SEASON OVERVIEW & FERTILISER PRICING 2016

Craig Tosetti

As we move towards the start of another Summer/Autumn spreading season I have seen some great positives come out of the first 6 months of the financial year. This is helping me stay reasonably confident that the budget I've put in place for the company should at this point in time, track as planned. I did a **SWOT** analysis on how the first 6 months went and what Vickery Bros could possibly expect going forward.

Strengths identified were, beef up substantially on this time last year and hitting record levels; lamb pricing still very strong; wool up 10% on this time last year; average farm income in the grazing belt up 30%; clover and lucerne seed growers achieving near record prices. Some cropping clients achieving much better returns by baling than harvesting, and dairy although sluggish benefiting from the depreciation of the AUD.

Weaknesses identified were, a failed spring for the 2nd year in a row with water becoming an issue. Crop quality, yields and prices at harvest down for our Northern cropping clients. The potential for higher supplementary feed requirements and world dairy prices still at very low levels.

Threats identified were; a very very real potential of a huge shortage of single superphosphate x Portland. Our investigations of stocks already made as against this same time other years coupled with a good understanding of how much can be produced each day going forward; plus knowing the approximate tonnage of Chinese super booked to come in tells us that SSP will be in very short supply by mid March. This shortage scenario could also lead to manufacturers and importers increasing pasture fertiliser pricing. Other minor threats in relation to the above include lower currency impacts whilst importers are negotiating fertiliser tonnage for the Australian cropping market. A better than 60% chance of an early break also hampering smooth planning of fertiliser application and not being able to supply our Southern clients from our traditional Northern base with enough grain to meet their needs, making it a possibility of empty leg transport movements into areas we don't service.

Opportunities identified for the business were: Offer customers good incentives for early application of fertiliser to get the best price of the season and us all beating the possibility of a shortage of SSP. Offer deferred payment of LIME applied in December until April 2016.

Incentivise our Northern cropping clients to store on farm for delivery throughout the year and capture a premium without big grain receival storage and handling costs. Purchase enough grain to fill our own limited storage as a back up.

The strengths and opportunities going into next season certainly outweigh the weaknesses and threats although the anticipated SSP shortage concerns me greatly. Driving around over the last few months as the country started to dry off you could really see the difference in the paddocks that have a good fertiliser history; they seemed to hang on well.

The weather is always a difficult one to predict; it can give you some hope for an upcoming rain event and then break your heart when nothing falls from the sky. The current El Nino is predicted to remain strong over the summer months but then turn into a La Nina next year reversing from dry conditions in eastern Australia to above average rainfall and extreme wet weather events. This has occurred with the 2 previous strong El Nino events in 82/83 & 97/98. We are not weathermen but because it is already so dry there is no reason why you shouldn't consider your fertiliser requirements earlier than normal this season, Geoff Vickery keeps telling us all that it is never dry both ends of a season.

Fertiliser pricing over the last year has been affected more by the falling Australian dollar than changes in world pricing. Overall world prices have not had the huge spikes and lulls as we have seen in the past. I am receiving reports daily on fertiliser pricing to help make the best decisions on when to buy on behalf of our customers. World fertiliser prices are similar to the last few years but with the Australian dollar hovering around or just above $0.71 US compared to $0.82 US in Dec 2014 and $0.91 US in Dec 2013, fertiliser prices will be more expensive this coming season.

DAP/MAP prices have dropped from a high of US$470 FOB during the middle of the year to now sit at US$410 FOB. This drop in world pricing is the norm for this time of year as world demand for product is sluggish and producer's inventory levels begin to rise creating downward pressure on prices. In the previous 2 years we have seen a spike in pricing during November/December as world demand picked up. This year it is forecast that there will be less of a spike in pricing but local suppliers will still be wanting to shift product early and will be offering some enticing deals to take delivery early, so if you have the space in your silo's you should be getting the best deal for the season ahead.

The pasture market is predicted to be strong for the coming summer/autumn season. As with DAP/MAP, single superphosphate has increased in price as a reflection of the falling Aussie dollar.

Vickery Bros. are offering great early bird deals and incentives to Supply, Freight & Spread your fertiliser to beat the usual rush and the potential shortage of SSP. If you are interested in taking advantage of these early bird deals please contact one of our experienced Agronomists who will work out a fertiliser program to suit you.

Contents:

CASE STUDY: CALCULATING THE COST OF RETURN ON A FARM HIGHER THAN DISTRICT AVERAGE.

James Stewart

The topic I have chosen for this newsletter is one I constantly get quizzed about throughout the growing season. In fact it has been a probing topic of discussion from other clients right throughout the 8 years I've been looking after this particular farm.

That farm is Jigsaw Farms. This property acquires a lot of interest; and there are normally two trains of thought when I get asked about the enterprise.

I can categorise the questions into two groups:

The first group quiz me in regards to pasture species; how they seem to grow so much feed, the fertiliser rates and the mix of products they use. The conversation normally ends with: "I should try a paddock on the farm and see if I can do the same".

The second train of thought I can only categorise as; "it's not the real world". Some people believe that the properties couldn't be able to look as good as they do without, possibly; a capital application of "obscene" amounts of fertiliser.

So what I plan to do is explain to the first group exactly what happens to be able to grow the amount of grass that they do. And in the process I can achieve my second goal of giving you the actual numbers that stack up making Jigsaw Farms a very profitable business. This should squash the sceptics!!

To do a case study on the entire farm would be way too long for a newsletter article; and secondly I'd like you to read and digest the entire article. Thus, I have chosen to specifically analyse from meticulous records kept; the inputs and returns on one particular paddock at Hensley Park.

The paddock "Lewis" at the Hensley Park farm is 24.8ha and has had a great year in terms of production and return. This paddock is quite good in terms of growing feed, but it is by no means the best paddock on the farm. I'd rate this paddock as an; A-/B+ type paddock.

The story begins in 2009: "Lewis" was sown down to Holdfast Phalaris, Trikala and Leura Sub Clover. In 2012, Banquet II Ryegrass was sod-sown into the existing pasture. This is the current pasture species at this point in time.

Including 2009, the average annual autumn application rate of fertiliser each year for this paddock applied early January has been:

- 16.3kg/ha of Phosphorous,
- 23.5kg/ha of Potassium (K),
- 20kg/ha of Sulphur.

Lime @2.5t/ha in 2011.

Urea applied after the break in May 2012 & 2015 and in spring 2013.

No HayBoosta has ever been applied when locked up for silage.

No capital application of fertiliser has ever been done on any part of the farms.

Analyte / Assay	Unit	Value	Very Low	Marginal	Optimum	High	Excess
Soil Colour		Grey					
Soil Texture		Clay Loam					
pH (1:5 Water)		5.7	Moderately Acidic				
pH (1:5 CaCl2)		4.9					
Electrical Conductivity (1:5 Water)	dS/m	0.09					
Electrical Conductivity (Saturated Extract)	dS/m	0.7					
Chloride	mg/kg	34					
Organic Carbon (OC)	%	2.9					
Nitrate Nitrogen (NO3)	mg/kg	5					
Ammonium Nitrogen	mg/kg	13					
Phosphorus (Olsen)	mg/kg	24					
Phosphorus (Colwell)	mg/kg	76					
Phosphorus Buffer Index (PBI-Col)		110	Low				
Potassium (Colwell)	mg/kg	190					
Sulphate Sulphur (KCl40)	mg/kg	9					
Cation Exchange Capacity	cmol(+)/kg	7.9					
Calcium (Amm-acet.)	cmol(+)/kg	5.6					
Magnesium (Amm-acet.)	cmol(+)/kg	1.6					
Sodium (Amm-acet.)	cmol(+)/kg	0.25					
Potassium (Amm-acet.)	cmol(+)/kg	0.44					
Aluminium (KCl)	cmol(+)/kg	<0.1					
Aluminium (KCl)	mg/kg	<9.0					
Aluminium Saturation	%	<1.0					
Calcium % of cations	%	71.0					
Magnesium % of cations	%	21.0					
Sodium % of cations	%	3.10					
Potassium % of cations	%	5.60					
Calcium/Magnesium Ratio		3.5					
Zinc (DTPA)	mg/kg	0.58					
Copper (DTPA)	mg/kg	0.56					
Iron (DTPA)	mg/kg	540.0					
Manganese (DTPA)	mg/kg	14.0					
Boron (Hot CaCl2)	mg/kg	0.8					

"Lewis" was soil tested again this year. It was last done in 2011. A 4 year turnaround on the paddock being retested. A lot of my clients would have heard me harp on this!!

SOIL TEST RESULTS FOR LEWIS 2015:

As you can see the results from the soil test are virtually optimum for a grazing pasture. Sulphur and Potassium levels are just slightly lower than ideal; nothing we can't tweak. So the soil test is telling me we have no significant limiting factors that would affect growth rates.

This year in January," Lewis" received 14kg/ha of Phosphorous, 40kg/ha of Potassium (K), 19.3kg/ha of Sulphur and 18.7kg/ha of Calcium in the form of a blend at 205kg/ha. Cricket baiting was carried out in March with an application rate of 20kg/ha

STOCKING RATES THROUGHOUT THE YEAR:

During January and February there were 52 lactating (550-600kg) cattle which were rated at 25DSE each. These cattle were also being fed 10kg/head/day of pasture hay to maintain condition.

Urea was applied on the 4th of May to the paddock at a rate of 80kg/ha (applying 36.8kg/ha of Nitrogen) and spelled for 20 days until the last week of May. Working on a 12:1 ratio for applying the Nitrogen (12kg/ha extra growth of Dry Matter per 1kg/ha of Nitrogen applied) equates to the paddock growing an extra 441.6kg/ha of Dry Matter for consumption. Growth rates of the pasture at this time of the year were 17kg/ha/DM/day. (Figure acquired from Prograze).

On the 25th of May, 171 single bearing merino ewes were

introduced to Lewis with 2200kg/ha of DM in front of them. The ewes averaged 55kg live weight and were rated at 2.5DSE each. They were removed after 42 days (6th July) when the pasture was down to 2000kg/DM/ha. The ewes were in the paddock at a stocking rate of 17.3DSE/ha and consumed 3.5kg/ha/day of DM which equates to 1185kg/ha of DM removed. These figures were calculated by looking at the growth rate of the pasture throughout this period (17kg/DM/ha/day) and also the fact that there was an extra 441.6kg/ha of DM due to the urea application and response.

The percentage at lamb marking from this single bearing mob was 76% (130 lambs). Jigsaw Farms wean at 14 weeks when the lambs are around 31kg.

The paddock was spelled for a further 14 days until the 20th of July when 193 single bearing merino ewes weighing 55kg (rated the same as last mob at 2.5DSE) were introduced to Lewis. They were removed after 56 days on the 14th September. Stocking rate for this mob of lambing ewes were rated at 19.5DSE/ha. At this stage the paddock had around 2100kg/DM/ha available. Throughout this period it is assumed that the pasture grew at an average growth rate of 44kg/DM/ha/day and the ewes consumed around 3.5kg/ha/day, leaving the paddock with 2500kg/DM/ha. These ewes produced a lambing percentage of 85% which equates to 164 lambs.

After these ewes and lambs were removed from the paddock it was locked up for silage and no booster fertilisers were applied. Lewis was cut just 11 days later on the 25th September and yielded 3.9t/ha of silage (wet tonnes) It was cut early in the anticipation that maybe another cut or graze could be undertaken if the season continued. The silage was feed tested and came back with an ME of 9.5, protein of 18.5, digestibility of 60% and NDF of 47%. Although this may seem like it is not a huge yield for a silage paddock, it must be kept in perspective that this paddock had multiple mobs of lambing ewes rated at an average of both mobs at 18.5DSE/ha through the entire winter and cut just 11 days after stock removal.

From the 16th – 23rd October, 700 twinning merino ewes rated at 2.3DSE and 957 Lambs rated at 1 DSE (65DSE/ha) were present.

I'm sure you'll all agree a phenomenal effort for a paddock but something that is not unachievable on your own place.

Let's look at inputs verses outputs, and do the numbers match up to make it worthwhile doing??

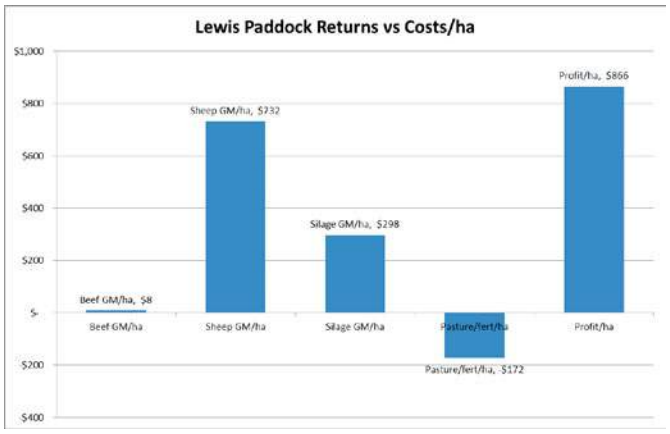
COST ANALYSIS;

To look at the cost analysis for this paddock the energy harvested from the paddock was calculated in MJ to then calculate the total DSE for the year. With one DSE removing 7.6MJ/day of energy, we could therefore calculate how much energy was harvested from the year and put that figure back into a DSE figure.

As you can see in Appendix 1, the figures were run through the grazfeed program which calculated the growth of wool per animal, meat, and also the pasture intake. To look at income, the liveweight and clean wool values were calculated to work back to look at the margins produced from this paddock.

At the bottom of the table in appendix 1, you can see that the net margin for this paddock throughout the year has retuned some serious income ($866/ha). It should also be kept in mind that there will more than likely be more stock to go in this paddock since these figures have been taken.

Graph 1. Returns v's Costs throughout 2015 for Lewis



In the graph above you can clearly see that the sheep production throughout the year has returned the highest income from the paddock. The silage has also returned some serious gross margins, keeping in mind that no money was spent on booster fertilisers.

In summarising, firstly I'm hoping you followed it through from start to finish; and it all makes sense. Secondly I haven't made any blues with my figures and calculations. I'm sure someone will let me know (Thanks Martin).

And finally as you can see; the returns per hectare verses inputs per hectare are significant.

Jigsaw farms is a very successful enterprise, stand alone!!; that with meticulous planning , good management, credible agronomic advice , and the ability to look objectively at cost versus benefit; makes the organisation a model for others who strive for higher profitability.

Appendix 1. Cost Analysis on Jigsaw Farms, Lewis Paddock.

Stock Class	Date in	Date out	No days	No stock	Stock DSE rating	Energy Harvested MJ	Energy Supplement MJ	Grazfeed wt gain grams/day	Clean wool Grazfeed Wool growth grams/day	Live weight Value $/kg	Wool Value $/kg	Cost of supplement $/day/cow	Cost per breeder $/head	Breeder/ha	Gross/ha $/ha	Animal Costs/ha $/ha	Margin/ha $/ha
Cows &	1-Jan-15	28-Feb-15	42	52	25	218400	196560	0				1.8	82	2.10	$ -	178	$ 8
Calves				49				750		$ 3.00					$ 186		
Single Bearing Ewes	25-May-15	6-Jul-15	31	171	2.5	100719		233	16.6	1	12		30	6.90	$ 92	18	$ 218
Lambs				128				347	8	$ 2.30	12				$ 143		
Single Bearing Ewes	20-Jul-15	14-Sep-15	41	193	2.5	150347		233	16.6	1	12		30	7.78	$ 138	26	$ 354
Lambs				164				347	8	$ 2.30	12				$ 242		
Twin Bearing Ewes	16-Oct-15	23-Oct-15	6	700	2.3	73416		298	17.2	1	12		30	28.2	$ 85	14	$ 160
Lambs	16-Oct-15	23-Oct-15	6	957	1	48003.12		103	12	$ 2.30	12				$ 88		
														Total	$ 976	$ 236	$ 740
	kg/ha	DM%	ME	Protein	NDF	MJ harvested	Value/t/DM									silage costs	
Silage	3900	63%	9.5	18.5	47	23342	225								$ 553	255	$ 298
													Overall total		$ 1,529	$ 491	$ 1,038
													Pasture costs/ha				$ 172
													Net margin/ha				$ 866

PHOSPHORUS DRIVES LAMB GROWTH RATES ON 'WARATAH' AT CAVENDISH TRIAL

Bruce Lewis

"Robert Pike of J Ellis and Co said the lambs were visually better on the high fertiliser paddock. "Whatever you did on this paddock you should take over the rest of the farm."

A whole paddock phosphorus demonstration trial has produced some impressive lamb growth rates in what has been a tough season. Lamb growth rates of over 300g/day has turned a tough spring into a rewarding finish for the prime lamb enterprise run on Waratah at Cavendish. In 2015 a phosphorous trial was run for the second year at the property in the Western District of Victoria. In addition to the replicated plot experiment one 50ha paddock on the farm was topdressed at the same rate of phosphorus as used in the trial which was 36kg P/ha. The idea was to see if the experimental work in plots could be converted into a paddock scale result.

THE PADDOCK CAPITAL APPLICATION OF PHOSPHORUS

A Vickery Bros Pasturemax blend was applied to the selected paddock @290kg/ha to apply 36kg phosphorus/ha and 36 kg sulphur/ha in early June. The commercial sized paddock (50ha) was stocked with crossbred ewes joined to a terminal sire (Late May/early June lambing at 4.6 ewes/ha). Pasture cover in early June during lambing was estimated at 500kg/ha dry matter (Picture 1). Here clover plants were present but with small dark leaves typical of low phosphorus. The pasture also had a germination of capeweed with bare ground also significant. The soil Olsen phosphorus level on the trial plot site was 5.7 mg/kg. Ewes were in light condition (estimate CS 2) and were fed oats pre lambing.

Picture 1 – 4th June 2015 – 500kg/ha DM

The phosphorus fertiliser was applied on the 9th of June (36kg P /ha). On the 25th of June the pasture was showing strong clover growth (picture 2).

Picture 2 – 25th June 2015 – 1000kg/ha of pasture dry matter 16 days after P application – note clover leaf size and colour change

On the 14th of October the pasture had grown to 2000kg/ha of dry matter consisting of sub clover and capeweed with some phalaris. Capeweed has not been controlled this year. As the pasture grew, ewes from an adjoining paddock were also given access to the paddock feed increasing the stocking rate by about 50%. The growth of the lambs was impressive given the tough seasonal conditions in early winter (picture 3). With many lambs exceeding an estimated 50kg/ha live weight the growth rate calculates to 300 - 350grams/day. Robert Pike of J Ellis and Co estimated the lambs in the trial paddock at 23 to 24kg DW. This converts to 50 - 52kg live weight based on a dressing percentage of 46%. Robert said the lambs were visually better on the fertilised paddock. "Whatever you did on this paddock you should take over the rest of the farm."

Picture 3 – Pasture 14th October with Ewe and Lamb

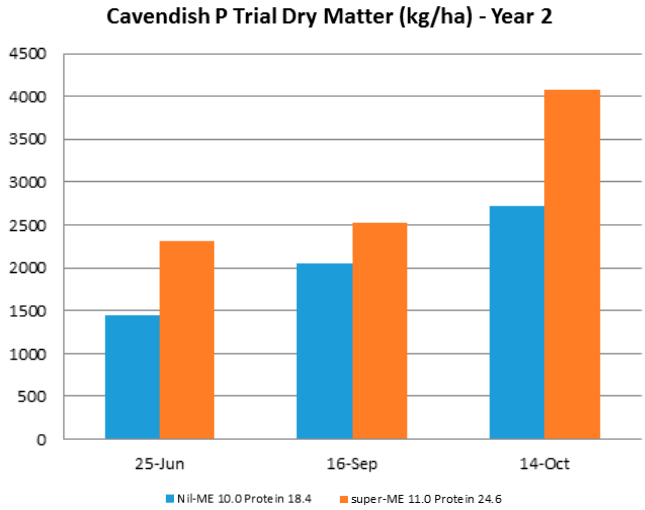
Picture 4 – Sale lambs Hamilton Market 18th November (Estimated 24kgDW) sold for $142. Second draft sold for $141.

THE TRIAL PLOTS IN YEAR 2

2015 was the second year of the phosphorus plot trial on 'Waratah' at Cavendish. In the first year on the trial plots treated with super @ 36kg P/ha there was strong clover growth in the first spring. This clover growth resulted in significant nitrogen being fixed in the soil. Higher fertility in the autumn of 2015 resulted in strong clover and capeweed growth in the fertilised plots while onion grass dominated in the unfertilised plots. Being a high fertility weed, capeweed was the strongest where the soil nitrogen was high. Being a low fertility weed onion grass was dominant in the nil fertiliser plots. After the first measurement the plots were sprayed with MCPA and opened to sheep and grazed out. The sheep cleaned up the cape weed and clover but left most of the onion grass.

Picture 5 – Trials plots year 2 after MCPA and grazing showing onion grass strips on Nil fertiliser plots.

The plots were measured for Dry Matter before grazing in June, September and October. The samples were also sent away for analysis of ME and protein during September. Moisture stress began to affect the clover during October and it was beginning to wilt. The fertilised plots measured higher metabolisable energy (11.0 vs 10.0) and higher protein (24.6 vs 18.4). These differences will have a large impact on animal performance and growth rates of lambs.



Soil analysis on the trial plots after 2 years (total of 72 g P/ha) showed the Olsen phosphorus has shifted from 5.7 to 10.0mg/kg. The soil has a phosphorus buffering index of 200 and it is expected that 3-4 years of capital applications will increase the Olsen P level to the optimum of 15mg/kg. After this level is achieved P applications could be reduced to 0.8kg/P/DSE. Soil water pH has remained at 5.1. Soil Sulphur levels (KCl40) have increased from 9 to 15 mg/kg.

CONCLUSION

After some excellent clover responses in the first year we were able to take the high phosphorus inputs to a 50ha paddock scale. The lambs achieved higher growth rates which exceeded our predictions however stocking rates would need to be higher and lambing a little later to maximise profit/ha. Given the higher growth rates of both pasture and lambs it is feasible to lamb later and still finish lambs in a tight Spring. High fertility species like capeweed will need to be managed in these higher fertility pastures where significant amounts of nitrogen is being fixed by clover. However improved grass species like phalaris also increased growth rates. Low fertility species like onion grass were reduced by the higher fertility/grazing combination.

SOIL TESTING

Following on from the article 'phosphorous driving lamb growth rates', soil testing is the tool to determine your soil phosphorus levels. The Olsen phosphorus test determines plant available phosphorus in the soil. The test has been well calibrated to field trial data to enable informed decisions on phosphorus application rates.

By conducting a soil test you can identify where your phosphorous level is; plus by using the phosphorus buffering test it can be calculated to see how much nutrient needs to be applied to increase the soil levels to the optimum range. As you can see from the economics of increasing your phosphorous levels, a soil test which costs under $150 is well justified.

Of course a soil test gives much more information on the soil than just phosphorus. Potassium, sulphur, soil pH and exchangeable cations all help make better decisions on your soil fertility.

The profits made from the trial paddock at Cavendish could not have been achieved if it wasn't for the knowledge given to us from the soil test.

If you would like to know where you can increase your productivity and profitability throughout your enterprise, give your local Vickery Bros agronomist a call to organise a soil testing plan to ensure you are kicking goals towards a productive and profitable business

EWE NUTRITION REQUIREMENTS AND ITS IMPACT ON LAMB SURVIVAL;

Rebecca Stewart

The importance of managing ewe nutrition and condition score throughout her lifetime is undoubtedly underestimated within some enterprises. The nutritional and condition score guidelines which are demonstrated throughout the lifetime ewe management course are an essential tool which should be undertaken by all sheep enterprises. Managing your flock to these guidelines will assist by increasing profits through producing more lambs, weaners and more wool.

There are seven important phases throughout the reproductive cycle of the ewe where nutrition has a great effect on the ewe and developing lamb. To ensure the best return from ewes and their progeny, managing to condition score and knowing the nutritional needs should be followed. Ewe condition during the seven step cycle affects the following:

- Conception success, reproductive rate and placental development
- Udder development, colostrum production and ewe milk production
- Foetal growth, wool follicle development and wool production in the progeny

Image 1.1 Seven step cycle of ewe reproduction

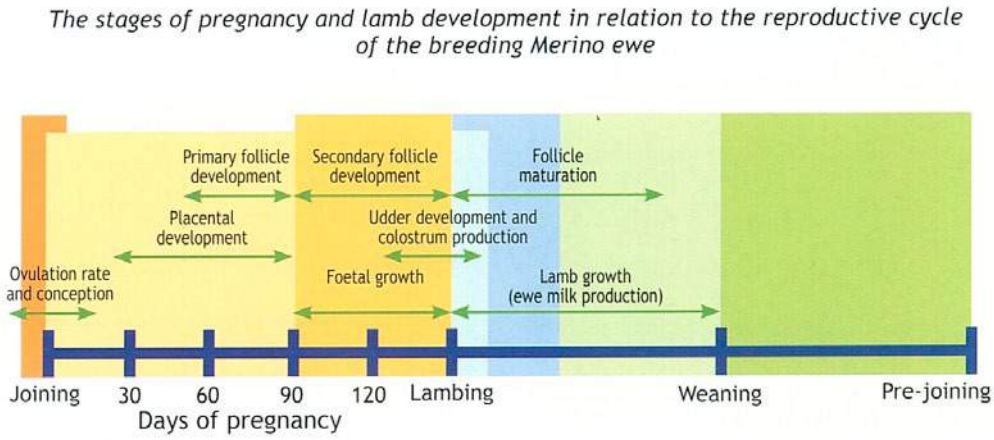


Image 1.2 Pregnancy stages and development of lamb throughout reproductive cycle

Image 1.2 above shows the time at which different developments within the ewe occur throughout the pregnancy. As you can see in the image, wool follicle development lasts from around day 50 through to lambing at day 150, with follicle maturation following up to around day 220. At each of the stages, condition score affects the development processes, whether it is placental development, foetal growth or ewe milk production.

PREPARING THE EWE FOR JOINING:

There is a strong correlation between ewes within a certain condition score range and the reproductive rate. Ewes which are in higher condition score at joining conceive more lambs, hence having a higher reproductive rate. Ovulation rate is also largely dependent on the condition score of the ewes at joining. Ewes need to be kept in condition score 3+ to be able to join effectively. At this condition, there should be no more than 10% dry merino ewes and less than 5% dry crossbred ewes within the mob. For an additional condition score at joining, up to 40 more lambs are conceived per 100 ewes joined. These conception responses will be greater when ewes are lambing in spring compared to autumn. To maintain the condition of a crossbred ewe weighing around 65kg, they need 10.3MJ/day. This energy requirement will have to come from outside sources such as grain and hay at the time of joining.

EARLY TO MID PREGNANCY (DAY 1-90):

At this stage of the pregnancy, there are numerous developmental features of the progeny that can be affected by the condition score. During this phase it affects the placenta size, lamb birth weight (in turn weaning issues), fleece weight, fibre diameter, follicle development and staple strength. Wool production contributes to about 70% of income from wool growers and up to 30% in fat lamb systems. Within both enterprises the wool clip is important and with condition scores having a great impact on the fleece weight and fibre diameter it is important to keep an eye out for these issues as they all add up. If the condition score decreases by 0.5, it reduces the clean fleece weight by 0.4kg and fibre diameter by 0.5µm. Poor nutrition at this stage of the pregnancy can cause the birthweight of progeny to be reduced due to the restricted growth and functionality of the placenta. During mid pregnancy (day 50-100) the placental growth is rapid therefore the nutrition is extremely important. If the ewes start from a low condition during this time, they will not have enough time to gain condition for lambing which can reduce the chances for both the ewe and lamb survival. During this stage the ewes need to maintain a condition score of 3.0, to be able to maintain this, a 65kg (single bearing) ewe will need 11.8MJ/day. A twin bearing 65kg ewe requires 12.2MJ/day to maintain growth.

PREGNANCY SCANNING:

Pregnancy scanning is a valuable tool that can be used by producers to improve profits, especially when running a higher stocking rate and also in poorer seasons. Scanning ewes can be used to identify dry, single and multiple bearing ewes. It gives most accurate readings between day 70-80 and it can be quite

a useful tool to better manage the nutritional requirements particularly during late pregnancy. Scanning allows producers to save costs on feed due to feeding minimal dry sheep and it will increase the overall reproductive rate of the flock by removing dry stock. When scanning and separating single and multiple bearing ewes, producers are able to relocate more feed to the multiple bearing ewes to ensure survival and increase birth weights.

In saying how useful scanning and splitting ewes is, it will only be a useful and effective tool for growers who have the capacity to split the mobs and have them in separate paddocks to feed accordingly. If you do not have the paddocks to be able to split the ewes accordingly, the returns of scanning will be minimal.

LATE PREGNANCY (DAY 90-150):

During late pregnancy, condition score influences the growth of the foetus and also the secondary wool follicles which are the most important part of the wool producing skin. During the last 50 days of pregnancy, 70% of the growth of the developing lamb occurs and is rapid until birth. At this period of pregnancy, there is greater impact on the lamb birth weight than at the start of pregnancy. With birth weights most sensitive at this period of pregnancy, lambs can lose up to 0.5kg (both singles and twins) from ewes losing one condition score. Ewe mortality is the greatest risk during late pregnancy and ewes which are below condition score 2 will be most affected. Twin bearing and fat ewes over condition score 4 are also more likely to die during late pregnancy. In terms of wool production, good nutrition during this stage leads to lower fibre diameter and higher fleece weight. The higher the follicle density, the lower the fibre diameter of the fleece. During this stage of pregnancy, single bearing ewes need to be kept at a condition score 3.0. To achieve this, a 65kg ewe requires nearly 16MJ/day to maintain condition. Twinning ewes need to be at condition score 3.0 and above, to maintain this, a 65kg ewe needs 18.5MJ/day.

LAMBING AND LACTATION (DAY 150-220):

The first 48 hours of a lamb's life are critical with around 70% of mortality occurring from now until weaning. For maximum lamb survival, the optimum birth weight is between 4.5kg and 6kg. When the birth weight drops below 4kg the survival rates decrease dramatically and losses occur more often. The average birth weight for a single born merino is around 5kg and for a twin born lamb it is typically around 4kg. Feed on

offer to the ewes and the weather conditions also have a large impact on lamb survival. Removing the temptation of the ewe leaving the birth site by making sure there is adequate feed on offer will also greatly increase the chances of the lamb's survival. Ideally the ewe and lamb/s should stay at the birth site for at least six hours so the ewe can commit her lamb/s to memory. By simply ensuring the ewe has at least 1200kg/ha DM (single bearing) to 1800kg/ha DM (twin bearing) you can increase the survival by up to 20%. When there is likely to be poor weather conditions and/or low feed availability it is incredibly important for the ewes to maintain condition to avoid mortality. Ewes which are also in better condition are able to produce more milk which obviously means larger lambs will be produced that have higher survival and growth rates. The main factor which drives lamb growth rates is the feed on offer for the ewes during lactation. A ewe uses fat reserves and pasture to provide good levels of lactation for her lamb/s and throughout this period a ewe will lose some condition. The peak of a ewe's energy requirement is during day 20-30 of lactation where a 65kg single bearing ewe will need 26MJ/day and a twin bearing ewe will need a whopping 33MJ/day just to maintain body condition! To ensure ewe and lamb survival, ewes need to be kept between 2.7 and 3.0 condition score. If a ewe is in poor condition during lactation, she will not be able to produce enough milk for her lamb/s and this will result in the ewe weaning her lambs earlier and growth rates will be lower.

WEANING (DAY 220-240):

The most important factor for weaner survival is lamb liveweight. Lamb growth up to weaning is highly correlated

to the total energy intake from milk, pasture and on some occasions supplementary feed. By ensuring management targets are met throughout lactation, you can ensure that weaning survival and size of weaners is increased. Lambs which are grazing on legume-based pastures will typically grow up to 30% better than lambs on grass based pastures. Twin lambing mobs should be based on pastures with at least 30% legume and more than 1500kg/DM/ha. Single lambs are typically 3-5kg heavier than twin lambs at weaning, managing the mobs to paddocks where feed is optimal for growth is the key in weaner weight and hence survival.

The optimum weaning age is not as straight forward as it seems due to factors such as ewe condition, feed supply, pre-weaning growth rates and likely growth rates after weaning. At two weeks of age, lambs begin to consume pasture and after 12 weeks of age, the lambs get minimal benefit from milk compared to that of pasture. Lambs should be weaned between 13 and 14 weeks after the start of lambing as there are no benefits for the ewe or lamb if the weaning is delayed.

Imprint feeding should be undertaken even in good seasons while the lambs are with their mothers to recognise supplements to reduce weaner loss. Lambs should be fed 5-6 times over a two week period prior to weaning or until above 90% of the lambs are eating from the feed trail. For imprinting, lambs should be fed 50-100g/ewe/day. Weaner survival is the greatest when the lambs are over 40% of mature weight at weaning and at 45% of mature weight going into the summer. To ensure that the ewes will be able to conceive in the following year, the condition score should be between 2.5-2.7. If the condition scores are not kept to target through this period, the weaner weights in the following season will be affected and the conception rate of the ewe will be decreased. Weaners need to be grazing on at least 1100kg DM/ha, if not more to be able to achieve positive growth rates throughout the summer and autumn. For a 65kg twin bearing ewe to maintain her condition score between 2.5-2.7, she requires almost 14MJ/day.

POST WEANING/PRE JOINING (DAY 240-365):

This last stage of the reproductive cycle of the ewe is important for the upcoming joining period. The more weight the ewes gain throughout this period, the less it will cost to achieve target condition scores by the next joining. To achieve high reproductive rates, ewes need to be in condition score 3.0-3.5. It is essential to utilise pasture after weaning to immediately put weight back on the ewes. You should monitor the ewes at least twice throughout this stage to ensure the condition score does not decrease below 3.0. If the condition does decrease below 3.0, it is difficult to raise condition, especially when the feed has dried off and quality has decreased. Being proactive and managing ewes through supplementary feeding before they slip below the condition targets is essential not only for the ewe, but for budgeting purposed through the summer.

Ewes need to be in condition score 3.5 or heavier and they need to be grazing on green feed above 1000kg/DM/ha or above 800kg/DM/ha of dry feed to ensure ground cover is preserved. When ewes are grazing on dry feed, ewes will need to be supplemented to maintain condition as required.

A 65kg dry ewe requires 10.3MJ/day to keep condition. As an example, if the ewe is grazing on 800kg/DM/ha of dry feed which is 45% digestible, the intake will be 4.12MJ/day. Obviously this undersupply in energy will have to be supplemented with grain/hay to increase intake to 10.3MJ/day.

Ensuring your ewes are kept to condition is not only essential for delivering efficient feed allocation and limiting production losses but it assists producers by increasing profits made.

References:

Ferguson, M. Thompson, A. Gordon, D. (2007) Ewe management handbook, 'Optimising merino ewe nutrition to increase farm profit', Lifetimewool.

Trompf, J. Thompson, A. Gordon, D. et-al (2007) Lifetime Ewe Management, High rainfall zone edition. Rural Industries Skill Training, Hamilton. Department of Agriculture and Food WA, Narrogin.

POTASSIUM ON GRAZING FARMS

Tom Waldron

"If you always do what you've always done
You'll always get what you've always got" – Henry Ford

All too often as farmers we can under estimate the importance of Potassium (K) in our farming systems, and it would be fair to say that we all have areas on our properties that have been depleted in K, such as some of our lower slopes. Potassium is important to the plant as it is necessary for plant growth and is important for the plant's ability to withstand extreme hot and cold temperatures, drought and insect pests, and also regulates water use.

REMOVAL OF POTASSIUM FROM CROPPING AND GRAZING

One of the main factors that can cause the loss of K from Victorian soils is from the continual cutting of hay and silage; for example, a 12tn crop of silage at 2% of K in dry matter will deplete a soil of around 80kg of K/ha, this will require the equitant of 320kg of super-potash 1:1. When you look at the amount of K removal by animals it is relatively small by comparison, but take these losses over a few years, and there is obvious depletion.

SYMPTOMS OF POTASSIUM DEFICIENCY IN CROPS

General symptoms initially include a light green to yellow colour of the older leaves. Marginal scorch of the edges and tips of these leaves follows, often resulting in senescence. As the severity increases, this condition progresses towards the top of the plant. Other symptoms include slow plant growth, weak stems and lodging, high screening levels in the harvested grain and reduced disease resistance. Potassium is highly mobile in the phloem (the living tissue that carries organic nutrients, in particular, sucrose, a sugar, to all parts of the plant) and can be moved to newer leaves if the nutrient is in short supply, with deficiency symptoms appearing first on older leaves.

POTASSIUM AND STOCK HEALTH

Excessive soil K levels can result in luxury uptake by pasture, thus increasing K intake by animals escalating the risk of stock health problems, notably calcium deficiency (milk fever or hypocalcaemia) and magnesium deficiency (grass tetany or hypomagnesaemia), typically on grass-dominant pastures. The high K concentration in pasture suppresses the uptake of calcium (Ca) and magnesium (Mg) by stock, leading to low concentrations of each in the cow's bloodstream. Dairy cows are the most susceptible especially during the transition period (before calving) and early lactation. Not grazing cows on areas where effluent has been applied during these times, particularly on consecutive days, will minimise the risk of grass tetany. In addition, grazing the pasture when ryegrass has reached the three-leaf stage is recommended, because the concentrations of Ca and Mg will have increased in the plant by that stage. Magnesium oxide can also be added to stock feed to reduce the risk of grass tetany.

TRANSFER OF POTASSIUM BY ANIMALS

The transfer of potassium to stock camps within a paddock and to areas outside the paddock is significant. In a dairy farm situation, the transfer of potassium from paddocks to laneways and dairy effluent is a major loss factor. Paddocks closest to the dairy shed which are used as night paddocks will accumulate potassium whereby paddocks furthest from the dairy will test with lower levels. For example; the annual return of K to pasture from the grazing cow can be calculated from estimates of intake, for example if the intake is 8,000kg DM/ha containing 2% K then the annual return will be 128kg K/ha from urine and 16kg/ha in the form of dung, assuming that 80% is excreted as urine and 10% as dung. Typically, dairy pastures and supplementary feeds contain between 1% and 3% of their total dry matter as K. However, the quantity of K within dairy effluent will vary with location and feed type.

Soil testing is the best method to monitor potassium. This then can be easily applied with your annual topdressing program. Prescription blends are able to be formulated in consultation with Vickery Bros to meet your exact requirements.

Further reading and references

Graham Price (ed) (2014) Australian Soil Fertility Manual, Third Edition: CSIRO Publishing

Hosking W J. (1986) Potassium for Victorian Pastures, Department of Agriculture and Rural Affairs, Victoria

Edwards N.K. (1993) Distribution of Potassium in the soil profile of a sandplain soil under pasture species. In "Plant Nutrition

Jeff Ball, (2004) Don't Overlook Role of Potassium, The Samuel Roberts Foundation

HOW WILL YOU MANAGE CROP DISEASE NEXT SEASON???

Rebecca Stewart

Disease within crops is a major problem within the grain industry that all growers have to deal with and prepare for each year. Most diseases that affect cereals are caused by fungi. These fungi feed off plants by diverting the carbohydrates needed for growth and development to their own growth and reproduction. They affect the plants the most by reducing the green area of the plant which is essential obviously for chlorophyll and carbohydrate production, resulting in reduced growth and development of the plant.

Using a fungicide is only one management tool that growers can implement into the system. One of the many fungicides available is Flutriafol.

Flutriafol is a group 3, DMI (demethylation-inhibiting) fungicide. What that means is that this type of fungicide prevents the formation of sterols in the fungi. Ergosterol for example, is necessary for the membrane structure and function of the fungi. The DMI fungicides penetrate the plant cuticle and are transported through the transpiration system of the plant where it results in abnormal fungi growth and eventually death.

When using Flutriafol as an in furrow fungicide, it controls the following diseases:

Wheat: Stripe rust and Take-all

Barley: Powdery mildew, Scald and suppression of net form net blotch

Canola: Blackleg

Flutriafol is a highly water soluble fungicide, therefore being readily up taken by the plant root system and translocated through the leaves and stems. When used as an in furrow fungicide, the fertiliser must be sown in the same furrow as the seed to provide adequate protection against disease. Using Flutriafol as a disease management tool this upcoming season will assist the crop greatly due to immediate protection from sowing. Trial results have repeatedly demonstrated that using treated fertiliser, which gives early protection, will enhance yield potential resulting from improved seedling health and early crop vigour. Due to intake being a highly systemic fungicide, new crop growth is protected. One great reason for using Flutriafol this upcoming season is that you are protected for up to 130 days. What this essentially means is you are protected from disease risks even if you are unable to get onto the paddock to spray with a tractor. Intake (a brand of Flutriafol) can provide up to 130 days protection against stripe rust in wheat and up to 120 days protection of powdery mildew and also scald in barley. It also supresses net form net blotch for up to 110 days.

With all the protection upfront for the above diseases, using Flutriafol next season on your cropping fertiliser may save you a few dollars!

Flutriafol can be applied on your fertiliser through the Vickery Bros. depot in Coleraine to suit your needs. Give your local Vickery Bros. agronomist a call to discuss the disease management options you have this next upcoming season.

Predicta B Soil Analysis:

A great disease management tool that is available for growers is the Predicta B soil testing. This test analyses the soil borne pathogens through DNA to propose risks of disease/s before sowing. The results will indicate whether the following diseases will be a significant risk during the season:

- Cereal cyst nematode
- Take-all
- Rhizoctonia bare patch
- Crown rot
- Root lesion nematode
- Stem nematode
- Blackspot of peas

The soil DNA testing was developed for the southern cropping regions to assist growers in reducing the risk of yield losses associated with disease.

To be able to access the Predicta B diagnostic services, you must use a SARDI accredited agronomist who can send away the samples and receive the results to analyse. Vickery Bros. are now accredited for the testing and analysing of the test provided through SARDI.

If you would like to know any more information about the Predicta B soil testing services or are worried about disease this upcoming season, give your local Vickery Bros. agronomist a call.

References:

Predicta B Soil Testing and Analysis, [Online], http://pir.sa.gov.au/research/services/molecular_diagnostics/predicta_b

GRDC, Cereal Fungicides Fact Sheet. May 2013, Southern Region

Mueller, D. (2006) 'Fungicides: Triazoles', Department of Plant Pathology

Crop Care, Impact Fertilisers, 'The crop care guide to intake' (2014) http://www.cropcare.com.au/ProductSearchResults

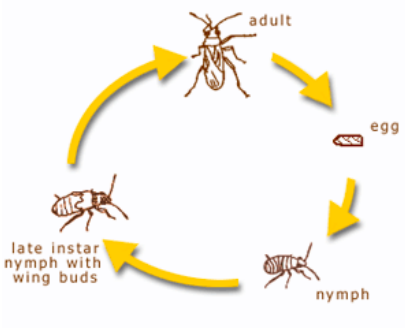
CRICKETS; LIFE CYCLE AND CONTROL

Rebecca Stewart

Once again in this upcoming season, the early feed will be vital for all producers. To ensure that your pasture can get a good start, you will need to control the cricket populations through either baiting or spraying. To ensure that correct control is taken to eradicate the population, the life cycle and behaviour of crickets should be understood.

The Black Field Cricket (Tellegryllus commodus) is a large problem in our area during the start of the season and even in the next few weeks when the eggs start to hatch during December. Most of the time they are not controlled until they have caused substantial damage to emerging crops and pastures. Crickets produce one generation throughout the year but the offspring may be at different stages throughout the season as not all eggs hatch at the same time.

During the winter months the eggs are held in a dormant state (diapause) in the soil and start to come out of diapause after there has been a period of high temperature. It takes three days of 30°C to begin the development process of the embryo within the egg and then hatching occurs. It takes about 14 days for the egg to develop into a nymph and hatch. After hatching, the nymphs eat and grow rapidly. Research trials have shown that the small nymphs can cause herbage losses of up to 15mg of Dry Matter (DM) per hectare, per day. Nymphs go through a process of moulting, where they shed their skin 9-10 times throughout this growth stage to later produce wings as an adult. This moulting process will take between two and four months depending on the conditions. The cricket thrives at temperatures between 26-32°C and the timing of their life cycle will depend on these surrounding temperatures. At the end of the moulting period, when the nymphs are at a reasonable size (late instar in image 1) they consume around 31mg/DM/ha/day. As early adults, the crickets cause the most damage and consume 35mg/DM/ha/day. With a population of simply five crickets per square meter (considered low), research trials have estimated to show crickets cause a pasture loss of 1.8kg/DM/ha/day.



"This is equivalent to 1.5 ewes/ha/day! With the feed issues that we face this summer I wouldn't have thought that anyone could afford to have that extra feed devoured up by the crickets!"

Adult crickets commonly live for 2-3 months depending on the surrounding temperatures, in severe cases the crickets can live for up to six months. The female crickets deposit their eggs into damp soil through a tube like organ when conditions are around 30°C and can lay between 500-1000 eggs under these prime conditions. The eggs of the cricket are small white oval shaped (3mm in length) and go into diapause when soil temperatures are 12.7°C.

As small nymphs and early adults, crickets cause the most herbage loss of 31 and 35mg/DM/ha/day. To control these populations effectively, you must ensure you are choosing the correct method of eradication. The use of a non-residual synthetic pyrethrin insecticide should be considered if there is a green pick for the crickets to uptake the insecticide. In areas where there is no green pick throughout the paddock, baited grain treated with Maldison 500 (or equivalent) should be applied.

Baited grain can be treated and applied on affected pastures through the Vickery Bros. depot. To supply, treat and spread the affected paddocks with the grain, it costs $22/ha and the grain is applied at 15kg/ha for effective control.

Controlling the cricket problem starts NOW! Be proactive… not reactive

References:

R.H. Blank & M.H. Olson (1981) The damage potential of the black field cricket Teleogryllus commodus , New Zealand Journal of Agricultural Research

T. Walker & S. Masaki (1987) Cricket Life Cycles, Evolutionary Biology Vol. 21, Plenum Publishing Corporation

FEEDING LIVESTOCK IN ANOTHER TIGHT SPRING;

Tom Waldron

("Proper planning prevents p---- poor performance").
The 6 "p's" of success.

Well it seems like Deja vu as we move from another dry spring into summer, and it would be fair to say that a lot of key decisions regarding stocking rate and selling strategies should have already been made. But if we look at the challenges from last year another critical influence we need to plan for is stock water. Bearing all that in mind, for the farming business to be sustainable careful consideration about stocking rate must be given to ensure that we are able to stay in business going forward. As they say, the first rule of business is to stay in business.

PLANNING;

By now any dry ewes would have been identified and taken out at lamb marking and either put out on the lowest value feed, if not shorn and sold. Discussion around weaning needs to be weighed up against feed on hand, and quality. Ewes with lambs at foot need to be assessed regularly for condition score, as their condition now directly effects next year's lamb crop, and once they have been weaned it is prudent to take the lighter edge off and priority feed. Imprint feeding is also another useful tool and needs to be done prior to weaning.

KEY POINTS TO CONSIDER;

- Condition Score (CS) all ewes. Identify which sheep to sell first, dry ewes, wethers and or old sheep.
- Feed the lower condition score ewes, preferentially and this year's multiple-bearing ewes.
- Consider buying extra feed early, it may be cheaper.
- Ensure an effective drenching program — don't feed worms.
- Create fodder budgets for lambing and weaning paddocks.
- Start supplementary feeding earlier or use confinement feeding to defer grazing selected paddocks.
- Prior to weaning, teach lambs to feed while on their mothers (imprint feeding).
- Rotationally graze to improve feed utilisation.
- Monitor, monitor, monitor.

FEED BUDGETING

The importance of identifying ewes with a condition score below 2.9 CS has a dramatic impact on the amount of additional feed supplement required. Take out ewes with a condition score at or above CS 3 as their requirements will be different than those that are lighter and can be fed a maintenance only diet.

The table below demonstrate the ME requirements for a 60kg ewe at different stages.

ME Requirements (MJ/day) for a 60kg Ewe				1.16	
Pregnancy				Lactation	
Day	Single	Twin		Day	Single	Twin
Dry	9.6	9.6		1	14.5	16.7
10	9.6	9.6		10	21.7	27.1
20	9.7	9.7		20	24.0	30.9
30	9.7	9.7		40	21.6	27.1
40	9.9	9.7		60	17.3	21.0
50	10.0	9.9		80	15.5	16.1
60	10.1	10.1		90	12.8	14.4
70	10.4	10.6		100	11.8	13.0

DIGESTIBILITY RULE OF THUMB;

As feed begins to dry off estimated digestibility is 60%. It is estimated to drop 5% each month thereafter until it reaches a minimum of 35%

DO NOT UNDER ESTIMATE YOUR FEEDING REQUIREMENTS;

The table below demonstrates the dry feed on offer (FOO) in kg dry matter/ha and converts it to ME, so if a 60kg ewes with CS of 3, in a paddock with 1600kgDM/ha FOO at 60% digestibility that has been weaned will require 9.6kgME/day and (if assumed) on a ration of 11.96kgME, there would be a surplus of 2.36kg ME. Alternately if the same ewe at 30 days pregnancy grazing on 850kg FOO/ha with a digestibility of 40% would require additional ME of 7.38kgME/day.

ME Intake from Dry Feed(MJ/day) Table 2					1.22
Dry FOO kg/ha	Digestibilty 35%	40%	45%	50%	60%
850	0.97	2.32	3.78	5.00	7.56
1150	1.34	3.17	4.88	6.34	9.88
1300	2.56	3.42	5.25	6.95	10.74
1600	1.71	4.03	5.98	7.81	11.96
2500	2.44	5.25	7.32	9.27	13.42
2800	2.56	5.49	7.56	9.64	13.66
3250	2.81	5.86	7.93	10.00	13.79

Table 3 shows to feed an additional 7.38kg ME you would need to feed an additional 0.6kg/day of barley with a fed test of 12.5MJ/kg, this seems a lot, but considering the ME provided in the paddock and the requirements of the ewe at that stage of pregnancy, you would be looking to feed about 4.2kg of barley /week just for maintenance.

ME supplied by supplement *Table 3*						
	Ration Fed (kg/day)					
ME (as Fed) MJ/kg	0.1	0.2	0.4	0.6	0.8	1
5	0.5	1	2	3	4	5
5.5	0.6	1.1	2.2	3.3	4.4	5.5
6.5	0.7	1.3	2.6	3.9	5.2	6.5
7.5	0.8	1.5	3	4.5	6	7.5
8.5	0.85	1.7	3.4	5.1	6.8	8.5
9.5	0.95	1.9	3.8	5.7	7.6	9.5
10.5	1.05	2.1	4.2	6.3	8.4	10.5
11.5	1.15	2.3	4.6	6.9	9.2	11.5
12.5	1.25	2.5	5	7.5	10	12.5
13.5	1.35	2.7	5.4	8.1	10.8	13.5
15.5	1.55	3.1	6.2	9.3	12.4	15.5
16.5	1.65	3.3	6.6	9.9	13.2	16.5

As can be seen, supplementary feeding can be easily underestimated, the importance of having a good handle on pasture FOO estimates, and feed testing supplements can create some real efficiency in your feeding system.

Table references from Lifetime Ewe Management.

IS ALL LIME THE SAME…

Roger Gee

We are often asked, 'What is the best agricultural lime product to use, when ameliorating soil acidity?' This is a fair question because not all agricultural lime is the same, in chemical analysis, neutralising value, or particle sizing.

Agricultural lime comes from naturally occurring limestone & dolomite that is mined and crushed at a number of quarries/pits throughout the district. The chemical analysis is determined by the source of the lime material, and the quality or effectiveness of these different liming products varies from rock material to quarry.

Agricultural limestone in Victoria, range in calcium carbonate (CaCO3) contents from 48% to 97%, and is the most commonly used product for increasing soil pH in pastures, and the most cost-effective. A list of the principal liming materials, together with some of their properties, is given in table below.

Burnt lime (also called quick lime) is calcium oxide (CaO). It is a faster-acting lime and has the highest neutralising value. This lime is mostly used in horticultural enterprises and is not usually applied to pastures.

Slaked lime (also called hydrated lime or builder's lime) is calcium hydroxide (Ca(OH)2) and has a higher neutralising value than agricultural lime but is more expensive and not usually applied to pastures.

Lime kiln dust is the very fine dust (particle size of less than 0.1 mm) produced by kilns used to burn lime. It contains both limestone and burnt lime, and is difficult to handle due to its fineness, so a contractor experienced in spreading this product should be used. Cement kiln dust has similar properties, plus it can contain significant amounts of potassium (commonly 3% to 5%).

Wet lime is also known as liquid lime. Liquid lime is designed to rapidly raise pH through a fast reaction, due to the micro calcium carbonate particles with hydrogen ions that neutralises acidity.

Wet lime is not usually applied to pastures because these products do not supply, in most situations, enough calcium to rectify a soil deficiency (base saturation imbalance).

Dolomite is a mixture of calcium carbonate and magnesium carbonate (CaCO3 and MgCO3). As the magnesium carbonate content of limestone increases, it is firstly called dolomitic limestone and finally dolomite (pure magnesium carbonate).

The Limestone Association of Australia defines dolomite (as a product) as having a minimum magnesium carbonate analysis of 28% and a minimum calcium carbonate analysis of 35%. Dolomite is frequently used in horticulture as a source of magnesium (for example, in orchards), and is sometimes used on pastures.

To truly compare agricultural lime we need to look at the Neutralizing Value (NV) of the material. Neutralising Value is the capacity of limestone to neutralise acidity relative to pure calcium carbonate, which is given a value of 100%.

Other liming materials are more reactive than limestone and therefore have higher neutralising values, for example hydrated lime and burnt lime. A higher neutralising value means that more of the product that you have paid to have delivered and spread is working to increase soil pH.

We should also consider Particle Sizing, the size of the lime particles determines how quickly the lime can neutralise acid. Lime with a higher proportion of finer particles has a greater surface area to react with the acid in your soil, and they will be better distributed through the soil after incorporation.

Research shows that finer limes do increase pH faster. For a faster treatment of soil acidity, you need a lime with a higher proportion of fine particles.

It is best to think about lime in terms of the cost per tonne of neutralising value delivered and spread. How quickly you see benefits from your investment in lime is also important in determining the value for money.

Different lime products can be compared by multiplying the on-farm cost by 100 and then dividing by the neutralising value.

Lime should be applied on the basis of soil test analyses, and purchased on the basis of effective neutralising values, and costs.

Timing is important and the majority of research data shows agricultural lime begins to become effective as soon as the soil is moist and reaches its major impact after 12 to 18 months.

So when to apply? Autumn being the time most of us think about it, but ideally late Spring through early Summer is ideal. The ground is still moist, we are less likely to have lime washing after a heavy rainfall events which does happen in autumn, and there are less demands on spreading contractors at this time.

Pasture Tip; always consider liming if a new pasture is being sown.

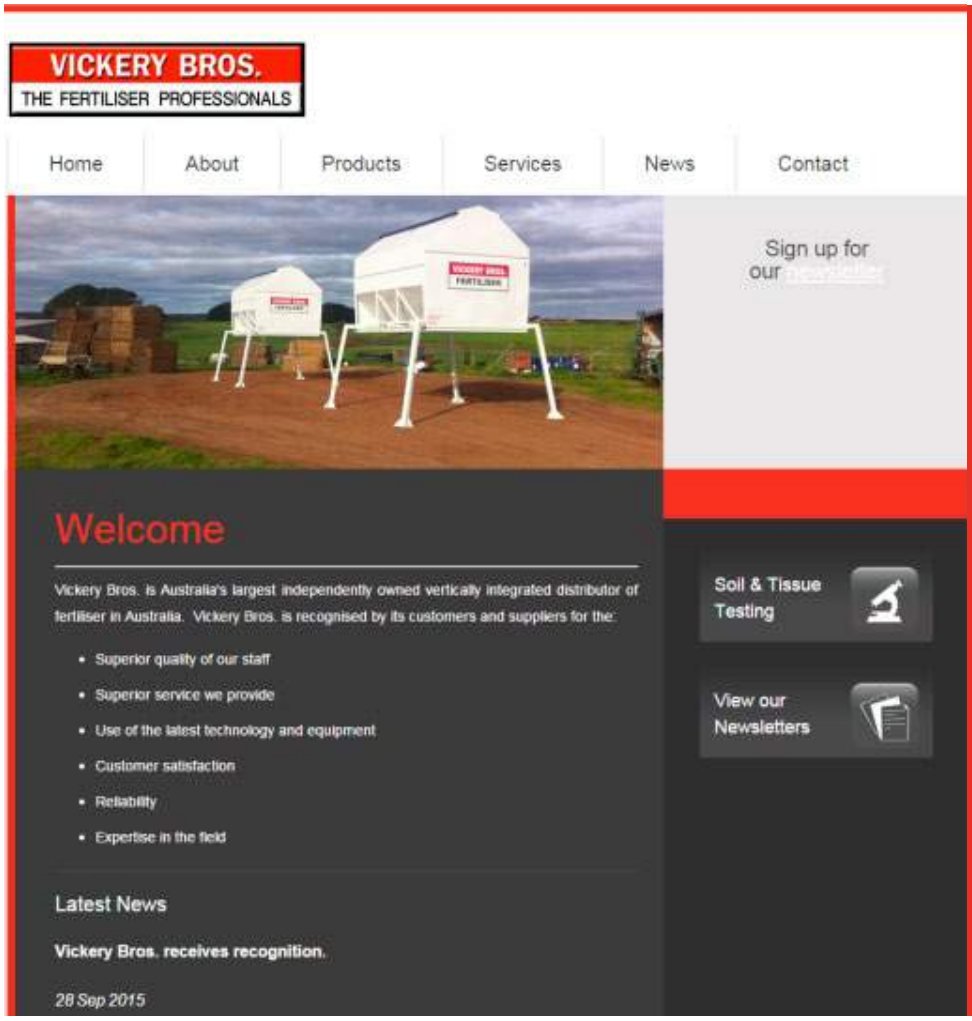
Chemical analyses[a] of pure and commercial grades of the principal liming materials.

Liming material	Neutralising value			Calcium (% Ca)			Magnesium (% Mg)		
	Pure form	Commercial grades[a]		Pure form	Commercial grades		Pure form	Commercial grades	
		Good	Poor to fair		Good	Poor		Good	Poor
Agricultural lime (calcium carbonate)	100	95–98	60–75	40	36–39	28–32	0	Usually <3%	
Hydrated (slaked) lime (calcium hydroxide)	135	110–120	<105	54	44–49	<40	0	Usually <1%	
Burnt lime (calcium oxide)	179	128–150[b]	<120	71	49–58	<45	0	Usually <1%	
Dolomite (calcium/magnesium carbonate)	109	92–102	60–75	22	21	10–15	13	12	4–7
Burnt dolomite (calcium/magnesium oxide)	214	110–160[b]	80–100	42	25–32	–	25	12–18	–
Magnesite (magnesium carbonate)	119	95–105	–	0	0.5–1.0	–	28.6	20–28	–
Burnt magnesite (magnesium oxide)	250	180–220[b]	–	0	1–2	–	60	43–55	–

[a] Analyses of commercial grades of materials based on NSW DPI records.
[b] High values can be expected only from freshly burnt products. Burnt and hydrated lime, dolomite and magnesite readily react with carbon dioxide and moisture in the atmosphere to revert to hydrated and carbonate forms, causing their neutralising values and calcium and magnesium analyses to fall with time and exposure to air.

Joining the Vickery Bros. team is James Beaton, who will be operating out of the office as technical support for our growing computer and phone systems, revamping our website and creating detailed spread maps for our clients.

James has come to us from Telstra where he has had nearly 13 years of selling and fixing all sorts of gadgets, so we know he will be a valued asset to the Vickery Bros. team.



www.vickerybros.com

Vickery Bros. would like to invite you to have a look at our new website. It has links to all our products, services, and locations of our depots and offices. We have also added the ability to download any previous newsletters that you may have missed. We have dedicated pages to the sand and concrete aspects of the business to give a broader idea of the services that we can offer you. Another new feature is our news section where we will be posting all events and changes within the company to keep you informed of what is going on including promotional pricing and deals.

Vickery Bros have appointed Tom Waldron as sales agronomist working out of the Coleraine office to support Vickery Bros on farm services.

Tom, with his wife Julia and their three boys, live and farm at "Minno Creek" in the Coleraine district, having purchased the property in 2013. Prior to this, Tom's farming experiences range from Western Victoria, Southern Riverina and the South Island of New Zealand. He worked with Tom & Alison Silcock in the Balmoral District for 3 years from 2001 after managing "Pooginook Merino Stud" from 1998. Upon Tom and Julia's return to NZ in 2004 Tom was appointed as manager for Caberfeidh Station, one of the 12 Lone Star Farms stations, a 6,000 hectare property comprising of 18,500 Perendale and Composite ewes finishing approximately 28- 30,000 lambs and 1,000 head of beef annually. In 2009 Tom and family purchased a small farming property, and Tom continued with off farm development projects overseeing three dairy conversions on the irrigated downlands of North Otago.

Tom originates from a large scale sheep/beef family operation on the South Island of New Zealand, studied at Lincoln University and has completed numerous Certificates in Agriculture in NZ, he also enjoys intensive development projects and has a good understanding of pasture development. Tom relishes the interaction with other farmers and understands the challenges that many farmers face, has a genuine passion for the agricultural industry as a whole, and is looking forward to meeting with some of you throughout this summer.

HUMUS – DO WE HAVE ENOUGH IN OUR SOIL

Roger Gee

A BRIEF HISTORY OF HUMUS

The role of humus in soils has been acknowledged since ancient times as it provided the 'fat of the land'. From the writings of the Romans to the early 20th century there has been a constant struggle to find sufficient organic matter, in the form of manures and composts, to build and maintain the quality of agricultural soils. There was never enough manure and, over time, the soils were exhausted. Limestone, sedimentary chalks and marls, sea sand, pond mud and the ashes from dried, burnt tussocks and other plants were all used as soil amendments where they were available.

For nearly 2000 years until the mid 1800s, scientific thinking was dominated by the teachings of Aristotle and there were few advances in the plant sciences. As observation and experimentation gradually replaced dogma, new discoveries were made and theories were promoted, some to be later discarded. Humus Theory was largely accepted by scientists and agriculturalists before 1840. Plants obtained their food by absorbing soluble humus from the soil via their roots and assimilating it into their tissues.

By the mid 1800s the role of photosynthesis in plant nutrition was being unravelled. Sprengel and Liebig in Germany and Lawes and Gilbert in England established that plants required a number of minerals that they absorbed from the soil. These plant nutrients could be supplied from mineral fertilisers. The Mineralist Theory slowly replaced Humus Theory and the search for commercial sources of fertilisers began. In regions where the new fertilisers were used more food was being grown than could be consumed. Fertiliser use in the 20th century resulted in whole populations being free from hunger for the first time in history.

Despite this, during the 1900s public concerns were raised about the sustainability of intensive agriculture, especially where soils were being continuously cropped without inputs of organic matter. Alternative agricultural philosophies and methods, including biodynamic and organic farming, were developed and established. The importance of humus, under its new title of soil organic matter, and its role in several soil properties was established during this Ecological Period.

TODAY

There has been a reversion back to the Humus Theory by some promoting this approach rather than identifying limiting plant nutrients and correcting with the use of fertiliser. Which approach is best for our soil? Which would increase our soil organic matter levels the most? You would think that by adding composted organic material would improve soil levels the most. Some simple maths indicates the rates required are substantial. (See Phil White's article last December newsletter). Phil calculated applying 5 t/ha of compost would increase soil carbon from 2.50% to 2.52%.

Perhaps the easiest option is to let the plants produce the organic matter by removing the limiting nutrients to achieve full growth potential. The main components of organic matter are carbon (C), nitrogen (N), phosphorus (P) and sulphur (S). Photosynthesis and legume nitrogen fixation from productive pastures produce a lot of plant material (C and N) while phosphorus fertilisers supply P and S.

Figure 1 - Photosynthesis

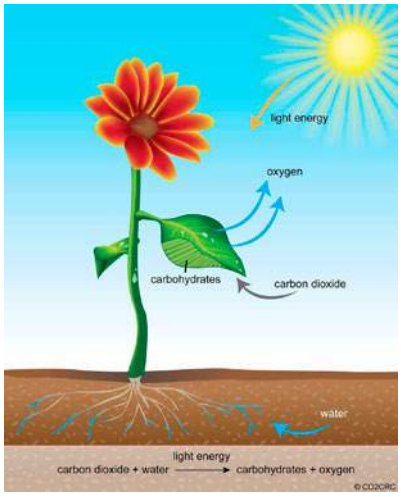
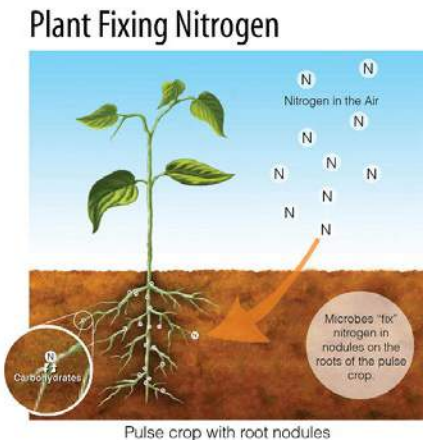


Figure 2 – Nitrogen fixation



The ratio of these nutrients in organic matter is 100:10:1:5:1.5. and remains reasonably constant. Applying only 15kg/ha phosphorus to a phosphorus deficient legume pasture will increase photosynthesis and nitrogen fixation to ultimately increase soil organic matter. Organic matter will accumulate in fertilised legume based pastures until it reaches an equilibrium. The final level will depend on the soil type, rainfall and drainage. A quick look at soil test data in SW Victoria shows organic carbon levels in legume pasture to be often above 3% organic carbon (5.2% organic matter) while cropping soils in NW Victoria with lower rainfall and less legume pasture often 1% or less organic carbon (1.7% organic matter). Although these numbers seem low, a soil with 5.2% organic matter would have 73 tonnes/ha of organic matter.

CONCLUSION AND RECOMMENDATIONS

The companies that manufacture and sell humic products make a number of claims relating to their physical, chemical and biological properties. There is some evidence from laboratory experiments and pot trials that support these claims. However, in 1996, Piccolo et al. (Piccolo et al. 1996) noted that there was no direct evidence that humic products could ameliorate soils under field conditions. To date, sufficient field trials have still not been conducted to make recommendations to farmers about the efficacy of these products.

It appears that there may be a role for humic products in agriculture under particular circumstances. The most promising results have come from work related to the availability of phosphorus and micronutrients and the role of humic products in soil remediation. Southern Farming Systems and Latrobe university have obtained encouraging yield responses to deep ripping in 20tonne/ha of poultry manure to increase the plant root depth and nutrition.

However, one question keeps repeating itself. If the average Australian agricultural soil already contains 17 t/ha of naturally occurring humic substances, why buy and add any more?

Organic matter accumulates over time in fertilised, legume-based pastoral soils, and reaches a maximum [a steady state] after 20 – 50 years. The amount of organic matter present at steady state depends on the soil parent material and climate, with a lower steady state in drier soil, and increasing with soil moisture.

Hence the volume of reference material & trial data available to the farming community, from MLA, Dairy Australia, landcare groups, and departments of agriculture, explaining that well fertilised pastures, with a good percentage of legumes, are the most productive and efficient.

Billingham, Kim (July 2012) 'Humic products' - Potential or presumption for agriculture (NSW DPI)

Edmeades, Dr Doug (2015) 'Talking about soil organic matter' Fertiliser Review issue 35 (agKnowledge NZ)

GRDC Project Code: KDI00023 (2013) 'Managing Soil Organic Matter: A Practical Guide'

Soil Quality – fact sheets (2015), www.soilquality.org.au

Soil Organic Matter – dpipwe.tas.gov.au

Soil Organic Matter and Soil Function (May 2014) Murphy, Brian W - Review of the Literature and Underlying Data, GRDC & Australian Government Department of the Environment.

CHOOSING A PASTURE TO SUIT YOUR OPERATION.

Leighton Rees

Farmers are often faced with problems associated with declining pasture species and an increase in weed species throughout their paddocks. Renovating or improving these pastures to increase production can mean considerable time and cost to the producer. A large amount of planning needs to take place to ensure you are selecting the right pasture to suit your enterprise and to ensure that the variety you choose will persist and give you as much production as possible.

Pasture selection will vary considerably and there will be many factors that influence this. You need to take into account many things such as:

- Soil type
- Growing season
- Average rainfall
- Paddock pH & fertility
- Weeds present
- Stock class
- Animal demands
- How you plan to graze the proposed area, (set stocking or rotationally grazed) etc.
- Do I need a short rotation species? Something that will be cut for hay or used as part of a renovation program?
- Or something that will persist and produce for as long as possible.
- Are you looking for winter growth or summer growth?
- Which pasture and species will my stock perform the best on?

These are a few of factors and questions that may influence your decision making and pasture selection.

The first step when selecting a pasture species is to look at your farm location as well as your growing season or average rainfall. In other words what species and varieties can I grow in my area and which of these varieties will give me the best persistence and value for money. The three most common pasture varieties are outlined below.

RYEGRASS

Ryegrass is undoubtedly one of the most popular species in a pasture fed enterprises. It has the ability to produce huge yields and be extremely high in quality if placed in the right environment and under the correct grazing conditions. Ryegrass, especially annual ryegrasses are extremely responsive to fertiliser applications and yields can be enhanced dramatically by applying nitrogen based fertilisers.

The performance and persistence of ryegrass will vary considerably depending on a number of things eg. soil fertility and type, average rainfall, stock class and grazing management.

To get the most out of a ryegrass, it needs to be sown in the correct conditions for it to perform to its potential.

Ryegrasses are generally broken up into 2 categories, diploids & tetraploids.

DIPLOIDS

These have two sets of chromosomes and are a much smaller seed than a tetraploid so can be sown at lower rates with reduced seed costs. The diploids have finer leaves and stems but have a greater number of tillers per plant.

Diploids are better suited to a set stocking enterprise and have better drought resistance. They also have the potential to withstand greater levels of pugging than a tetraploid can.

Some diploids can be extremely dense and for this reason are not as suited to companion planting with clovers as a tetraploid.

Diploids are suited to areas where the average rainfall is between 550-750mm.

Rates should be around 8-16kg/ha and slightly more in a high rainfall situation.

Diploids will generally have a better persistence in marginal rainfall areas than a tetraploid ryegrass.

TETRAPLOIDS

Tetraploid ryegrasses contain four sets of chromosomes and have a much larger seed size. The leaf and stem size is much wider than that of a diploid and feed quality is generally higher.

Tetraploids are often preferentially grazed and there is the possibility of overgrazing in a set stocking situation which can lead to persistence issues.

Tetraploids are also less tolerant of dry summer periods and again persistence issues can be a problem. They are more suited to areas with regular rainfall and in particular areas with irrigation.

Tetraploid sowing rates should be 18-25kg/ha and 25-35kg/ha in higher rainfall areas.

When choosing between tetraploid and diploids look at whether or not you plan on set stocking or rotationally grazing. Decide if you want clover as a companion plant and look at persistence between the two. Pasture management is extremely important when it comes to the longevity of your ryegrass. If the plant is under moisture stress try to reduce grazing pressure during this period.

When selecting a variety look at the heading date of the plant. This is the time at which that particular grass starts to go into a reproductive phase. As a rule a ryegrass with an early heading date is more suited to areas that have a shorter season or an earlier finish and where spring conditions may become hot and dry early. These earlier heading varieties also exhibit good late winter growth.

Ryegrasses with a later heading date will normally produce less winter growth but will make up for it at the other end of the season (providing rainfall is adequate) producing more pasture growth into early summer. Therefore more suited to southern areas where the season hangs on or under irrigation where moisture levels can be managed.

PHALARIS

Phalaris is a very versatile pasture species and can adapt too many soil types & rainfall zones. Phalaris varieties have come a long way and have the potential to produce high levels of quality dry matter and have the added advantage of good persistence. Being deep rooted phalaris has the ability to access moisture and nutrient at a greater depth than ryegrass which can give it greater persistence on lighter soil types. Newer varieties also have increased levels of winter growth whereas the older varieties tended to only produce through the spring period.

Providing phalaris is managed correctly it can provide high quality feed and will respond well to fertiliser applications. Production can also be enhanced during cold periods with applications of gibberellic acid & nitrogen.

If left unmanaged phalaris can become rank and the feed value will decline quickly during this period. If this happens stock will be less likely to graze these areas (especially sheep)

Overgrown phalaris can also cause a decline in clover persistence due to the fact that it is shaded by the phalaris.

Animal health issues can arise if hungry stock are introduced into a paddock shortly after the autumn break when the first green pick of phalaris is available. (Sudden death)

There are many varieties of phalaris on the market and some will produce high levels of winter feed. Phalaris is ideally sown as a companion with clover or ryegrass but can be sown alone.

Phalaris is very tolerant of water logging and certain varieties have been developed to withstand high levels of soil acidity. These particular varieties aren't however suited to set stocking as the growing node is higher in the plant and therefore subject to over grazing.

Winter active phalaris varieties are more erect and have a higher tolerance to acidity. These are more suited to dryland areas and grazing by cattle, although Holdfast GT will withstand sheep grazing pressure.

Winter dormant phalaris is more prostrate and often has a denser crown, suited to a sheep grazing enterprise with summer rains.

When choosing sowing rates for phalaris you need to consider whether it is being sown alone or as a companion with something else.

Sowing phalaris with ryegrass is not advised as the phalaris seedling will most likely be out competed by the fast establishing ryegrass.

Phalaris is very slow to establish so there is a need for good weed control early on in the establishment phase. Ideally sow phalaris at the end of a renovation program which gives you plenty of time to control weeds in previous crops.

Sowing rates of phalaris can vary between 2-4kg/ha depending on the situation.

SUB CLOVER

Clover is extremely valuable and a vital component in any pasture situation. Sub clovers are extremely persistent and can persist extremely well in poorer areas.

They are generally sown in areas of winter dominant rainfall and provide a valuable source of nitrogen through the nodulation process. This nitrogen can then be utilised by accompanying

grass species. In a highly clover dominant pasture the excess nitrogen produced if not utilised can leach through the soil profile therefore causing higher levels of acidity. To avoid this sow sub clovers with a deep rooted perennial species that can utilise nitrogen that is produced.

Sub clovers are annuals and therefore need to set seed every year to reproduce. Sub clovers are very effective in their ability to bury seed and regenerate. If sub clovers get a chance to bury seed over 2-3 years they will create a large seedbank in the soil. This seed can last for several years. When choosing a variety pick at least two different species with varied flowering dates. This will give you more of a chance in developing a strong stand of clover.

If you farm in an area with an early spring look at sowing an early and a mid- flowering variety, and in a later area sow a mid and a late maturing variety.

Grazing management is important in a mixed pasture system and if sown with phalaris and ryegrass the grass species need to be kept grazed to ensure that sunlight can get to the clover.

Sub clovers are susceptible to insect attack eg. Red legged earthmite & lucerne flea. They may also cause bloat in stock.

Sub clovers are also sensitive to many chemicals on establishment and prior to the 3 true leaf stage. Triffoliate leaf)

Productive pastures need fertility. This can be for persistence as well as to obtain maximum yields. It is false economy to spend money on seed varieties and then sow them into a low fertility area only to discover that they don't persist and weed species start to find their way back into your pastures.

Spend the money on soil testing and find out exactly what your fertility and pH levels are. This can then be used to guide you as to required nutrients.

Nitrogen based fertiliser can also be effective if sown beside the seed at recommended rates. Nitrogen will promote early seedling vigour and you will be grazing your pastures much earlier in the season. Excess nitrogen beside the seed can however cause seed burn. Phosphorus is also extremely important for pasture establishment and when sown with the seed it will be accessible to the seedling straight away.

The more you graze these pastures the more you will need to add nutrient especially if removing the dry matter for hay or silage. It isn't recommended to cut newly sown pastures for hay or silage in the first year. Give the sown species time to establish a strong root system. This will again help with persistence of your newly sown pasture. Annual ryegrass is an exception to this and is quite often only sown for hay production.

Preparation and planning is the key to a good pasture. Weed control and good seedbed preparation are essential. This will provide you with a better germination as well as give less competition to the sown species. In crop applications of chemicals may also be necessary to ensure clean weed free pastures. There is no point in letting weeds utilise available nutrient at the expense of your new sown pasture.

MANAGING STOCK WATER AND QUALITY

Lower than average spring rains and little if any run off has caused many of us to consider water availability and quality for the coming summer period.

Water reserves in Western Victoria are often dams fed from surface runoff. As dams' supplies are exhausted, creeks and bores may be utilised. Water quality needs to be checked in this case. An electrical conductivity meter can be purchased online for around $20 or give your agronomist a call to have a full water analysis done.

Livestock require certain levels of water quality to sustain growth and production. The level they require will change dramatically with the amount and quality of feed on offer.

The stock class and age will also affect the amount of water and quality required.

The main way we measure water quality is by salinity. This is a measure of the dissolved salts in the water.

As a rule most surface water is generally low in salts compared to underground water. Higher amounts of salt in the water will mean that your stock will require a greater volume of water due to the fact that the body requires a higher turnover to deal with elevated salt levels.

Livestock on high quality green feed can tolerate poorer water quality.

Salinity is generally measured in electrical conductivity (EC).

Below indicates levels of salinity and the effects that it may have on certain stock classes.

Electrical conductivity EC	**Risks involved**
Less than 1600	Relatively low level of salinity. Should not cause any issues to livestock.
1600 - 4700	Should be satisfactory but may cause temporary and mild diarrhoea if livestock haven't adjusted to this level of EC.
4700 - 7800	May be used for dairy, beef cattle, sheep, pigs and horses. Levels above this may not be satisfactory for lactating animals. Not suitable for poultry.
10900 - 15600	Higher risk for lactating or younger animals in warmer conditions. Unsuitable for pigs, poultry and horses. Where possible should be avoided for most livestock.
15600 - 23400	Cannot be used for stock other than adult dry sheep.
30000	Toxic to all stock classes.

PH

When looking at water quality we also need to take into account pH. A pH of between 6.5 and 8.5 is considered satisfactory. Either side of this range and you can run into animal health issues which can decrease an animal's appetite and cause weight loss and production losses.

At the lower end of the scale reduced feed intake may occur and as the pH gets more alkaline there is a risk of stomach problems and there is also a lower feed conversion efficiency. This in turn reduces production.

CHLORIDE

Chloride levels can have a major effect on livestock and their ability to function properly. An excess of sodium chloride can result in dehydration, kidney failure, poor function of the nervous system and even death. A full water analysis will give a chloride analysis.

Below are the thresholds for chloride levels in water.

- Dairy cattle 1600 mg/L
- Beef cattle 4000 mg/L
- Horses 1200 mg/L
- Ewes & lambs 2400 mg/L
- Adult dry sheep 5600 mg/L

SUMMARY

Don't take any chances when it comes to water quality. Have your water tested regularly and make sure it is suitable for your particular stock class and age.

VickeryBros have the ability to collect and have water samples tested by an accredited lab to make sure there are no surprises when it comes to water quality.

Curran, G (2014) Primefact 533 second edition. Water for livestock: interpreting water quality tests.

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	Tom Waldron	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
- ☐ Soil test to check nutrient levels
- ☐ Control those crickets!

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

POSTAGE
PAID
AUSTRALIA