VOL 2 ISSUE 4 - December 2010

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Department of Agriculture and Food

FEED TROUGH

Funded by Dairy Australia and your dairy service levy

Western DAIRY

Crops to alter milk composition

Dairy farmers may be able to use high yielding crops to manipulate milk composition, according to research by the FutureDairy team at Camden, NSW.

The field trial, conducted by Honours student, Douglas Mackintosh, involved lactating dairy cows grazing Persian clover or forage rape (brassica).

There was no difference between the two crops in total milk yield. However cows grazing forage rape produced milk with a higher protein content than those grazing Persian clover. In contrast, cows grazing Persian clover produced milk with a higher milk fat content than those grazing forage rape.

FutureDairy project leader, Associate Professor Yani Garcia, said the effects on milk composition were likely to be due to forage rape having a lower fibre content and higher energy than Persian clover.

Energy intake is the main driver of milk protein content so the higher the energy concentration in the feed, the higher the content of protein in the milk.

"We know from previous research that both forage rape and Persian clover are high yielding crops, providing quality feed during the autumn, when quality pasture is typically in short supply," said Yani.

FutureDairy's results suggest that dairy farmers with pasture-based systems can choose the forage crop that best suits their needs.

"With forage rape, we should expect higher yields in early autumn and possibly an increase in milk protein content, according to these results. Persian clover will be a better fit where the feed deficit occurs in late winter and early spring," he said.

Below: FutureDairy research has found that cows grazing brassica, or forage rape, produce milk with higher protein content than cows grazing Persian clover.

This has been the experience of some farmers involved in FutureDairy's Hunter Valley on-farm trials.

"Two of the farmers grew forage rape to fill the feed gap in early winter. Compared with the previous year, their annual results show increases in total milk solids per cow, milk solids per kg of body weight and an increase in overall annual milk protein production," said Yani. ■

From the Editor's Desk

This month's Feedtrough is scheduled to coincide with a series of feed budgeting workshops convened by Western Dairy in response to last month's dry season workshops.

With the entire WA dairy industry operating under tight economic conditions, the opportunity to manage margins through highly effective feed budgeting exists. Western Dairy would like to thank veterinarians Dario Nandapi and Peter Rosher for responding to this need and making time available to deliver this important service. Meanwhile, a focus on feeding systems will be a big part of the February Australian Dairy Conference tour that comes to WA from February 20-26. Eight WA dairy farmers will be featured on the tour and the local dairy industry is encouraged to be part of the on-farm visits to have access to some innovative discussions on the feedbase. ■

Cow cooling centre p2

Hay Losses During Storage

by Steve Little, Grains2Milk program leader for Dairy Australia

Storing hay outside, unprotected and on the ground is the cheapest and easiest way to store hay, but it has the greatest potential for dry matter, digestible dry matter and nutrient losses due to spoilage and weather deterioration. These losses can be halved by using good coverings, and reduced by about two-thirds by storing the hay indoors in a shed.

The review of research on hay losses undertaken by SBScibus for Dairy Australia's Grains2Milk program as part of the recent feed wastage study highlighted these factors affecting hay losses during storage:

- ***Moisture content at baling*** - Moisture content at baling influences the chances of mould development, microbial growth and heating. (Recommended moisture levels for safe storage of hay are 16-18% for small squares, 14-16% for large round bales and 12-14% for large squares).
- ***Bale density*** – Water shedding capacity is directly affected by bale density. At least 49 kg DM/m2 is recommended.
- ***Storage time and weather conditions*** - Deterioration in hay quality is a function of exposure (storage) time, and the intensity of rainfall and humidity. The weathering effect is greatest in the outer 20cm layer, which constitutes a third of the total weight of a round bale. Persistent rainfalls will result in the outer layer of the bale becoming saturated. The deeper water penetrates the bale the less drying occurs between rainfalls. Higher humidity slows drying. Hay should be protected from the weather where rainfall is more than 500 mm (20 inches) during normal storage periods.
- ***Surface*** – At least half of the losses associated with outside storage occur not from above but from below, through contact with the ground. Bales stored on a well drained, raised surface (eg. crushed rock) or better still, elevated off the ground (eg. tyres, telegraph poles, wooden pallets) will absorb less water through the wicking effect and suffer less deterioration than bales stored directly on the ground.
- ***Bale placement*** – Bales placed end-to-end incur less weathering than bales placed individually or side-by-side. Spacing rows of round bales 45-90 cm apart will ensure good drying and air flow. Placing bales north-south will maximise sun exposure for drying. Bales should not be placed in shaded areas such as under trees. ■

For further information from the Grains2Milk feed wastage study, visit www.dairyaustralia.com.au/Farm/Feeding-cows

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Cow Cooling Centre

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In the hot months, when dairy cows are at risk of heat stress, the dairy yard can double as a farm cooling centre.

Dairy Australia's Cool Cows program leader, Dr Steve Little, said water sprinklers could be installed quickly and at low cost.

"Every Australian dairy should be fitted with yard sprinklers and a big water trough at the dairy exit. As well as keeping your cows cool, the sprinklers will keep the flies away," Dr Little said. "Installing a shade cloth or solid roof over the dairy yard in combination with sprinklers can dramatically reduce the impact of heat stress on milk production and herd fertility.

"Many dairy farmers start with a simple system, and once they've seen the benefits, invest in a more permanent solution, such as a solid roof with sprinklers and fans."

Shade reduces the amount of heat cows absorb in the first place, while sprinklers and fans help the cows offload heat through evaporative cooling. Dr Little suggests that on very hot days it may hardly be worth sending the cows to the paddock if you have a farm cooling centre.

"Instead, consider feeding a high quality forage or partial mixed ration on a loafing paddock or feed pad close to the farm cooling centre. Allow cows to move to and from the farm cooling centre during the heat of the day," he said.

Offer cows the best quality pasture in the evenings when it is cooler, even if it means altering the paddock rotation.

A farm cooling centre is just one of several cooling infrastructure options for dairy farms. Cool Cows is one of many examples of the dairy services levy at work. ■

Soil pH & N fertiliser

Many farmers know about the importance of soil pH and of nitrogen (N) fertiliser as factors that drive pasture production.

A low soil pH is bad for soil health and for pasture production. The recommendation is to maintain soil pH above 5.0 (in CaCl2) and preferably above 5.5. Some would even argue soil pH needs to at 6.0 (in CaCl2). When it comes to N fertiliser, the Greener Pastures team at DAFWA has done much, some of which has been discussed in previous articles in the Feed Through. One question that remains is this: 'how much does soil pH affect the ability of pasture to respond to N fertiliser"?

Some work has been done overseas to investigate the interaction between liming and nitrogen fertiliser in pasture soils. We are not aware of any experiments that have attempted to define the response to N fertiliser at different pH levels in Australian pasture soils. For this reason, the Greener Pastures team has started a series of trials to answer these questions.

The team started by looking at the 2010 results from over 800 soil tests for (pasture) paddocks on the Swan coastal plain. These soils ranged in pH (in CaCl2) from 3.8 to 6.9, with an average of 4.9. We were interested in soils with a pH of 3.8 to 4.2 that had not been limed since soil testing was done in early 2010. We approached a property owner with the unusual request to collect a truckload of his top soil, and are now the proud owners of that soil with a pH of 4.0.

We are currently undertaking a lime incubation trial which started 4 months ago in early Aug 2010. Lime is applied at 11 different rates rates ranging from 0 to 13 tonnes per ha. The lime was either applied to the soil surface or thoroughly mixed into the soil. The soils are kept outside at ambient temperatures but are kept damp throughout the trial. The difference in effectiveness of mixing lime into the soil compared to applying it to the surface has been quite stunning so far. There has been virtually no change in soil pH with lime applied to the soil surface, whereas with lime mixed into the soil we have already reached pH 6.0 after 4 months at the higher lime rates. Some of the soils with lime mixed in were placed in a room kept at a constant 30 C and there soil pH has reached close to pH 7.0 within a couple of months of application.

Our incubation trial will be used to work out how much lime it takes to shift the pH of our original soil with a pH of 4.0 to create soils with a pH of 4.0, 4.5, 5.0, 5.5 and 6.0. Once we have achieved this, the final and main part of our trial will start next year. Our soils will be used to establish a pot trial (that is: a trial using pasture grown in pots) with irrigated perennial ryegrass. The pasture grown in the soils with these different pH levels will receive 6 different N fertiliser levels: 0, 0.5, 1, 2, 3 or 4 kg/ha/day. Over a period of at least 12 months we will measure pasture yield by harvesting the pasture each time it reaches the 3-leaf stage. From this we can work out to what extent soil pH affects the ability of pasture to respond to N fertiliser. ■

The Greener Pastures team at DAFWA will keep you updated on progress. For more information contact Martin Staines 9780 6288.

HOW MUCH FEED?

Planning ahead was the key message given to local dairy farmers by visiting Northern Victorian dairy farmer Peter Sexton and his advisor Cameron Smith, at the recent Western Dairy dry season seminars.

In order to plan you need to do a feed budget to ensure that you know what quantities of each feed you need to buy for the next 12 months. Don't leave your planning too late as it will be a costly exercise to buy feed and/or sell stock when everyone else is trying to do the same.

Guesstimates aren't good enough. There are a number of feed budgeting methods available (paper and software based) and many dairy advisers who can readily assist you. One method using ME requirements is shown on the Dairy Australia web site in the farm section/Feeding Cows/bought in feeds/planning and budgeting "Plan For Profit – Feed Budgeting: Fact Sheet 2".

An alternative feed budgeting method, using Dry Matter Intake (DMI) requirements, will be used as an example at the Fast Feed Facts Western Dairy workshops presented by Drs Peter Rosher and Dario Nandapi this summer.

Doing a feed budget involves these steps:

1. **Feed inventory.** Calculate how many tonnes of feed is on hand. This could include pasture.
2. **Stock inventory by month.** Categories of stock include:
   a. Milkers.
   b. Dry cows
   c. Springers
   d. Replacements
      i. Weaners (0-6 months)
      ii. Yearlings (7-12 months)
      iii. Mating heifers (13-18 months)
      iv. Pregnant heifers (19+ months)
   e. Others (Bulls and steers)
3. **Calculate feed demand.** For each category above, multiply number of stock by the predicted dry matter demand of each feed. Multiply this by days in the month to calculate monthly demand.
4. **Tally total feed demand** for period of interest (usually 12 months or until next spring)
5. **Calculate** feed deficits for the period of interest
6. Use this information to purchase feed and/or reduce feed demand.

Feed budgets should be reviewed as circumstances change and as the season progresses. Make sure your feed budget makes realistic allowances for feed wastage based on your feeding system.

The table right is a simplified example of a feed budget for 650kg cows producing 24 litres per day for December to February.

The predicted DMI equation used was DMI = 2% of body weight + 1/3 of Milk (4% fat). The predicted DMI equation used for growing animals is DMI = 2.5% of body weight. ■

Month	**Dec**	**Jan**	**Feb**
Days	*31*	*31*	*28*
milkers	**100**	**90**	**85**
grain DM	10	10	10
silage DM	5	5	5
hay DM	6	6	6
Total DMI	21	21	21
Predicted DMI	21	21	21
dry cows	**0**	**10**	**5**
hay DM	13	13	13
Total DMI	13	13	13
Predicted DMI	13	13	13
springers	**0**	**0**	**10**
grain DM	3	3	3
hay DM	10	10	10
Total DMI	13	13	13
Predicted DMI	13	13	13
Total Grain t DM	31	31	32
Total grain AF	34	34	35
+ 1% wastage	35	35	36
Total silage t DM	16	14	12
silage t AF	52	47	40
+10% wastage	57	51	44
Total hay t DM	19	21	19
Hay t AF	22	24	22
+10% wastage	24	27	24

Promising Irrigation Results for a Drying Climate

Over the last two irrigation seasons, Harvey Water in partnership with DAFWA, the WA Department of Education and a number of irrigation consultants have been investigating the water-saving potential of a number of alternative irrigation systems compared with traditional surface irrigation methods.

For the last two summers fodder for the dairy herd at the Wokalup Campus of the WA College of Agriculture has been grown under the traditional surface irrigation system, but also under the College's centre pivot irrigator as well as areas irrigated by a solid set system, a new overhead "floppy" irrigation system and sub-surface drippers at three different spacings. During year 1 a millet crop was grown and during the second summer a more traditional pasture sward of ryegrass and clover.

Researchers at the site collected water use information for each irrigation and cut pasture samples from randomised quadrats around the paddocks in order to measure pasture growth rates but, more importantly, Water Use Efficiency as measured by how much water was required to grown each tonne of pasture.

Although the results varied markedly across the two years because of the different pasture species being grown (and some teething troubles with the trial of course!) significant water savings were observed across both years.

The Relative Water Use Efficiency (WUE) of the systems as measured by how many tonnes of pasture were produced per ML of irrigation water is now calculated. The surface system is assumed to be the "normal" irrigation system, so all of the others are compared to this. In year 1, all of the alternative systems produced between 1.5 and 2 times as much crop per ML as the surface system. In year 2 all of the alternative systems were about 1.2 times as efficient as the surface system in terms of using water to grow plants.

It should also be noted that analysis of the soil showed that the surface irrigated block was very much more fertile than the others.

These results can have a significant impact on WUE on an individual farm, but at the irrigation system scale, the water savings are potentially very large indeed. For example, if all of the irrigated dairy farms in the HWIA were to shift to these systems, almost 30GL of water per year would be saved or, at an average cost of $50 per ML, $1.5 million worth of water a year.

Something to think about as we move into what could be a difficult season water-wise. ■

For further information, contact:
Richard Yates 0419 048 575

Feed Testing critical

by Sam Taylor, Agronomist, Landmark

Supplementary feed availability and prices will be at a premium this summer. Knowing the exact cost and quality of feed sources is extremely important and helps determine how much supplementary feed and class of stock it is fed to.

Animals with a higher energy demand such as those in early lactation will require a feed source of greater energy and digestibility than dry stock. This can only be determined objectively via feed testing.

What is tested? All types of feed can be tested. The usual tests include Metabolisable Energy (ME), Moisture %, Dry Matter (DM), Acid Detergent Fibre% (ADF), Neutral Detergent fibre% (NDF),Digestible Dry Matter (DDM) & Crude Protein% (CP).

ME is the most important factor as it is the actual energy that can be used by the animal, and should also be used to compare costs of various feed sources. CP is important for ration formulation and to determine that animal requirements are being met. Knowing the feed values of your grain and fodder will ensure you are not overfeeding, making the resource last as long as possible.

Know your costs? With prices for supplementary feed also being near record highs, it is important to know the actual cost of the feed source you are intending to purchase, particularly in relation to energy content. Table 1 outlines the cost of common feed sources based on a dry matter % and also at a c/MJ level. Costs between fodder sources vary, however you will also need to add your freight and feeding out components to these initial costs. Also consider the potential % wastage and conversion efficiencies of various sources.

What is required? As with all analytical testing, it is very important that a representative sample of the feed source is presented to the laboratory to ensure valid results. More information on how to correctly sample, package and what quantity is needed for different feeds is available from your feed testing laboratory as this will vary between laboratories.

Feed test data is used to determine the appropriate feed requirements per head, helping to ration out supplies, potentially reducing costly additional feed bills, while confidently supplying adequate nutrition to meet livestock production targets. ■

For Further Information

National Dairy Australia Feedbase Projects have a wealth of information about feedbase research & management in WA and other dairy regions available on their websites:

Greener Pastures
www.agric.wa.gov.au/greenerpastures

FutureDairy
www.futuredairy.com.au

Project 3030
www.dairyextension.com.au/project3030.asp

Western Dairy
www.westerndairy.com.au

Dairy Australia
www.dairyaustralia.com.au
www.myG2Mfeedreport.com.au
www.coolcows.com.au

Tasmanian Dairy Demonstration Farm www.tddf.com.au

Beyond 2012
www.tasdairyprojects.com.au

Keep us in the picture!

Are you growing or thinking of growing cereal silage or brassicas - then let us know.

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