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Department of Agriculture and Food

GOVERNMENT OF WESTERN AUSTRALIA

FEED TROUGH

Western DAIRY

Dairy Australia

Your Levy at Work

POTASSIUM FERTILISER REQUIREMENTS FOR ANNUAL RYEGRASS PASTURES – A NEW APPROACH

Martin Staines, DAFWA, Bunbury

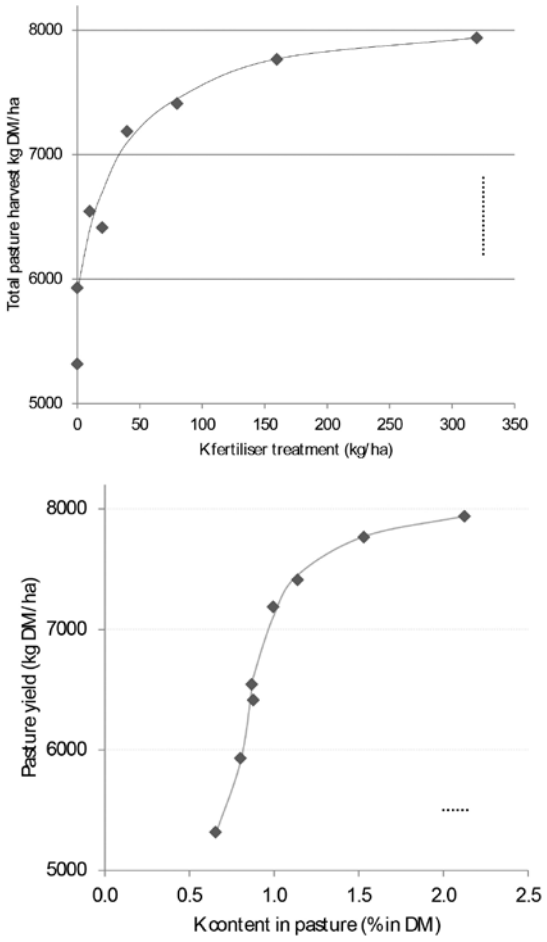
The DAFWA Dairy Team is undertaking a new study to provide WA dairy farmers with updated potassium (K) fertiliser recommendations for modern intensively managed annual ryegrass dominant pastures. Current K fertiliser recommendations are based on requirements for clover which are higher than for ryegrass. As a result, farmers may be applying more fertiliser K than required for ryegrass dominant pastures. Some dairy farmers have started to apply fertiliser K based on ryegrass plant test results rather than soil test results. However, suggested minimum plant test concentrations for ryegrass are based on work with perennial ryegrasses. Our experiment will determine the minimum plant test K concentrations for annual and Italian ryegrasses to achieve pasture production at 95% of the maximum yield potential during 2013 and 2014.

The experiment is located in a paddock at Vasse Research Centre which has been depleted of soil K over the past 6 years. Initial soil K levels were ~43 mg/kg for most treatments, but were as low as ~31 mg/kg for the control treatment (see below). Basal fertilisers and lime are being applied to ensure that soil pH and nutrients other than K are not limiting pasture production. The amount of K fertiliser (applied as muriate of potash) used ranges from 0 to 320 kg/ha/year, applied in 6 applications per grazing season.

Aristocrat annual ryegrass and Concord Italian ryegrass are grown in 64 separate plots (4 x 4½ meters each). Pasture is harvested mechanically at the 3-leaf stage and pasture DM yield per plot is recorded. Pasture samples are taken to determine K concentration. Five pasture harvests have been conducted so far (12 Jun to 4 Nov). The two species of ryegrass have been responding similarly and results are therefore averaged across species. Results are summarised in the 2 figures shown below. The dotted lines indicate the 'least significant difference' between treatments.

Total pasture yield over the first 5 harvests ranged from 5300 to 7900 kg DM/ha (see left figure). The effect of K fertiliser on pasture yield was highly significant. Soil with an initial soil K level of ~31 mg/kg was limiting pasture production. Soils with initial soil K of ~ 43 mg/kg did not respond significantly to 10-20 kg K/ha, but did respond significantly to 40 kg K/ha and above. There was no significant difference in pasture production between treatments receiving 80, 160 and 320 kg/ha of K fertiliser.

The relationship between K concentration in pasture and pasture DM yield is shown in the figure on the right. It suggests that 'luxury uptake' of K has started to happen above ~1% K in pasture DM. K concentration in pasture differed significantly between the treatments receiving 80, 160 and 320 kg K/ha.



For further information on this project contact Martin Staines, martin.staines@agric.wa.gov.au

Precision Ag hits the Dairy P4

2013/14 Grain Prices to Dairy Farmers

Alan Peggs, Alan Peggs Rural, Nedlands WA

Well above average rainfall in the late winter/early spring over most of the WA Wheat Belt has resulted in crop yields being around 40% above budget. This coupled with a near record corn crop in the United States together with a recovery in Black Sea grain production has resulted in world grain stocks increasing significantly. This has had a downward impact on price. The crop with the lowest increase in stocks is wheat. As a result wheat prices have fallen only marginally from where they were last year. In contrast the crop with the largest increase in stocks has been corn. Hence corn prices have declined significantly compared to where they were twelve months ago. This in turn has impacted on other feed grain (barley, triticale and oats) prices.

Domestically the opening of Bunge's grain storage facility at the Port of Bunbury will impact on the price of grain to dairy farmers. Currently Bunge is offering $299/t for ASW wheat and $230/t for feed barley delivered Bunbury with 'carry' costs calculated at $2.50/t/m for wheat and $2.00/t/m for barley. In addition some carriers have indicated they will be prepared to charge a lower freight rate on grain to Bunge's terminal compared to taking grain to dairy farmers because of the ease and speed of unloading.

Table 1: Feed Grain Prices to Dairy Farmers in the South West 2013/14 *(5th December 2013)*

Grain	Price Landed SW Harvest	Carry Fee After Harvest
	$/t	$/t/m 1 Jan 2014
Wheat ASW	300	2.50
Wheat GP1	295	2.50
Triticale	255	2.50
Feed Barley	230	2.00
Low Lignin Oats	200	2.00
Lupins	345	3.00

For more information please contact Alan on Mob: 0428-932-717

From the header!

Tammy Negus, RFDG Coordinator

Most WA grain growers are harvesting the last of their crops and are very happy with the higher than average yields for cereals. The overall production and quality does vary between farms and regions depending on the crop management and the local conditions.

Stuart Bee from Jerramungup is pleased with the yield this season compared with the last couple of years. "Barley and wheat yields are averaging 3t/ha, screenings are low and we are achieving either the APW or ASW category."

Williams's farmer Lewis Johnstone comments on his wheat, "Some crops are averaging above 4t/Ha with good protein levels and low screenings". Growers producing for the noodle wheat market and premium price aim for 9.5 to 11.5% protein. Noodle wheat crops that are out of this protein range will be downgraded. Late applications of nitrogen are more likely to produce cereals with greater than 11.5% protein. "Canola yields have been averaging 2t/Ha and oats 4t/ha. Large areas planned for oaten hay have been harvested as grain rather than hay due to the difficulty of getting onto the wet paddocks", Lewis mentioned. In return oats are in high supply and at lower prices.

Quairading farmer Chad Mills comments, "We are harvesting cereals between 2.8 and 4t/ha which is much better than we thought the season was going to produce. Unfortunately we missed the premium protein bracket due to the low protein so most of the wheat has gone ASW but the screenings are low".

DIETS FOR SUMMER PRODUCTION

Rob La Grange, Dairy Industry Specialist WA

The hot weather over the summer months presents challenges that Western Australian dairy farmers have to manage to maintain production. Milk produced in these months is expensive milk and this would impact significantly on the bottom line if no price incentives were offered. Three factors combine to impact on the cost of production.

Lower Quality Fodder

Dryland farmers have to feed fodder as conserved hays or silages that are higher in fibre with reduced energy and protein levels. The effect of feeding these fodders considered on their own is reduced daily intake because of the higher NDF (neutral detergent fibre) content combined with reduced energy and protein. The diet will need manipulation to maintain production and this will cost. Irrigated farms allow farmers to offer green feed to the herd but this feed generally doesn't match spring pasture in quality. Summer grain crops are lower in energy and protein (sorghums more so than millets) whilst brassicas, chicory and fodder beet have both good energy and protein levels. However even on irrigated farms some conserved fodder will need to be fed and the ration adjusted accordingly.

Increased Concentrate Intakes

Farmers have to increase daily intakes of energy and protein concentrates to offset the effects of fodder quality. The cost of these extra supplements relative to the milk price on offer will determine what levels will be fed and some farmers will accept the consequence of lower production to optimise returns. The use of protected fats or oils in the ration is another option and some research has shown improved yields from these energy rich supplements. Care needs to be taken when feeding fats and the advice of a nutritionist is recommended. Some research has indicated that milk responses to increased dietary protein levels are elevated in hot climates. This effect appears to be related more to a higher intake of feed than the actual protein fraction. A typical ration for a 28 litre daily yield could comprise 5.7 kg wheat (as fed), 2.8 kg lupins (as fed) and 13 kg DM good quality pasture silage. The challenge with high levels of concentrate in the daily diet is to maintain rumen function and physiology. PMR (partial mixed rations) and TMR (total mixed rations) allow for the higher level of concentrates to be fed over the 24 hour day rather than as slug feeds in the shed. Being aware of metabolic disorders and corrective measures is still important. TMR feed wagons need to be operating correctly and farmers need to think about the best loading sequence in consultation with the nutritionist to achieve a complete mix. Another factor to keep in mind is the variable quality of the conserved fodders. Knowing the nutritional composition of these fodders will reduce the risk of variable milk yield because the ration can be balanced prior to feeding out.

Heat Stress

The effects of heat stress on feed intake, reproduction and milk production are well documented and these are worse for high yielding cows. There will be an impact on the bottom line if not managed. Managing heat stress will be the most important issue to address and thought needs to be given to the use of shade, adequate drinking water, cooling water and fans (www.coolcows.com.au). Some advocate additives such as yeast and betaine that help in times of heat stress but responses are variable and it would pay to evaluate these options. There is evidence that cows need extra potassium and sodium in the diet under hot conditions. Talk to your nutritionist.

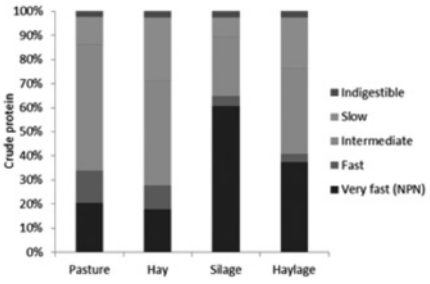
For further information, please contact Rob La Grange at rob@westerndairy.com.au or 0448 939 344

BE PROTEIN SMART!

Part 3 of series on feed protein quality and utilisation by Dr Bronwyn Edmunds (PhD), Dairy Research Officer, DAFWA

Higher dietary crude protein doesn't always guarantee improved performance. When we talk about protein we usually lump it all into the easily measured value of crude protein (CP), which is simply the total N in a feed. While CP is a useful measure, as precision farmers you could be using more detail to optimise, understand and meet your production and economic targets.

Each type of feed has different protein characteristics which can be thought of largely in terms of rumen degradability. Figure 1 provides a basic idea of the variation in protein quality from forages. All of these forages have the same CP content of 18%, but if you fed them in a ration where ME was held constant and protein was limiting they wouldn't all provide the same outcome in milk performance. Here's why! The bars in the figure represent either fresh or conserved pasture and within each bar, CP has been broken down into 5 categories, depending on the speed of degradation in the rumen. Non-protein N (NPN) is converted to ammonia very rapidly once ingested. The highest level of NPN is found in silage. This is due to the breakdown of protein to simple N structures by plant and microbial enzymes after the grass is cut. In the rumen, this rapidly degraded protein is converted to ammonia and is usually in surplus of microbial requirement. While some is recycled most of it passes out in the urine, representing a loss. Silage also has the lowest proportion of slowly degraded protein, which means a lower supply of rumen-undegraded protein will flow to the intestines. Needless to say, cows cannot use silage protein very efficiently. Hay, on the other hand, has a much lower proportion of NPN and higher proportion of slowly degraded fibre-bound protein. Cows therefore use the protein from hay more efficiently and less is lost through excretion.



This knowledge may be useful in circumstances where a higher proportion of hay is included in the diet and the overall ration CP is lower than if you were feeding straight silage. Rather than increasing lupins to balance out both protein and energy, it may only be necessary to bump up the wheat, which is cheaper, for the additional ME. This is illustrated by the rations in the table, which were formulated using Rumen8 for a cow producing 25 L/d.

	$/t DM	Ration 1	Ration 2	Ratio
Pasture silage kg (ME 11 MJ/kg, CP 14%)	170	9	7	7
Pasture hay kg (ME 9.2 MJ/kg, CP 10%)	120	1.5	3.5	3.5
Wheat kg	270	3.75	4	4.5
Lupins kg	335	3.75	3.5	3
DMI kg DM		18.0	18.0	18.0
ME MJ/kg DM		11.5	11.3	11.3
CP % DM		17.4	16.6	16.0
$/t DM		221	215	213
Potential savings (compared to ration 1 and fed for 6 months to 350 cows)			$7,300	$9,350

Even though ration 3 has lower CP than ration 1 and 2, it still provides an adequate metabolisable protein supply to the cow due to the higher level of starch from the wheat. With the current high price of lupins, this sort of knowledge could provide you with the flexibility to keep your ration costs down.

For more information on feeding protein to dairy cows please contact Dr Bronwyn, Edmunds (PhD), Dairy Research Officer 0468 456 755 www.agric.wa.gov.au

Discovering Disc Mills

Tammy Negus, RFDG coordinator

Most grains that we feed to cows need to be processed to give acceptable and maximum digestibility. Feeding whole, unprocessed cereal grains generally leads to lower utilisation of the supplement and lower milk responses. This is because the grains do not spend sufficient time in the rumen for microbes to break through their seed coat.

In terms of milling, ideally wheat, barley and triticale should be cracked or broken into 3 or 4 pieces. Increasing the degree of rolling or hammering milling makes the grain starch more readily available in the rumen and improves utilisation.

The most common form of on farm processing in Australia is roller and hammer milling. However more dairy farmers are considering and choosing to upgrade to a disc mill due to their benefits. Busselton dairy farmer Michael Blake is using a Skiold Disc Mill in his dairy and comments," They are easy to adjust and have a good capacity".

As the name suggests, with disc mills the grinding takes place between two discs. The grinding degree and distance between the discs can be adjusted to cater for different feeds to get the optimal structure. The ideal feed structure is not the same for all species of animals just as the grinding process is different for different types of raw materials. Some machines are found to be suitable for grinding raw or processed feeds up to 12mm diameter. Most importantly they produce a consistent processed grain size.

Most disc mills can be changed manually by means of a handle on the front or automatically via an actuator receiving settings from the control system of the plant. The simplicity of these machines can mean their operation is easier for staff than the more complex operation of other milling systems.

Other benefits of the disc mill are the compact size and they can easily fit into existing operation plants. They are generally low maintenance with good durability on parts and the discs can be produced in tungsten carbide. This is the same material as is used for producing cutting tools in the engineering industry.

They have a quick processing time with a capacity of 1,000 to 12,000 kg/h, depending on the model, raw material quality, moisture con¬tent, and grinding fineness. The mill size can vary depending on the size of the electric motor (up to 55kW). Depending on the mill size and grinding degree you can get a typical power consumption of only 5 kWh per ground tonne. The low energy requirement results in power and cost savings.

Disc mills have less noise pollution and generally run quieter, as low as 80 dB (decibels A) which is much quieter when compared to roller or hammer mills at 85 to 90 dB (A). They can operate without air ventilation, which eliminates dust emission.

There are a few different brands on the market and the cost varies depending on the model. They are generally more expensive to purchase and install than roller mills. The better companies have several years of product development and testing behind them and have produced a good all round mill for grinding of grain. All dairy farms are different and the disc mill may not be suited to your feeding system but are certainly worth investigating when striving for greater feeding and farming efficiency.

For further information on processing grain visit www.dairyaustralia.com.au or see Feeding Dairy Cows - A manual for use in the Target 10 Nutrition Program.

Precision Ag hits the Dairy

Sam Taylor, AgVivo

Commonly used on broadacre farms, precision agriculture has had little adaptation into dairy farming systems. That has the potential to change with the development of the Smart N system.

In a nut shell: Technology called Normalised Visual Differential Index is used to detect the level of "greenness" of pasture species. An increased level of "greenness" indicates a higher the level of nitrogen found within the plant. Each boomspray nozzle has an individual sensor which turns the nozzle on or off depending on the level of greenness measured within the view of the sensor. This enables application of liquid fertiliser, predominantly Flexi N, a liquid nitrogen product, to be applied between urine and faeces patches within a grazed pasture.

Improving Nitrogen use efficiency and reducing greenhouse gas emissions in intensively grazed pasture systems.

Caring for our Country funding is being used to investigate the adaptation of common broadacre precision farming technology into intensively grazed pasture systems. Using the concept derived by New Zealand based agricultural innovator Craige McKenzie, a joint project between Western Dairy and the Tasmanian Institute of Agricultural Research (TIAR) will ground truth the validity of the "Smart N" system.

The Smart N system uses Weedseeker technology to strategically apply liquid nitrogen (N) to intensively grazed pastures. The system works in the reverse to a weedseeker on a broadacre farm which only turns on the spray nozzle when a green weed is detected. In "Smart N" mode, the weedseeker sensors are reverse engineered so that they are on the majority of the time, and when a high N / high biomass patch of pasture is detected by the NDVI sensor on the weedseeker unit, the nozzle is turned off.

In intensively grazed dairy pastures, up to 30% of the paddock area has been measured as high N patches from the previous 2-3 grazings. These patches which are the result of urine and faeces deposits generally contain 800-1000 kg/N/ha and as a result are not responsive to applied N (or P or K). With up to 30% of the paddock potentially not requiring N, the opportunity exists to reduce N applications, but until this concept was developed, there was no practical way of actually applying N between these nutrient rich areas.

"Smart N" has been demonstrated on a small scale previously, but this project aims to validate the technology on a larger scale, and to discover and refine any pitfalls in the practical adoption of this technology.

"There are still many unanswered questions that need to be resolved" said James Hills, the project lead on the Tasmanian side of the project. "We are still unsure as to how sensitive the weedseeker's are, and if they will pick one, two or three grazing rotations worth of urine patches, and also how soon after a urine patch is deposited will it be detected."

Small scale calibration and validation trials are currently being done with urine collected in the TIA dairy at Burnie and then applied in strips in paddocks that were cut for silage and have not been recently grazed, ensuring the background should be free of N patches from grazing animals. "We will test the small boom we have here at the different sensitivity settings every couple of days to see when and what it is registering. Hopefully this will give us a better idea of how long after grazing before we can apply our nitrogen." James went on to say.

The calibration work done with the small scale boom, has laid the way for the larger scale demonstrations to begin. In both WA and Tasmania, 6m demonstrations boomsprays have been set up with weedseeker sensors and are being used to run demonstrations on 4 paddocks in Tasmania and 3 in Western Australia. Total pasture biomass will be measured at all locations, with the aim being that there is no significant difference in the level of pasture production between conventionally fertilised treatments (blanket N applied) or that which is fertilised with the "Smart N" technology which has reduced amounts of N applied.

Reducing the amount of N applied not only provides the farmer with the opportunity to reduce fertiliser input costs, there is also the benefit of less N being prone to leaching or volatilising into the environment. Reduced N concentration in the pasture will also lead to reduced greenhouse gas emissions from animals grazing the pastures, which is one of the main aims of the project.

As the sensors will also detect nitrogen rich clover within the sward of the pasture, it is possible that N will not be applied to these areas either, representing a further reduction in the area to which N is applied. Healthy clover plants will fix their own nitrogen, and it is also thought method may encourage clover within the sward, potentially increasing the content of clover within the pasture, although this is yet to be proven.

The project will run demonstrations this summer on irrigated pastures at the Tyrell's property, Woodhouse's and Stuart & Alison Scott's. At least 3 grazing rotations will have N applied using this technology.

To view a short video of the "Smart N" concept, follow this link YouTube link: http://www.youtube.com/watch?v=bYpA0gQG5CI

For more information contact Sam Taylor 0429 332 593
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QUALITY MATTERS

2013/14 Silage & Hay Competition

Western Dairy is pleased to promote a competition for all dairy farmers for silage and hay made this season. This is in recognition of the importance of quality when it comes to feeding conserved fodder to high producing cows throughout the year but particularly through summer.

Prizes include 250 kg of Speedyl tetraploid annual ryegrass seed from Seedforce will be given to the top quality silage and the top quality hay samples submitted for testing with in each category.

Please contact Rob La Grange at: rob@westerndairy.com.au or 0448 939 344 for the competition guidelines and how to enter.

The Feedtrough is published by Western Dairy and edited by Western Dairy's Regional Feedbase Development Group coordinator Tammy Negus.

Previous issues of the Feedtrough are available at www.westerndairy.com.au
To contribute to the Feedtrough please email Tammy at tammy.negus@gmail.com