FEED TROUGH
VOLUME 4

Western DAIRY | Dairy Australia
Your Levy at Work

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The Value of Effluent

Dan Parnell, Agsure Consulting

A good effluent system needs an efficient effluent application system which can utilise the nutrients from the effluent to grow grass and save on fertiliser. The effluent material - solids, liquid or sludge will vary in their nutrient value and required application method. Typically, liquid effluent from a storage pond has high Nitrogen (N) and Potassium (K) levels which are soluble and readily available to plants. Sludge and solids have more organic nutrients and take time to break down and become plant available. There are many application systems available and one size does not fit all.

Some key considerations are;

- Effluent is applied to enough area to avoid excessive build-up of nutrients which is an environmental hazard and has animal health risks.
- Effluent is applied to low risk paddocks and monitored with soil testing.
- Nutrients are applied during a non-storage period to avoid run-off or leaching off farm.
- Effluent is applied to high yield crops or pastures such as silage paddocks or summer crops which can be exported from the paddock to reduce nutrient loading.
- Ease of management.
- Sufficient solids separation in the effluent system to reduce blockages for liquid application.

As part of the DairyCare project Bree Brown collected liquid effluent samples from WA dairy farmers in 2017. The range of the results are summarised in the table. There is a large variation between these samples which is typical as different effluent systems have different levels of treatment and water use. The time of year, rainfall and cows diet can also affect results. This highlights how important it is to test your own effluent on farm at different times of year and not rely on industry data.

Table 1: Nutrient level of various effluent sources from WA dairy farms

NUTRIENT	RANGE	MEAN
Total Nitrogen (N) mg/L	97.5 - 1610	750
Potassium (K) mg/L	39 - 889	434
Total Phosphorous (P) mg/L	21.1 - 378	163

Effluent typically does not supply a balanced range of nutrients so the application of liquid effluent is usually limited by the rate of potassium for animal health reasons.

COST BENEFIT

It is important to establish a business case for investment in effluent systems. One way is to determine the cost of the nutrients compared to fertiliser (see the table example). If 6mm of liquid effluent or 60,000L/ha of effluent (using the mean nutrient concentration for WA) a value of $121.65/ha is applied in nutrients. This doesn't necessarily consider the benefits of effluent organic matter for improving the soil through better water holding capacity and soil structure. You could argue that farmers have already paid for the nutrients why not use them efficiently as possible.

Table 2: Nutrient value in $/Ha If you apply 6mm of liquid effluent or 60,000L/ha effluent at the mean nutrient concentration for WA.

NUTRIENT/HA	$/KG	NUTRIENT VALUE $/HA
Phosphorous 10kg	$4	$40.00
Nitrogen 45kg	$1.15	$51.75
Potassium 26kg	$1.15	$29.90
Total		$121.65/ha
		*Includes cost of freight for fertiliser

Effluent samples will continue be collected and analysed to help build a database of effluent nutrient values typical in WA dairy systems. This will help Western Dairy consultants fine tune application rates, helping to keep nutrients on farm, maximising the returns from effluent for farmers.

Picture - Busselton dairy farmers the Lammie's, recently demonstrated their new effluent pond stirrer and tanker at a 'Dairy Walk 'n' Talk' event. They have been developing an effluent management plan through the DairyCare project as part of the Revitalising Geographe Waters program.

For specific advice call Dan Parnell or Sam Taylor. Visit www.fertsmart.dairyingfortomorrow.com.au/dairy-soils-and-fertiliser-manual/chapter-13-using-dairy-effluent

Irrigation – Using the Water Wisely

Tammy Negus, Agronomist

The cost of irrigation equipment, water, electricity (to run centre pivots) and the cost of the inputs for irrigating crops is significant. Make sure you are using water efficiently to get the best return from the land and produce quality feed. These 10 points should be top of mind for this year's irrigation season;

1. **How much water have you got?** With lower rainfall in the south-west many farmers have less water available for irrigation so you might be better off irrigating a smaller area more effectively than a larger area scarcely. Some farmers could consider using their water allocation for early germinating pastures/crops in autumn rather than irrigating in summer.
2. **Make sure the crop/pasture fits the purpose or feed gap that you require.**
3. **How much water will you need?** There is a wide variation in water use efficiency of crops in terms of tonnes of dry matter grown per Mega Litre of water applied. You must consider the daily plant water requirements when irrigating and keep this in mind when making decisions about summer crops and how they fit into your system.
4. **Seasonal water demand** - perennial pasture, maize, forage sorghum and millet all have moderate tolerance to water stress and for the summer crops the water requirement varies with planting time. Calculate the seasonal water demand at www.agric.wa.gov.au/irrigation-calculator.

CROP	SEASONAL WATER DEMAND ML/HA
Perennial pasture	7.5
Maize	5.5
Forage sorghum hybrid	5.5
Millet	4.5

5. **Irrigation scheduling -** you should calculate the daily water use and calculate the readily available water (RAW) in the rootzone of the crop using the crop coefficient. For instructions and crop coefficients visit www.agric.wa.gov.au/water-management/evaporation-based-irrigation-scheduling.
6. **Timing is crucial for optimum growth - k**now when to start up irrigation to avoid a decline in pasture growth rate is important.

   Research in Tasmania by Institute of Agriculture's (TIA) Dr James Hills shows that by getting the start-up decision right, the pasture rates can be maintained at 80kg DM/ha per day, while the pasture growth rate declined to less that 40kg/ha per day where the start-up irrigation was delayed by as little as 8-9 days.
7. **Measure** the soil moisture using suitable soil moisture monitoring equipment. Obtaining pasture/crop production (DM/Ha) as well as soil moisture data will enable a good assessment of the performance of your system
8. **Check irrigation equipment** – for those with flood irrigation, keep channels clear and flowing. For centre pivots regularly check nozzles, tyre pressure, gear boxes, wheel tracks, obstacles and pumps.
9. **Get your soil health right** - consider soil structure, nutrition and biology. Soil test well before planting and plant tissue test to allow correct fertiliser decisions to be made. Variable rate irrigation (VRI) is technology that is available and being used by some farmers to meet different soil requirements within an irrigated area.
10. **Control weeds and insects** to optimise the water and nutrients to maximise the crop growth.

The new IrrigateWA smart phone app is designed to help you calculate irrigation requirements and access information in the paddock. Visit www.agric.wa.gov.au/apps/irrigate-wa Look out for further activities from the Smarter Irrigation Project at www.dairyingfortomorrow.com.au/tackling-specific-issues/water/smarter-irrigation-for-profit/ contact Sam@agvivo.com.au or 0429 332 593.

Feeding in Summer

Messages from Western Dairy and Dairy Australia

As the hot weather rolls in its important to consider herd health and maintain milk production. These are some points to keep in mind when looking at your summer nutrition program.

- The appetite is decreased, ability to digest and absorb nutrients in the feed is decreased. Dry matter intake drops by 10-20% depending on the length of the heat stress.
- 20-30% more maintenance energy is required to compensate for keeping the cow cool. Feeding more starch or added fat can be useful tools. Dietary fats above >5% of the ration can reduce DMI.
- An Energy dense fibre source is important in hot weather because the cows appetite is suppressed. Higher energy dense feed means cows can consume less. This is crucial for high-producing herds already being fed plenty of starch via grain/concentrates.
- Make sure the ration includes enough available protein, consider canola meal as a source.
- Ruminal acidosis risk is increased during hot weather by several factors; Cows prefer to eat in "blocks" in the cooler times of the morning and evening, cows tend to select against low quality forage/fibre, the natural buffering system the cow relies on to combat ruminal acidosis does not work as well in hot weather.
- Research suggests that heat stressed cows have an increased need for glucose within their bodies. Providing starch in a more slowly fermented form such as maize assists the production of glucose in the cow.
- Allow for 200-250 litres of water per cow per day in hot weather. This is double what cows usually need each day. Consider using sprinklers and shade on the dairy yard.

For more consult your nutrition adviser to develop a summer nutrition program. Visit www.coolcows.com.au for tips on dealing with heat stress in Australia herds.

Feed Forum

HINTS FOR HAY

Ann Noakes, Glenbrae Hay Transport

The new seasons hay is onto the feed market. The amount of optimism, quality and yields produced this season varies from farmer to farmer and region to region. The late rainfall received in some regions means there will be a reasonable amount of poor quality/rain damaged hay on the market. The export industry dominates the WA market and strongly influences pricing. Most southwest farmers have very little carry-over of fodder from last season and will be looking to supplement/balance homegrown fodder with purchasing hay.

Some hints for the coming hay buying season;

- Forward plan and buy early to secure a good supply of quality hay. You have an advantage if you store on farm. Plastic or tarpaulins can help cover hay and preserve quality.
- If you have storage to purchase and receive hay early you are at an advantage. Consider plastic or tarpaulins to cover hay and preserve quality.
- Choose quality hay, check with your supplier regarding the quality parameters. Export certified hay will have certain standards of quality (feed tested, higher energy, ARGT free, weed standards).
- Buy hay or straw per tonne rather than per roll/square. Purchasing squares rather than rolls is more effective due to dimensions for freight.
- Good quality straw can be useful to supplement hay and blend with concentrates. High density bales and barley straw are sought after and supply can be limited.

For enquires contact Ann:
0409 575 065
haytrans@westnet.com.au

RUMEN8 - ITS FARMER FRIENDLY!

Try Western Dairy's own Rumen8 software to check your cows diet is balanced and meeting the herds requirements. Visit www.rumen8.com.au to learn more and get the latest updates.

FEED PRICES FOR DAIRY FARMERS

Tammy Negus, Agronomist

The WA grain harvest is expected to be around 12 million tonnes this year, down from nearly 16 million tonnes last year. Grain quality and yields are variable across the state and prices will generally be higher than the 2016 harvest.

Speak to your supplier early about your requirements. If you have on farm storage you could benefit from taking delivery early. To give you an idea of the current prices, Bunge in Bunbury are currently buying 2017 feed barley at $256/T ex GST (~ $276 delivered), and multigrade wheat (APW1) for $276/T (~$296 delivered). See the table for a feed price guide.

Always consider quality and feed test. CBH and Bunge 17/18 receival standards for graded wheat APW and AGP have a minimum of 10.5% protein whereas feed wheat and ASW have no minimum for protein. APW has a minimum test weight (hectolitre) whereas feed grade wheat has no minimum. Keep up to date with the WA crop report www.giwa.org.au/2017 and subscribe to DA's state Hay and Grain Report by contacting sofia.omstedt@dairyaustralia.com.au

FEED	ESTIMATED COST (EX GST, PER T, DELIVERED) *
Feed Barley F1	$275 - 285
APW1 Wheat	$295 - 310
ASW1 Wheat	$280 - 300
Feed Wheat	$270 - 280
Lupins	$370 - 380
Canola meal	$450
Oats	$220 - 230
Straw	$60 - $110
Cereal Hay	$140- $180
Pasture Hay	$150 - $200

** Allows for freight, prices as per 23/11/17, average from Bunge Bunbury, CBH, Dairy Australia*

DON'T FORGET THE HEIFERS

Pay attention to the nutritional requirements and growth of other categories of livestock -heifers, calves, weaners and bulls over summer. Ian Bradshaw from Cattle Vet Services wrote an article on feeding heifers in the 2016 Feed Trough newsletter.

Ian highlights the importance of knowing your target weights and strategically weighing heifers, setting your heifer calving dates and seeking help when you are falling behind your targets to re-evaluate your plan and performance. For the full article www.gtp.com.au/westerndairy/inewsfiles/FeedTroughDecember2016.pdf

FEED TEST - DON'T GAMBLE WITH QUALITY

Test your grain and hay to know what you're buying and test your home grown fodder so you know what you are feeding. Collect a representative feed sample for testing, label samples clearly with a description and sample date and ensure your feed samples arrive at the lab quickly for minimal deterioration. Use an accredited laboratory and understand that there will always be some variation in results due to differences in the sampling and the testing technique.

Get assistance from your nutritionist to understand the results and use them to feed your cows better. Visit the DA website for fact sheets on feed testing and AFIA www.afia.org.au/index.php/projects/laboratories/fodder-testing-proficiency-program

FEED PLANNING AND BUDGETING

- Be proactive with purchasing your feed and secure supply early. Feed contracts are essential to ensure security. *

- Categorise your silage and hay on quality (feed test) so it can be best fed to certain groups of animals.
- Do a stock count on cattle to feed over summer, amount of feed on hand and feed required. Make a feed budget, plan and assess the ration regularly.
- Feed wisely - minimise wastage, mix TMR feeds properly, determine the dry matter, bulk density and hectolitre weight of what you are feeding and calibrate your equipment
- Plan for the 2018 Autumn pasture season by considering varieties, seed requirements and management. Soil test paddocks early and control summer weeds to maximise the moisture and nutrients for next seasons crops. *For more see the 'Buy right' feed fact sheets at www.dairyaustralia.com.au

Dietary transition experiment in WA

Ruairi McDonnell & Martin Staines, Western Dairy Research Scientists

Save money by transitioning your cows slowly onto silage. Our results indicate that slower changeover cows could sustain milk yield at a much higher level than rapidly transitioned cows.

In WA, as lactating cows transition from a grazed pasture-based diet to a conserved forage-based diet in late spring/early summer, there is a marked reduction in milk yield per cow. The Flexible Feeding System (FFS) study in 2013 showed that this decline is typically 4 L per cow between Sept/Oct and Dec. Average herd days in milk had no significant effect on this the decline in that study, so it is likely that nutritional or environmental factors are the key cause. It might also be due to reduced feed intake during the transition.

Milk output is affected by the quality of forage consumed, with grazed pasture generally being of greater nutritive quality than pasture silage, and this factor is likely to explain much of the decline. The FFS experiment demonstrated a clear difference in the mean metabolisable energy (ME) content of grazed pasture relative to pasture silage (12.0 v 10.3 MJ/kg DM respectively). Farmers in the region generally increase the provision of energy dense cereal and protein meal supplements to counteract the lower ME content of silage during the dry season.

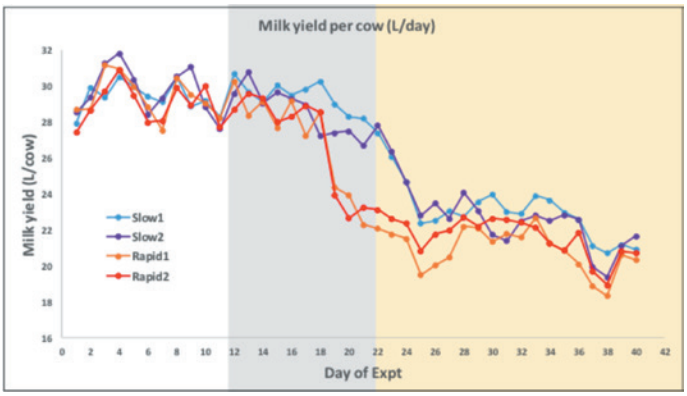
It is generally accepted that a gradual transition from pasture to silage, as opposed to a rapid change, is likely to provide benefits in terms of sustaining milk yield. However, the magnitude of the yield benefit has not been quantified. There is little quantitative information on the feeding management methods used to transition high producing dairy cows from a grazed pasture-based diet to a grass silage-based diet.

Western Dairy's experiment compared milk production responses of cows assigned to one of two treatments; (i) a gradual transition from grazed pasture to conserved silage over a 10 day period and (ii) a rapid transition from grazed pasture to conserved silage over a 24 hour period.

RESULTS

The changes in mean milk yield for each of the two treatments throughout the experiment are presented in the first graph below.

- Period 1 (white), all cows were treated the same and there was no difference in milk yield (all were consuming pasture as the only forage source).
- Period 2 (grey), the gradual treatment sustained a greater milk yield for longer than the rapid treatment, despite both groups getting access to equal amounts (but provided in a different manner) of grazed pasture and conserved forage. The diets were balanced for DM and ME intake.
- There appeared to be a residual effect which spread into the beginning of period 3 (yellow), before milk yield per cow in both treatments again became similar.



Milk yield in the two rapid treatment herds fell significantly in period 2 once pasture was replaced with silage (day 17; 27th November), from approx. 28-24 L/cow, before stabilising at around 22 L/cow. In contrast, the slow changeover cows had a much more gradual decline in milk yield. By the end of the experiment, all herds were producing the same amount of milk (no statistical difference), but throughout period 2 (grey area in graph), slow changeover cows could sustain milk yield at a much higher level than rapidly transitioned cows. When we quantified the difference in milk yield between the two treatments, it amounted to 51 L/cow throughout the experiment.

On a 500 cow herd, with a milk price of 47 c/L, this would equate to a difference in milk income of $12,000, if cows were transitioned onto silage slowly, as opposed to the rapid transition. Concentrations of fat and protein were unaffected by treatments (P> 0.05). However, both were significantly affected by the time of sampling. These results are typical for the time of year for this region, in agreement with earlier studies.

A further point on this preliminary data was the ability of the two slow treatments (blue and purple) to sustain milk yield at a similar level to a fully grazed pasture diet, even in the final days of the transition period when almost 100% of forage consumed was silage. This finding needs more investigation, but it appears that even a small portion of "green pick' in the diet can allow cows transitioned in this manner to produce almost the same amount of milk as a 100% grazed pasture forage diet.

For more please contact Western Dairy Research Scientist contact peter.hutton@westerndairy.com.au or 0408 797 145.

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