward pressure, a major US producer has reduced its potential output by 30%. Australian purchasers are sitting, but the currency falling could negate any price advantage and shipping windows still need to be adhered to for on time delivery into the Australian market.

Another factor that has arisen in the market is the potential change to the Chinese export tax rules. There is an expectation that the Chinese will implement a flat rate all year round rather than the high/low tax windows which are currently in place. This will make Chinese product a more attractive proposition for Australian traders. Normally all of Southern Australian DAP/MAP purchases occur when China has the high tax rate enforced which has consequently priced the product out of our market. Freight is cheap x China -US$29 as against US$50 x Tampa; so some forward purchasing is on hold until an official announcement. It just needs to be good quality!!

Many local suppliers have been caught with excess Urea stocks this season due to the unexpected early spring cut-off. Even though World Urea pricing has increased, the domestic Urea price has not reflected this increase and remains steady as local suppliers try to off load excess stocks in their sheds to make room for incoming Phosphorus shipments due January onwards. The Urea price will start to reflect the world market pricing again after Christmas when stocks will become short and suppliers will be looking for their next purchase going into autumn.

Phosphorus pricing for the coming season will be slightly higher than last season but still below the last 5 year average and very much affordable. Vickery Bros. are offering good deals at the moment for early delivery and spreading, talk to your local Vickery Bros. agronomist about your fertiliser requirements for the upcoming season and take advantage of these early bird deals.

Contents:

PHOSPHOROUS –GETTING YOUR INPUTS RIGHT AFTER A SPRING SHUT OFF

Rebecca Stewart

Is the grass greener on the other side? You may think that you are seeing things, but this year it has been very easy to pick the paddocks and or properties that have a sound fertiliser program with adequate phosphorous levels. Remember, anything has got to be 20% different before the naked eye can pick something up. So in fact you are actually observing something at least 20% better or worse.

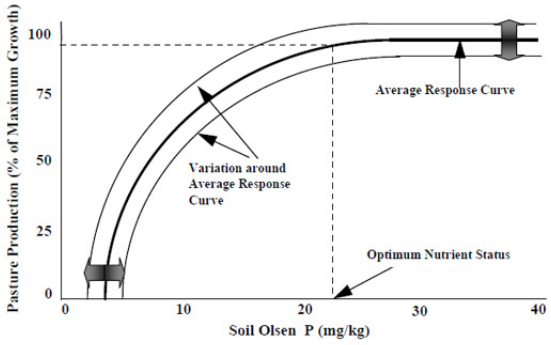
WHY DO WE PUT ON PHOSPHOROUS YOU ASK??

We primarily put on P to increase growth of legumes such as clover. Legume production increases nitrogen fixation, therefore producing N for grass species.

It seems too simple but the importance of phosphorous cannot be forgotten.

Phosphorous has many functions within plants and is essential for growth. No other nutrient can be substituted.

With phosphorous being so important for growth and development and the implications it has on plants to survive a tough spring; it's no wonder there is so much variation throughout the district in terms of feed available.



Source: Adapted from Roberts (1996).

Figure 11.4 Relationship between relative pasture production and Olsen P

The above figure shows the relationship between pasture production and Olsen P levels. As you can see, if you keep your Olsen P levels within the optimum range for your farm, you will achieve maximum growth from your pasture throughout the year.

In redgum country for example, the soil tests that I have conducted show that many producers are running below optimal levels at only around 6 Olsen P. If you were to increase your Olsen P level up to 12-15 (optimal for redgum country), you can be gaining an extra 30-40% in your pasture production!

Now you will all be saying, *"This is going to be too expensive"*. The reality is; **the cheapest feed that you can have is the grass you grow!**

With the current prices of feed barley at $270t and pasture hay around $160t ex. farm, the costs of increasing your on farm pasture production are not hefty at all!

HOW CAN I DO THIS YOU ASK?

There are a couple of steps involved in taking a big leap towards improving your pasture production, but the first and most important step of all is to **conduct soil tests** on your property to identify the current levels.

A doctor can ask you questions whilst assessing your inner workings with you lying on a table, and make a reasonable guestimate. But a blood test will either confirm or negate his thoughts.

From soil tests we can then see your Phosphorous Buffering Index (PBI) and current Olsen P levels.

Table 11.1 The amount of capital P (kg/ha) required to raise soil Olsen P by one unit (1 mg/kg) based on the PBI class and PBI values

PBI Class	PBI Value	Kg P/Unit of Olsen P	Equivalent Rate of Single Superphosphate (kg/ha)
Very Low	0 to 50	5	57
Low	50 to 100	7	80
Moderate	100 to 200	9	102
High	200 to 300	11	125
Very High	300 to 600	13	148
Extremely High	Over 600	15	170

Source: Adapted from Burkitt et al. (2001).

Table 11.1 above shows the different PBI values and the amount of Single Super that is required to increase your Olsen phosphorous levels.

The Phosphorous Buffering Index (PBI) is a measure of the potential of a soil to adsorb phosphorous or resist a change in the status of plant available P.

A low PBI will mean that you do not need as much phosphorous to increase your soil levels and you will quickly see responses.

A high PBI shows that your soil is not easy to change and you need to apply more P. In these high PBI and clay soils, they typically have high aluminium, iron and manganese, and these elements readily tie up the plant available phosphorous.

In my experience, redgum soil type is typically in the moderate range for PBI.

Using the example of a property with a sound clover base and a PBI of 200, we could increase the production by 30% by taking the Olsen P levels from 5.7 to 9. To achieve this increase, we can follow the steps below off the PBI chart:

We need to increase the soil test levels by 3.3mg/kg

With the PBI (200) we will need 9kg/ha of P to increase by one mg/kg.

Therefore in total we need:

3.3 × 9 = 29kg/ha of phosphorous, equivalent to 329kg/ha of Single Superphosphate or 185kg/ha of PastureKing!

NOTE: the above equation is what needs to be added over and above your annual phosphorous applications! This additional fertiliser is classified as a capital application.

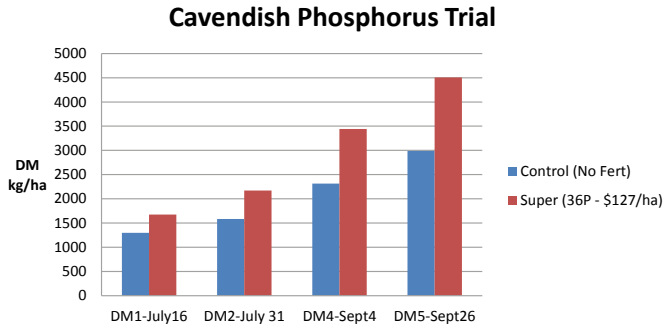
Image 1.1 Phosphorous deficient clover plant on RHS compared with healthy clover plant on left.

The example that I used above will be making you all think ***"I can't afford that!"***

Raising your Olsen P level for increased pasture production does not need to be done in one season or over the whole farm at once. It can be planned out with your local agronomist to be raised over 3-5 years (or longer) depending on your individual situation and fertiliser budgets. Paddocks identified with potential should be targeted first; "suck it and see" over a small area to start with.

If you have been spreading the whole farm at ½ bag/acre (100kg/ha) for many years and you are slowly seeing your pasture production decline, maybe you need to be re-assessing the needs of your property with your current stocking rates..

This year Vickery Bros conducted a phosphorous trial north of Cavendish which had a fantastic clover base, but was being taken over by undesirable weed species. Soil tests showed that the most limiting factor was phosphorous; so that's what we targeted. **The article following this is the "economics" with a very conservative cost benefit analysis on the inputs running prime lambs.**



The above chart shows the dry matter measurements of the trial.

P was identified as being the most limiting factor and you can see that the plots which had P fertiliser applied (super), grew the most dry matter- (4507kg/ha). The plot grew 1518kg/ha more dry matter than the control, which only produced 2989kg/ha. Applying the above rate of Super cost $127/ha (supply/deliver/spread) which works out to be 2.82c/kg of dry matter grown! This figure is quite small when you consider the cost of other dry matter feeds, such as hay.

As you can see in the picture below, the trial plots really stand out with a carpet of clover. Looking beyond the fenced trial area you can see the pasture is predominantly onion grass with clover and some phalaris.

In this instance, with phosphorous being the most limiting factor; the pasture showed a great response from the application of 36kg/ha of P.

This proves that the most **limiting** nutrient on your soil test needs to be addressed **first**. It will be the biggest thing holding back production levels.

If you are unsure of what you need to be targeting this year, give your local Vickery Bros agronomist a call to start building a plan.

Now has never been a better time to increase the phosphorous levels within your soil, especially with protein prices being strong and fertiliser pricing being in the lowest percentile over the last 5 year average.

If you think that phosphorous doesn't matter or you are putting enough out; take some time to study the cost benefits of this trial in the following article by Bruce Lewis.

PHOSPHOROUS TRIAL ECONOMICS

Bruce Lewis

"This exercise turned off more and heavier lambs than the unfertilised pasture with an extra profit of $466/ha!"

The following article is an economic review of the phosphorous trial which was conducted by Vickery Bros at a site north of Cavendish earlier this year. We entered pasture data which we measured into Grazfeed (CSIRO developed software package). It predicted ewe and lamb pasture consumption and hence animal growth rates to give lamb live weight yield/ha. The predicted growth rates on the fertilised pastures are less than what is being achieved on district properties; so we believe the predictions are conservative. It must be stated however the unfertilised pasture had a low phosphorus level with an Olsen P of 5.7. We knew it would be very responsive to applied phosphorus, plus had a base of clover in the pasture to respond.

At the trial site north of Cavendish, super was applied on May 30 at 409kg/ha to apply 36kg/ha of phosphorus. The plots were measured with a rising plate meter throughout the year (5 measurements) until pastures began to dry off. The visual responses and clover content between the plots was outstanding, particularly the clover response. Overall the Phosphorous plots -grew pasture with more clover and less onion grass than the control plot (no fert). Visually the fertiliser plots were a mass of clover and minimal weeds compared to the no fertiliser control which was predominantly onion grass and small stunted clover.

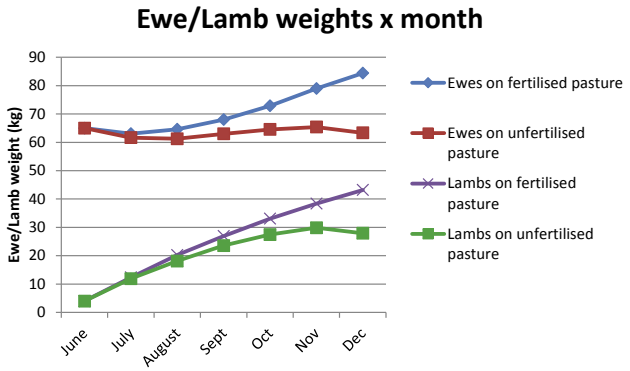
CAVENDISH PHOSPHORUS TRIAL

After completing this trial we put the data into the GrazFeed program. The GrazFeed program developed by the CSIRO takes into account inputs and scenarios such as DM on offer, clover percentage, digestibility, sheep breed, ewe size, ewe reproduction stage (days lactating), supplementary feed and weather. Grazfeed then calculates animal pasture consumption and ewe/lamb growth rates.

With the higher measured pasture growth rates and higher clover content on the fertilised pasture and using dry matter consumption figures predicted by Grazfeed, we calculated we could run 7.5 ewes/ha compared to 4 ewes/ha on the unfertilised pasture. With 130% lambing percentage; 9.8 lambs were produced on the fertilised pasture. The poorer pasture which was predominantly onion grass was predicted to only turn off 4.8 lambs/ha with a lambing percentage of 120%. (Due to lighter ewe condition score after the spring)

GrazFeed predicted that the lambs grazing on the clover dominant pasture would weigh an extra 13.3kg more at the end of spring than the lambs grazing on the onion grass dominant pasture. When the program looked at the ewe weights throughout the season, it predicted that ewes on the clover dominant pasture would weigh 21kg more than the ewes on unfertilised pasture. In terms of preparing your ewes for joining the next season, the extra weight and condition is a key driver to lambing percentage.

Graph 1.1 – Predicted ewe and lamb weights based on monthly Grazfeed runs.



At the stocking rates Grazfeed predicted; 421 kg/ha of lamb (liveweight) was produced on the fertilised pasture, and 143kg/ha of lamb on the unfertilised pasture. In the fertilised pastures lambs were sold off in December, while lambs were sold a month earlier on the unfertilised plots as they were losing weight in the last month. Income for lambs was costed at $4.70/kg DW and $8 skins. Dressing percentage was estimated at 46% for good pasture and 43% for unfertilised pasture.

Table 1 – Lamb returns

	Lamb LW/ha	Dressing %	DW (kg)	Gross $/ha	Ewe variable costs	Fertiliser cost	Margin $/ha
Super-36P	421	46%	194	$919	$60	$127	$732
Nil	144	43%	62	$298	$32	$0	$266
					Extra Profit/ha		$466

With the cost of fertiliser being $127/ha, it must be remembered that this was a capital application to increase productivity. In this instance, the 36kg/ha of P would raise the soil Olsen P level from 5.7mg/kg to 9mg/kg, when calculated from looking at the Phosphorous Buffering Index (PBI). In the following year, the costs could be reduced to a manageable level which would have less capital fertiliser for build up.

As an ongoing maintenance example on this property; if you were to run at the predicted DSE of 18.75, you will need to be applying 15kg/ha of P, once optimum soil P levels were reached. This is certainly achievable but with the costs of purchasing the extra stock and the variation of seasons, you may reduce your stocking rate to the following.

The general rule of thumb for stocking rate in your area; take your average rainfall, in inches and minus 10 to get your DSE rating. In this case, with an average rainfall for 26", minus 10 = 16DSE/ha.

If you were to apply 15kg/ha of P over your pasture as a maintenance application, this would equate to; 170kg/ha of Single Super or 96kg/ha of PastureKing.

Given the higher ewe numbers required to utilise the fertilised pasture, changing a farm to higher fertility will require significant funds for buying livestock. This cost will have a larger effect on cash flow than funding the fertiliser inputs.

SOIL ACIDITY, LIMING, ALUMINIUM & MANGANESE TOXICITY – SOME FREQUENTLY ASKED QUESTIONS...

Phil White

"Whilst liming increases the availability of macro-nutrients such as P, it should be remembered that 100% availability of not much is still not very much!"

WHAT IS LIME?

An agricultural liming material is defined as a Calcium or Magnesium Carbonate containing compound capable of neutralizing soil acidity.

The reaction of lime added to an acid soil is shown by the equation below.

$$\underset{\text{[lime]}}{CaCO_3} + \underset{\text{[acid]}}{2H^+} \longrightarrow \underset{\text{[calcium]}}{Ca^{2+}} + \underset{\text{[carbon dioxide]}}{CO_2} + \underset{\text{[water]}}{H_2O}$$

The carbonate (CO_3^{2-}) is the active ingredient of the lime and it is the amount of carbonate added to the soil through liming that determines the reduction in H^+ ions thus increasing soil pH. A rough rule of thumb is that 1t of good quality agricultural lime will increase pH by 0.1 of a unit. The finer the lime the faster the reactivity occurs but the overall pH change is determined by the amount of carbonate added not the fineness of the product.

WHY DO WE LIME?

Liming is generally carried out to overcome aluminium and manganese toxicity and increase the availability of molybdenum and phosphorus as well as enhancing nitrogen mineralization by making conditions more favourable for microbial activity. Lime has been shown to aid in the inoculation of legumes as the Rhizobium bacteria responsible for nitrogen fixation are particularly sensitive to low pH, high aluminium conditions. Subterranean clover, our dominant pastoral legume is quite tolerant of acid soil conditions however the Rhizobium bacteria that 'fixes' nitrogen for the plant isn't. This problem is visually identified by sub clover responses to nitrogen applications and urine patches. pH conditions closer to neutral also increase the activity of decomposing soil biology such as earthworms and increase nitrogen mineralisation, the process by which organic forms of nitrogen (in plant material of dung) are converted by bacteria to inorganic plant available forms.

WHAT EFFECT WILL LIMING HAVE ON MY LEGUME NODULATION?

Biological nitrogen fixation through the symbiotic relationship between *Rhizobium spp* and sub clover in particular, has traditionally been relied on as the primary input of nitrogen in Western Victorian grazing enterprises. Acid soils harbour lower levels of rhizobia, which results in poor legume nodulation. Rhizobia are susceptible to the increased concentration of aluminium induced by low soil pH and the increase in H^+ ions. Whilst the reduction in molybdenum availability at low pH is also a contributing factor to retarded legume nodulation.

HOW WILL MY PASTURE RESPOND TO A LIME APPLICATION?

Pasture responses to lime application depend on the initial soil pH, aluminium and manganese content as well as the pasture species present and nutrient status of the soil. Whilst liming increases the availability of macro-nutrients such as P it should be remembered that 100 % availability of not very much is still not very much! The lower the initial pH the greater the response with responses plateauing at pH 5.8. Increased legume abundance and hence nitrogen fixation and subsequent mineralisation is one of the primary responses to lime applications. Acid sensitive plants such as lucerne and phalaris will be more responsive at higher pH than more tolerant species such as cocksfoot and some cereals.

WHAT ABOUT FORMER BLUEGUM PLANTATION SITES?

Former bluegum sites often have quite low initial soil pH and associated high aluminium content. This makes establishment of legumes difficult which is of particular concern as the nitrogen fixation by legumes will be of high importance to reduce the carbon to nitrogen ratio and enhance breakdown of the woody debris on former forestry sites. When deciding to undertake a bluegum to pasture rehabilitation project the first step will be to conduct a soil test to determine the initial soil pH and nutrient content. From this your Vickery Bros. agronomist will be able to quantify your lime requirement based on soil pH, aluminium content and soil texture. The soil pH and aluminium status will also have an influence on the type of pasture species sown. For instance cocksfoot is more tolerant of aluminium than phalaris which is more tolerant than lucerne. Again conduct a soil test and consult your Vickery Bros. agronomist for further information.

TELL ME MORE ABOUT ALUMINIUM?

Aluminium (Al^{3+}) is a constituent of most soils whose influence on plant growth is largely dependant on soil pH status. In near neutral pH soils aluminium is usually adsorbed on clay minerals in the form of $Al(OH)^{2+}$ and has no influence on plant growth. However as soil pH lowers (gets more acid ie more H^+ ions) aluminium becomes more soluble and is present in the form of Al^{3+} and acidic cation which is toxic to plants at high concentrations. High aluminium concentrations retard root growth which renders plants less able to extract water and nutrients. Al^{3+} also binds to phosphates to make insoluble aluminium phosphates which reduces plant available phosphorus.

WATERLOGGING IN RED GUM COUNTRY?

Unfortunately the double hit in our acidic winter waterlogged redgum country is the increase in availability of manganese under waterlogged conditions as well as low pH and high aluminium. Once soils become anaerobic (without oxygen) the solubility of manganese increases and can be found in toxic quantities.

HOW DO I KNOW IF MY SOIL PH IS TO LOW?

The first step is having a look at the history of the paddock and the pasture species that are in it. A lack of clover or poor clover

performance coupled with reduced nodulation of clovers is also an indicator. The dominance of acid tolerant weeds like sorrell is also an indicator. The second step is conducting a soil test to confirm your observations and quantify the amount of lime required to bring the pH back to optimum levels. Remember the optimum pH for one farming system and soil type will be different from the next; consult your Vickery Bros. agronomist for specialist advice.

WHAT ABOUT THE RATIO OF CALCIUM COMPARED WITH OTHER CATIONS, ISN'T THAT WHY WE APPLY LIME AS WELL?

No. As indicated earlier the active constituent of lime is the carbonate content which mops up H^+ ions hence neutralising soil pH and making conditions more favourable for plant growth and microbial activity. Emphasis should be placed on providing sufficient amounts of cations ie K^+ rather than worrying about the ratio of cations that exist in the soil.

WHAT TIME OF THE YEAR SHOULD WE APPLY LIME?

Ideally if we are trying to establish an acid sensitive crop or pasture we should try to apply lime the season before to allow time for the reaction of lime and subsequent pH change to occur. We should avoid applying lime and superphosphate close together as this will result in reversion of the phosphate in super to more insoluble forms. Vickery Bros. are currently running a lime deal where if applying in December and January, payment is deferred until April. This is a great way to ensure your lime gets spread on time before the busy autumn rush!

FROM THE LOGISTICS CHAIR

David Vickery

Vickery Bros strive to provide a professional vertically integrated service that is unmatched anywhere in the Australian fertiliser industry.

Right from the first step of agronomic advice and nutrient budgeting, the cost effective multi sourcing of the different nutrients required, the storage and blending of the products, the transport and application of the product; the supply chain is managed by the one company. Every link in this chain is equally important in the process of delivering farming clients the most cost effective nutrients for their farming enterprise.

It is my role as operations manager to ensure this co-ordination link is as smooth as it is strong, but extremely flexible to handle the logistics of integrating every aspect of what is virtually a "port to paddock" operation.

Plan A the day before most likely will revert to plan F by the time the job is finished. Co-ordination involves liaisons with, and around farmers, sand, concrete and metal clients, agronomists, all types of suppliers and their outloading facilities, depots, truck drivers and spreader drivers. With 1500 clients, 12 truck & trailers combinations, 18 spreaders, 6 depots and 50 staff; one hiccup in the chain normally requires another logistical move to keep downtime to a minimum; it's a lot like playing 10 games of chess at once with the tactics of short term actions whilst positioning for longer term strategy's. The biggest problem whilst managing the short term actions of 10 games is the shortage of the amount of time required to position the longer term moves.

This is where the new wave electronic technology kicks in. To generation Y this is quite simple; but tell a 50 year old truck driver that every last bit of information plus more that he requires to complete a job will be sent to him by email to an ipad that he has just been handed; it's not hard to imagine the reaction!! Six months later we have truck/spreader drivers who don't know how they ever went about the day's activities without one. This part alone saves logistics about 2 hours a day in free phone time, not to mention the electronic information sent from the driver back into the office direct to administration to invoice and complete the task.

Vickery Bros continue to be innovative and keep up with the ever changing technology in today's fast paced world. Our entire transport fleet is fitted with satellite tracking devices to remotely monitor where, when and how heavy vehicles are being operated on the road network. This real time data provides our logistical team with up to date information as to where any load is at any one time. Our trucks are also fitted with digital on board load scale providing accurate and reliable axle weight measurements and displayed on an easy-to-read LCD display.

Currently our transport fleet consists of 5 B Doubles, 6 Truck and Dog Trailers and one Semi Trailer to accommodate different load sizes ranging from 30t to 45t. The latest addition to the transport fleet is a Western Star 5 axle dog trailer, no doubt you would have noticed it driving around the area over the last few weeks, it certainly stands out.

Vickery Bros can also integrate additional customer requirement into its current transport operations. Due to our wide geographic spread Vickery Bros. continually have trucks operating from Melbourne and Adelaide and everywhere in between making the delivery of additional freight very easy. Vickery Bros can supply and freight products other than fertiliser, these include,

- Lime and Gypsum
- Grain
- Stockfeed Pellets
- Crushed rock and Aggregates
- Fine and Course Sand
- Pig and Duck Manures

At the time of writing this article we have started carting grain for the harvest around the Edenhope/Frances region, Vickery Bros will again be buying wheat and barley directly off the header and have available for farmers to buy.

Call or email me today.
0409 552 737 dave@vickerybros.com

SULPHUR

James Stewart

As the 2014 season finishes quicker than what we would all like, the 2015 season will be upon us and some decisions will need to be made.

What's available in the fertiliser budget? What have your soil test results come back saying? And finally what fertiliser product to run with this season?

Even though this year's growing season was dryer than the previous couple of years, the majority of the soil tests that I've conducted show that sulphur is the main nutrient that keeps showing up as being deficient. Even farmers that have been using generous rates of single super every year have soil tests confirming sulphur is low. In some cases, it has been the lowest levels that I have seen in my 11 years of agronomy!

Why is this happening? Well there are a number of reasons…

PRODUCT REMOVAL:

Cropping -

Sulphur is removed in our produce and sent out the farm gate. Cropping enterprises remove between 1.1 to 1.6 kg of sulphur per tonne of grain with all cereals. If the stubble is burnt or cut, 1 unit of S per tonne of stubble is removed. As an example in a 4t wheat crop, you will remove the following amounts of sulphur.

4t wheat crop, using grain/stubble ratio of 1:1.25 means you will be left with 5t/ha of stubble on the ground.

If you are to burn this stubble you will be removing 5kg/ha of sulphur.

Grain removal of a 4t/ha wheat crop:
4 × 1.6 = 6.4kg/ha of sulphur
Total removal from crop: 6.4 + 5 = 11.4kg/ha sulphur

If we look at another example using canola, this crop uses quite a bit of sulphur.

Every tonne of oilseed removes 7kg/ha of sulphur. Using an example of a 2t/ha canola crop.

Oilseed removal:
2 × 7 = 14kg/ha of sulphur

With the above figures and the use of MAP and DAP products these days (having only 1.5 units of sulphur per 100kg/ha), there is no wonder the soil test results are coming back deficient in sulphur.

Grazing -

Broadacre grazing farmers should work on figures of 28kg of sulphur per tonne of greasy wool that heads out the front gate. Let's break this down to what the average farm will remove. The average sheep cuts around 4.5kgs of greasy wool per year and as an example, if you were to run 6 ewes to the hectare over 1000 hectares you will get the following figures.

6 (ewes) × 1000 (hectares) = 6000 ewes total
6000 × 4.5 (wool) = 27,000 kilograms of wool per year off a 1000 hectare farm.
27 tonnes of wool × 28kg = 756 units of sulphur.
If we divide it by the hectares = 0.76 kg/ha of sulphur out the front gate in wool.

You must also consider the sulphur that is removed in meat production. So when it comes to selling lambs, the following figures should be worked on to ensure that you are applying enough sulphur for your production levels.

Meat production removes 4kg/ha of sulphur per tonne removed lamb. Working on the same example of running 6 ewes/hectare over 1000 hectares and the farm turning over approximately 8 lambs per hectare, you will remove the following units of sulphur.

Average lamb weight = 42kg
8 (lambs) × 1000 (hectares) = 8000 lambs total
8000 × 42kg = 336t of meat

336 × 4kg = 1,344 units of sulphur
Divided by the hectares = 1.344 ≈ 1.4 kg/ha of sulphur out the gate in meat.

With both wool and meat being removed on a broadacre grazing scenario, it is quite easy for the sulphur levels to slip if you are not calculating the requirements correctly!

LEACHING:

The previous 3 years to 2014 have been wet and we would all remember the summer we experienced in 2010/11 when roughly 10 inches of rain fell over December January. Sulphur like potassium and nitrogen is a mobile nutrient and will leach through the soil profile. As a rough rule of thumb, it is said that sulphur will leach through the soil profile at about half the rate of nitrates. Sulphur is held tightly in the soil by organic matter. More than 95% of sulphur found in the soil is tied up in organic matter and the release of this sulphur through mineralisation is the primary source coming from the soil. Lighter textured soils have a high potential to leach sulphur and unfortunately these soil types generally do not have a high organic matter percentage. Soils which have an organic matter lower than 2% are likely to be sulphur deficient. Under favourable conditions for mineralisation, for every 1% organic matter around 6kg/ha of sulphur will be released per year.

ROLES OF SULPHUR:

Sulphur is extremely important in both plants and animals and is a part of every living cell. It is a primary component of 3 amino acids which form proteins, enzymes and vitamins. Nitrogen fixation by legumes cannot occur without sulphur as these major nutrients have a close relationship. The relationship between the two should not be surprising considering they are both constituents of proteins. With the addition of sulphur to nitrogen, the nitrogen content of plants increases and this sulphur is important in converting nitrate nitrogen into amino acids. There is a lot of evidence within Australian literature that shows the ideal ratio for plant growth is 17:1 and for healthy animal production the ratio should be 10-11:1. Sulphur is also important in stimulating seed production, oil content of oilseed crops, protein content and the synthesis of chlorophyll.

In animals, sulphur is important especially in wool production as it is the main nutrient for two of the proteins responsible for wool fibre growth and production. Wool fibre is mainly protein, grouped into two main types, cysteine and methionine which are the sulphur containing amino acids. In a fine wool enterprise, sulphur deficient stock will not be able to produce as much wool, nor will it have a fine crimp. Over time you will notice that your quantity and quality of wool cut will dramatically decline, causing great reductions in your wool cheque.

Deficiency symptoms in younger plants include: stunted growth, yellowing and upward rolling of the younger leaves and little if any nodules on legumes. The deficiency symptoms are quite similar to that of nitrogen but they appear on the younger leaves. Pasture growth and production can be seriously affected by sulphur deficiency.

FORMS OF SULPHUR:

There are two forms of sulphur which are used in fertilisers, sulphate sulphur and elemental sulphur. Sulphate sulphur is the readily available form which is available for immediate uptake by plants. It is used in many fertilisers such as single super and sulphate of ammonia (SOA) for the immediate use of the plant available nutrient. Unfortunately this form of sulphur is quite prone to leaching in lighter textured soils and areas of high rainfall. Elemental sulphur is a slow release form of sulphur which must be broken down by bacteria in the soil for uptake. These bacteria (thiobacillus) break down the sulphur when conditions are favoured by warm soil temperatures, good soil moisture, low pH and soil aeration. The bacteria oxidise the elemental sulphur into the sulphate sulphur form to then be taken up by plants. Elemental sulphur comes in a product called sulphur bentonite. In this product, the sulphur is held in a pastille bentonite clay which is the carrier for the nutrient. When it is applied, moisture is absorbed into the clay particle which then swells and breaks the pastille into small sulphur particles.

Using sulphur bentonite on light textured soils with low sulphur levels can assist in reducing losses.

FERTILISERS:

Going forward in the coming season I would recommend using a product that Vickery Bros. have been making for the third year in a row. PastureMax 12-12 is an ideal blend which uses two forms of sulphur, 60% is sulphate sulphur and 40% is in the form of elemental. The ratio between the two products ensures that there is a good balance of immediate sulphur available to the plant and sulphur that will break down for uptake throughout the season. We also have a product called PastureKing SS13 which again has the two forms of sulphur. However in this product there is 69% elemental sulphur and 31% sulphate sulphur. Both these products have a 1:1 ratio of phosphorous to sulphur. If the quantities of sulphur are not sufficient for your requirements, we can always add more of the elemental sulphur in the blends to meet your needs.

Just a reminder that soil testing is well underway and I look forward to catching up in 2015 to make some plans for the season.

COPPER DEFICIENCY IN LAMBS

Leighton Rees

Copper deficiency in livestock has again been a problem for many lamb producers. Many farms that I have visited in the last two years have had issues with lambs being sold over the hooks and reports coming back that the carcasses have been damaged. These problems have been exacerbated in recent years due to increased rainfall over the winter period making copper unavailable to the animal. When the soil becomes saturated the availability of molybdenum increases. As moly becomes more available copper does the opposite.

These two trace elements tend to have an antagonistic effect on each other so the relationship between the two needs to be right. When looking at levels of availability aim for a 1-10 ratio meaning that if your moly levels are 1mg/kg then your copper level on your tissue test should be around 10mg/kg.

COPPER AVAILABILITY

The availability of copper during these cooler periods is extremely important, especially in a lamb production system as this is when most lambs are developing in utero. The demand for copper during this period almost triples. If copper isn't available to the developing lamb during this period then issues such as lambs breaking bones and unseen production losses may occur.

CONSEQUENCES

Many processors are now penalising producers for damage to carcasses eg. broken bones that have re-healed as copper has become more available later on in the season. The reason for this is that the particular cut that has been damaged cannot be sold.

This puts more pressure on the price of our finished product and basically means less profit for the producer.

Image 1.1 Fractures in lambs' rib bones.

SYMPTOMS IN ANIMALS

Copper deficiency can often be overlooked due to the fact that by the time you see symptoms of a deficiency in the plant or pasture, you will probably be already seeing animal health issues in your lambs. The reason for this is that animals have a much higher requirement for copper than your pasture does. The symptoms of copper deficiency can often go unnoticed for some time. Swayback or lambs breaking bones may be the first thing you notice when you come across a copper deficient animal. This quite often occurs at marking time because this is the first time the lamb has been put under pressure. Copper deficiency can be easily mistaken for low calcium levels as calcium deficient animals show similar signs to that of animals lacking copper. Copper levels need to be between 10-12mg/kg for optimal animal growth.

SYMPTOMS IN PASTURE

Signs of copper deficiency in clover are the cupping up of the leaf and die back in young tissue. White empty seed heads in grasses is also another sign of copper deficiency. The requirements for copper in the animal are far greater than that required by the plant to grow. Optimal levels of copper are between 6-12 mg/kg for plant growth.

SUSCEPTIBLE SOIL TYPES

There are certain soil types which are more likely to become deficient in copper than others. These are typically lighter textured soil types. Soil types such as peat soils which are high in organic matter tend to tie up copper also, making it unavailable to the plant. However, this is not to say that heavier soil types won't be deficient in copper as well.

MANAGING COPPER LEVELS

As part of a management program firstly look at tissue testing areas of your property with lighter textured soils or areas you suspect could be high in organic matter. As copper is extremely immobile in the soil you will need to conduct a tissue analysis rather than a soil test. Soil tests should only be used as a guide to trace element availability. Tissue tests should be taken during the winter when copper availability is at its lowest. This is when most of the problems are occurring and this is when you will get your most accurate reading. Another option is blood testing. This should be conducted at a similar time of year. As conditions warm up copper becomes more available to the plant and test results will only give you an indication as to available levels. Remember never to apply moly on its own without first checking available levels of copper and be wary when applying lime on areas of your property that could be low in available copper as this can also make copper temporarily unavailable to the plant and therefore increase problems. The effect that liming has on copper availability is that when the pH is increased the availability of molybdenum, unlike most other trace elements becomes higher resulting in less available copper. The excess moly affects the ability of the rumen to fully utilise copper and therefore it is excreted by the animal.

WHAT CAN YOU DO?

Correcting copper deficiencies can be achieved through supplementation of copper directly to the animal or by increasing soil levels of available Cu. Foliar applications can also be used and this will be immediately available to the animal. Increasing copper levels won't only help with animal health issues but it will also protect pasture from fungal attack as well as increase pollination.

There are a range of copper products out there which can be applied with your annual fertiliser application. Super Cu gives good coverage as there is copper in every granule giving good distribution. Copper can also be coated onto every granule at specific rates depending on soil and pasture requirements.

Maintenance rates of 200-300grams annually are used and in cases where there is a known deficiency apply approximately 1-2kg/ha of copper depending on tissue test results.

Applications of 1-2kg/ha of copper will be sufficient for around 5-10 years depending on the base level of nutrient that you started off with.

Image 1.2 on the right shows a lamb with a severe copper deficiency

During early winter I measured copper levels on many properties which had sold lambs over the hooks and been warned or penalised by the processors for damage to carcasses. On these properties where copper was tested and found to be below optimal we applied copper at various rates depending on available levels. At this stage there has been no reports from the processors of damage to lambs and carcasses on the areas where copper was applied.

FEEDING LIVESTOCK IN A TIGHT SEASON

Bruce Lewis

"By allowing the pasture to grow and develop leaf area after the break, plant leaves will intercept more sunlight going into winter resulting in higher growth rates through winter."

The dry spring has produced some short pastures going into summer which will result in higher than normal feed requirements. Animal body condition must be maintained at optimal levels if reproduction targets are not to be compromised. Planning and decision making should be done early in the season to calculate feed requirements before feed prices rise and agistment dries up.

Before commencing a feeding program some management decisions need to be made on which stock to feed over the summer and autumn. Any unproductive or cast for age stock should be identified for sale. Sheep prices are now quite good. It makes sense to sell earlier rather than later in a poor season. Keeping the most productive sheep will allow for a build up of stock numbers after the break.

Agistment is often the cheapest option available if it can be found. Agisting off farm will also reduce the stocking rate on the farm.

Developing a feeding and financial budget is an important part of the planning program. The Evergraze web site www.evergraze.com.au has some useful feed budgeting tools. The Feed budget rotation planner is an Excel-based spreadsheet that allows you to calculate animal requirements and to develop feed budgets taking into account existing paddock feed and quality. Working through a budgeting process will allow you to determine your likely feed requirements.

The main ingredient for maintaining adult livestock is energy. Metabolisable Energy (ME) is the amount of energy that an animal can digest from a kg of feed. In a feed test result it is expressed as Mega Joules of energy per kg of dry matter (MJ/kg/DM). Because all feeds have some moisture content the energy digested from a kg of undried feed is slightly less. When comparing feeds or working out rations the energy needs to calculated on an as fed basis which takes into account the moisture in the feed which makes no contribution to energy. For example a 60kg dry ewe will require 9.3Mega Joules of energy a day for maintenance. Some common feeds would have the following energy values. Fodder quality can vary considerably so have your fodder feed tested. Protein is also important for young growing stock especially if production feeding.

Fodder	ME (MJ/ kg DM)	Crude Protein %	Dry Matter %	Cost ($)/ Tonne	Cost ($)/ ME
Oats	10.4	8.8	90	270	2.9c
Barley	12.3	10.8	90	300	2.7c
Wheat	13.1	11.5	90	300	2.5c
Lupins	13.1	31.3	90	460	3.9c
Lamb Pellets	12.0	17	90	400	3.7c
Cereal Hay	9.5	8	85	220	2.7c
Clover hay	10.5	18	85	350	3.9c

From the example above feed wheat is the cheapest form of energy at 2.5c per MJ. Energy is the main ingredient for maintaining mature livestock. Lupins and clover hay are the same cost per ME (3.9c per MJ) however lupins have almost double the protein. Pellets are worth considering as they contain buffers to reduce acidosis and generally contain all minerals and trace elements. For production feeding like finishing lambs a lamb finishing pellet with balanced energy/protein may be a good option.

Cereal grains are carbohydrate rich foods and if excessive quantities are eaten, there is a sudden change in the microbe population in the rumen. This results in the formation of large amounts of lactic acid and acidosis. Wheat requires particular caution. Clinical signs can be depressed appetite and sore feet, while severe symptoms include scouring, abdominal pain, acute lameness and death. Cereal grains (particularly wheat) should be introduced very gradually over a 3 week period to allow the rumen to adjust gradually and to avoid acidosis.

Feeding days		Gram per head	Kg per 100 sheep
1, 2	Feed daily	50	5
3, 4	Feed daily	100	10
5, 6	Feed daily	150	15
7, 8	Feed daily	200	20
9, 10	Feed daily	250	25
11, 12, 13, 14	Feed daily	300	30
15, 17	Feed on alternate days	600	60
19, 21	Feed on alternate days	850	85
23, 26	Feed every third day	1300	130

Ruminants require a certain amount of functional fibre in their diet. Generally sheep and cattle eating pasture will get enough fibre. Cattle need a certain amount of fibre to ensure the rumen functions properly. Too little fibre can result in acidosis. Too much fibre will restrict intake and animal performance because the feed is digested too slowly. Neutral detergent fibre (NDF) is a measure of all the fibre and indicates how bulky the feed is. A high NDF will lower intake. A low NDF will lead to higher intakes however the ideal level of fibre in the diet is 30% NDF or more. If feeding sheep in a containment area a source of fibre must be provided. This could be hay or cereal straw.

FEEDING IN CONTAINMENT AREAS

Overgrazing pastures risks losing valuable topsoil because as ground cover is reduced the soil becomes fragile and subject to wind erosion. Bare areas will also be susceptible to water erosion when the break comes. By protecting the pasture base the pasture will also respond better to opening rains. Newly sown perennial pasture plants will be less likely to be grubbed out from continuous over grazing. By allowing the pasture to grow and develop leaf area after the break, plant leaves will intercept more sunlight going into winter resulting in higher growth rates right through winter. Hence pastures should be protected for a few weeks after the break.

Feeding stock in containment areas allows you to protect your pastures and your livestock. There is also the additional benefit of reducing the energy maintenance requirement for your livestock as there is little walking required searching for food. For example the daily energy requirement to maintain a 50kg dry ewe in

condition score 3 is 8MJ in drought paddock conditions and 6.7MJ confinement fed. Feeding becomes easier as stock are not spread out over the whole farm. Any seed weeds bought in with grain are isolated to one area and not spread over the whole farm. Stock can be left on paddocks until dry matter is reduced to 800kg/ha or ground cover is down to 70%. Paddock feed is then utilised while the stock are adjusting to supplementary feeding. Once paddock cover reaches 70% stock can be moved into containment areas. The fibre being eaten in the paddock can then be replaced with a fibre source such as barley straw.

A containment site should have a moderate slope with a stable soil such as a clay or clay loam and have some shade and shelter. Any shade trees should be protected with guards so they are not ring barked. Select the site so that it is convenient to your house but not too close to cause noise and smell problems with you or your neighbours. Good quality water in troughs that are regularly cleaned is important. Feeder pipes should be of sufficient size to allow troughs to quickly refill. 1 ½ or 2 inch poly is ideal for high flow rates. Stock should be fed in troughs unless the area is large with compacted heavy soil. Feed troughs can be made from a range of materials such as roofing iron, suspended cloth , or folded sheet metal.

HOW MUCH TO FEED

Energy required by ewes @ condition score 3 to maintain weight

	Maintenance energy (MJ/d) under drought paddock conditions						Confinement Fed	
Day of pregnancy	**45kg ewe - Single lamb**	**45kg ewe – twin lamb**	**50kg ewe – single lamb**	**50kg ewe – twin lamb**	**60kg ewe – single lamb**	**60kg ewe – twin lamb**	**50kg ewe – single lamb**	**50kg ewe – twin lamb**
Dry	7.4	7.4	8.0	8.0	9.3	9.3	6.7	6.7
50	7.6	7.8	8.4	8.6	9.7	9.9	7.0	7.2
70	8.0	8.4	8.7	9.1	10.1	10.7	7.4	7.9
100	9.0	10.2	9.9	11.1	11.5	12.9	8.6	9.8
130	11.3	14.1	12.3	15.4	14.4	17.7	10.9	14.1

Using the table above, if feeding medium framed ewes (50kg) which are presently dry, 8.0MJ of energy is required per day. If feeding barley with a feed test ME of 12.5 with 10% moisture this converts to 11.25MJ on an as fed basis. Then (8/11.25 = 0.71 kg or 710 gram/day is required to maintain weight in paddock. If the paddock still has useful feed this will reduce the supplement requirement.

Metabolisable Energy intake (MJ/day) from dry mixed pasture

	Digestibility					
Feed on offer kg DM/ha	**35%**	**40%**	**45%**	**50%**	**55%**	**60%**
500	0.3	0.7	1.3	1.7	2.2	2.8
1000	0.9	2.2	3.5	4.6	5.8	7.2
1500	1.4	3.3	4.8	6.3	7.8	9.3
2000	1.8	4.0	5.6	7.2	8.8	10.2

If the paddock has an estimated dry matter of 1200 kg/ha and has been feed tested to have 45% digestibility then the pasture will contribute about 4 MJ. The 4MJ can be fed with barley to make up to 8MJ which the ewes require. 4/11.25 = 0.355kg or 355 grams per day of barley required.

MINERALS

Deficiencies likely to occur with an extended high grain diet are sodium, calcium and vitamins A, E and B1. Adding a 50:50 mixture of limestone and salt at 2% to the grain will fulfil the sodium and calcium requirement. Pellets are easily balanced to have the full requirement of minerals and vitamins. Pellets are worth considering if the cost is comparable but would need to be fed in troughs to avoid wastage.

AFTER THE DRY

Allow pastures to build up leaf area for 3 weeks after opening rains. This will increase the total pasture grown. Release sheep with a full stomach and feed hay for a few days to allow stock to adjust to the new diet. Be careful with phalaris paddocks to avoid sudden death poisoning.

REFERENCES/FURTHER READING

Drought Feeding and Management of Sheep – DEPI Victoria
Drought Feeding and Management of Cattle – DEPI Victoria
Managing Farm Water Supplies – DEPI Victoria
Feed Budget Tables – Lifetime wool.

MYTHBUSTERS: WILL SPREADING COMPOST INCREASE MY SOILS CARBON CONTENT?

Phil White

A soils steady state carbon content is largely dependent on the annual rainfall and drainage of the site. Poorly drained soils in wet areas such as peat swamps have very high (>20%) organic matter and carbon contents; and semiarid cropping soils have very low (<2%) carbon contents. In recent times spreading compost has been advocated as a means of increasing carbon and soil organic matter and hence improving soil physical conditions such as moisture holding capacity and the soils ability to hold onto cations such as potassium. These are both worthy ambitions but performing an analysis of the scenario makes for some sobering reading.

Consider the scenario of adding 5 tonnes of compost per ha to a soil with an initial carbon content of 2.5% and an assumed rooting depth of 15cm

Soil volume to 15cm depth over one ha =

0.15 X 100 X 100 = 1500 m^3 X soil bulk density of 1.4t/ m^3 = 2100 t/ha

Convert to kg/ha = 2100 X 1000 = 2 100 000 kg/ha to 15 cm depth (effective grass rooting zone)

2 100 000 x 2.5% = 525 00 kg carbon/ha

A reasonably generous compost application is 5t/ha @ 60% DM = 3000 kgDM compost applied/ha

If the compost has an carbon content of 15 % we are applying 450 kg/ha of carbon

450 kg carbon/ha added x 100 / 2 100 000 (kg of soil to 15cm) = 0.02 % increase in carbon content before decomposition.

Or in other words the soil would increase from 2.5 % carbon to 2.52 % carbon.

It should be noted from the above example that the carbon applied to the soil will be further decomposed by microbial activity and carbon will be lost to the atmosphere as CO_2. So the actual increase in soil carbon content will be a magnitude lower than this figure. This compares with trial work that has shown the application of 25 t/ha of manure increased soil organic matter of the top 20cm by only 0.2% before decomposition (Mclaren and Cameron, 1996).

The practical reality of supplying 5 t[wet] of compost/ha over a farm of 300 ha would require 1500 t of compost with little to negligible increases in soil carbon content and substantial cost.

However we should also take into account the nutrient value of compost in the cost of this calculation as well.

A good quality compost will have a N -P -K -S rating of something like 1.50 - 0.45- 1 - 0.26 on a **dry matter** basis. Thus the aforementioned 3 t DM/ha [5 t wet] application of compost would supply 45 kg N, 13. 5 P, 30 K and 8 S which about half of which would become plant available over the first growing season. This would give the compost a nutrient value of roughly $109/ha (which would most likely become available over the next two to three growing seasons). This indicates that if compost or nutrient rich organic waste products can be sourced cheaply enough they will not increase soil organic carbon content directly but may increase carbon content indirectly by increasing pasture and or crop production thus adding substantial amounts organic material to the soil pool.

HOW DO WE INCREASE SOIL ORGANIC CARBON CONTENT?

During a pasture phase practices that increase plant production will generally increase soil organic carbon content. These include reducing nutritional limitations to plant growth which increases dry matter production. This results in increased root exudate production and the addition of carbon through leaf death and subsequent recycling into the organic carbon pool. Retaining stubbles and direct drilling in cropping programmes will minimise losses of soil carbon but they will not increase levels, however returning to a grazed pasture phase with legumes has been shown to increase soil carbon storage.

SOIL TESTING

Have you got your 2015 farm plan underway?

If you haven't already done a soil test analysis of your farm and worked out what, when and where you are going to spend your money on fertiliser, now is the time to do it.

Soil tests can assist in the budgeting for next year by knowing exactly what nutrients are within your soil and what you need to be applying. By doing this you are not only going to achieve the greatest responses to the applied fertiliser, but you will be increasing the overall productivity and profitability of your farm.

The agronomy team at Vickery Bros. can assist with all your soil testing and fertiliser budgeting for 2015.

With a soil test costing under $150 and fertiliser prices sneaking up for 2015, why wouldn't you do one to see where you can save yourself a few dollars?

We only send our soil test to one of the most accredited laboratories in Australia which has NATA and ASPAC accreditations.

DON'T BE TARDY ON CRICKET CONTROL!!!

Do you have enough surplus grass to feed your crickets this year? They are still going to need their share; and you can't just shove them all in a sacrifice paddock!!!

With crickets consuming up to 2000kg DM/ha in a year and the spring shut off we received, I would think that no one can afford to keep crickets this season! Controlling these little blighters needs to start NOW!

Although you may think that there are no crickets about; go put a hessian bag in an area which is susceptible and you will soon see that they are active. These cricket populations need to be monitored and decisions about controlling them need to be thought about now.

"If you are not monitoring crickets NOW, you may as well start buying another 2tonnes of hay/per hectare for your suspect areas. Hay definitely won't get any cheaper in February !!!

Controlling populations can be done either using an insecticide or baited grain. The use of a non-residual synthetic pyrethrin insecticide should be used in areas which have a green pick available for the crickets to eat. If there is no green pick available, grain baited with Maldison 500 (or equivalent) should be spread out on farm. You must ensure that you have the correct control for your situation to ensure the best response.

Grain can be treated at the Vickery Bros. depot and spread on the affected pastures. Rates of grain are 15kg/ha and to have your property treated it will cost $22/ha supplied, treated and spread.

Speak to your local Vickery Bros. agronomist about controlling crickets in the season coming and get your pasture protected before it's too late!

NEW CROP OPPORTUNITY

Roger Gee

Gauging by the numbers of farmers attending a present grower day near Heywood, TPI Enterprises have a good number of people interested in planting poppies in the district. This new cropping opportunity has the potential to return substantial rewards to growers and an alternate fit in cropping rotations.

Australia has traditionally supplied 50% of the world market for opiates – all of which has been grown in Tasmania. As the world demand has increased, so has the area required in Tasmania to cultivate poppies increased from 4,900ha in 2006 to 36,250ha in 2013. This 700% increase in the required land for cultivation in 8 years, hence the move into Victoria.

Victoria has been identified as a possible region within Australia for the cultivation of Papaver Somniferum, to increase the availability of raw material and off-set the agricultural risks, due to the climatic conditions, soil types, government support and proximity to Tasmania.

So who are TPI Enterprises? TPI Enterprises Ltd (TPI) was established in 2004 and is one of nine licit narcotic facilities in the world. It is Australia's only independent, Australian-owned poppy processor and narcotic raw material producer. The basis of TPI's success is the use of an innovative extractive and purification technology which uses water as opposed to a solvent based process used by all other licit processors of poppy.

The success of TPI's unique extraction and purification process has enabled TPI to supply quality product to the international narcotics market at a competitive price. Further growth of the business is limited by the availability of input raw material. The availability of Papaver Somniferum poppy crops were determined by the availability of suitable land in Tasmania, but now licences are available for Victoria which has a similar growing and harvest season.

Poppies, genus Papaveraceae and species name *Somniferum L.*, is a crop similar in growth habit to canola, growing best in free draining soils with a pH in water ranging between 5.9 and 6.5. Prior to selecting the paddock in which to cultivate poppies, a soil test should be undertaken to provide an indication of the nutrients available. As with all plants, poppies require a good supply of nitrogen, phosphorus, and potassium, sulphur, calcium and magnesium along with trace elements.

The following table indicates the total amount of available nutrient required to grow a profitable poppy crop:

Average Total Nutrient Uptake (Kg/ha) to produce 4t/Ha biomass

Macro Element	Requirement (Kg/Ha)
N	160
P	64
K	176
S	28
Ca	120
Mg	28

Poppies should be sown early enough to ensure they have made sufficient vegetative growth prior to flowering. Poor yields will often occur from crops sown too late in the growing season.

It is expected that the ideal time for sowing poppies in Victoria will be between late May and late September of each year. Growers need to be well organized so as they can sow their poppy paddocks at the optimum time for their situation.

Of critical importance is the herbicide/s used in previous crops as these can have a residual activity which may be detrimental or lethal to young poppy plants. Previous herbicide applications must be shared with TPI so they can help select the best paddocks to cultivate poppies.

A full list of residual herbicides effecting poppies is available from TPIs, however the following herbicides are the most important to consider;

Trifluralin - Many Victorian farmers use Trifluralin herbicides as a part of their grass weed control strategy. Farmers must be aware that there is a 3 to 5 year plant back period for poppies in a paddock that has been treated with any Trifluralin product. It is vital that paddock records be audited in regards to chemical application history before a paddock is selected for poppy production.

Atrazine, Chlopyralid, Oxyflurofen and Metsulfuron - Poppies should not be grown in paddocks treated with these chemicals in the previous 6 to 18 months (dependant on rates used).

Water is one of the major factors limiting the growth and yield of crops. Poppies are no exception with research clearly showing the positive effects on yield by sufficient water being available at times that are physiologically critical. These times include germination and establishment, vegetative growth, hook stage and flowering and post flowering prior to leaf senescence. Water supply can be managed by sowing time and irrigation. Sowing early so as the plants make most of their growth before rainfall declines and temperatures increase in spring and early summer can be an effective strategy. Irrigation can remove all risk of water deficiency provided it is applied at the correct time and rate.

Weeds are undesirable plants that compete with the sown crop for light, moisture and nutrients and usually grow very quickly. Most weeds in poppy crops can be chemically controlled but all herbicides have some negative effects on the poppy plants. These negative effects can be minimized by controlling weeds prior to sowing the crop and by making sure the poppy seeds germinate evenly across the paddock. This ensures herbicides can be applied at the optimum time to minimize the damage to poppies and to maximize their impact on the weeds. TPI provide herbicide recommendations but it is the responsibility of the grower to ensure herbicides are applied at the recommended rate and at the correct time.

Weed control should be a high priority for the grower and timely weed control is critical to the success of poppies.

Poppies are susceptible to a number of fungal diseases including poppy fire, downy mildew, leaf smut and sclerotinia. Some of these can be avoided by good farm hygiene practices such as of cleaning up stubble, controlling volunteer poppy plants and ensuring at least a three rotation between poppy crops. A range of fungicides are available to control these diseases and application rates and timings will be advised by TPI.

The role of the grower is to regularly observe the crop by walking through it. This will enable difference in the appearance of plants to be detected and treatments applied prior to serious damage occurring. It is important to detect change in the plants, not necessarily to know the cause and to act immediately as fungal diseases can become rampant within a couple of days under ideal conditions.

Harvesting of the capsules occurs after the plant has senesced and dried to a moisture content of below 14%. Only the capsules and approximately 5cm of stem are harvested. This is why even height of crops is important. It is anticipated that the crop will be ready for harvesting in Victoria between December and February, depending on planting dates.

Potential Returns; the dry weight of product and alkaloid content determine the value of the crop – the higher the alkaloid content the more you earn per tonne of crop. From the gross margins 2013 a 10ha crop with an assay of 2.6% and yield of 2t/ha, variable cost of $1,770/ha, and returned a gross margin of $1,900/ha

In Tasmania, returns of $6,000 - $8,000 / hectare have been realised by very diligent farmers. TPI also offers bonuses to growers who produce over a certain amount of alkaloid/ hectare. These bonuses range from $5,000 to $20,000. This current season (2014) TPI offered incentives for first time growers, and scaled incentives for long term commitment to TPI.

You might be reading this and thinking poppies look like an ideal fit, but you should be aware there is a substantial government regulatory framework you must follow.

In Victoria, only suitable people who are licensed under the Act are legally permitted to grow and/or process alkaloid poppies. The relevant part of the Act is administered by the Department of Environment and Primary Industries (DEPI).

Under the Victorian legislation:

The amount of poppies grown and processed in Victoria will be strictly controlled

Comprehensive powers have been granted to inspectors (DEPI and Victoria Police)
Access to growing and processing sites will be limited to authorised persons
There are very severe penalties for breaches of licence conditions, including imprisonment.

Applications will be assessed by DEPI and Victoria Police, including inspections of the proposed planting sites. Cultivation of alkaloid poppies for therapeutic purposes in Victoria is a highly regulated activity. Poppy growers must interact closely with their contracting processor and the Department of Environment and Primary Industries (DEPI) and strictly comply with licence conditions.

Any participant in poppy production who does not comply is risking the future of both the Victorian and the Australian industry.

Vickery Bros now have an increasing number of producers interested in cropping poppies next season, and we are working closely with TPI, and growers to assist this new enterprise in expanding. If you require further information please speak to your Vickery Bros. sales agronomist, or contact TPI Enterprises direct.

DID YOU KNOW?

- Vickery Bros. was established in 1948 by 2 brothers, Jack & Alan Vickery and now is a third generation family business.
- We move 200,000 tonnes of product per year.
- Vickery Bros. employs 50 local people.
- Our company burns over 1 million litres of fuel per year.
- We have more mobile phones than people!
- We supply and deliver: grain, concrete, rock, rubble and sand.
- We spread over 22,000 hectares of cricket bait last year with devastating results.
- We sponsor over 40 football/netball, bowling, tennis, cricket, racing, basketball, hockey and quoits clubs!
- Vickery Bros are currently in the process of updating our internal computer software package and we would like you to send us your current email address to email@vickerybros.com and include the AFL footy team you follow.
- Vickery Bros. operate concrete plants in Casterton, Neuarpurr and a new site to be commissioned in Edenhope Feb 2015. They have 5 concrete barrels with capacities ranging from 5.5m3, 6.5m3, 7.6m3 and 9m3.

Contact the professional team at Vickery Bros.

Where everything's covered.

Agronomy Team

James Stewart	0427 752 773	Bruce Lewis	0422 632 730
Leighton Rees	0437 752 707	Phil White	0417 752 776
Rebecca Stewart	0427 337 253	Roger Gee	0417 677 342

Depots

Coleraine 03 5575 2777 Heywood 03 5527 1777 Edenhope 03 5585 1975

Mount Gambier 0408 646 220 Frances 0418 330 267 Casterton 03 5575 2777

SEASONAL REMINDERS

- ☐ Take advantage of our lime deal to assist cash flow
- ☐ Get your farm nutrient plan organised
- ☐ Make sure your dumpsite has been graded
- ☐ Check for power lines around your dumpsite
- ☐ Soil test to check nutrient levels
- ☐ Follow us on Instagram and Twitter!!
- ☐ Control those crickets!

If undeliverable return to:
Vickery Bros. Pty. Ltd.
105 Whyte Street
Coleraine VIC 3315

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