



The University of Sydney

Volume 1, Issue 2

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Special points of interest:

The 2009 Symposium is fast approaching and included in this newsletter is further information on the event including a look at the program on page 11.

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Dairy Research Foundation



Foreword



Assoc. Prof. Yani Garcia
Director

Welcome to the June edition of the DRF Newsletter!

We have an exciting issue full of interesting news about FutureDairy work and the program of the 2009 Symposium which will be held at Camden Campus on 16th

and 17th September.

This year the theme is **Feeding for the Future** and we have a range of high quality speakers including 3 international speakers from USA, Argentina and NZ.

The industry continues to face very challenging times particularly in the south eastern States. The vast majority of dairy farmers in Victoria have no certainty of the base milk price for the new season as no official announcements have been made during June. Unfortunately the opening price is envisaged to be

below 30 cents per litre. There is little doubt this price is not sustainable, particularly given the current climatic situation in northern Victoria.

The situation in Queensland and most of NSW (with the exception of the Riverina) is a bit better although the uncertainty in relation to future milk prices is growing rapidly.

We hope you enjoy this Newsletter and continue supporting the Foundation. Don't forget to register for the exciting 2009 Symposium early!
Y.G.

From the President

An important piece of information for local farmers is the Government funding for the recovery of the Nepean River. In a nutshell, there will be up to \$15m available for projects aimed at reducing nutrient contamination, water consumption, or both.

This is a unique opportunity for farmers to

receive support to help upgrade irrigation systems or improve infrastructure!

The Foundation's most important event of the year is coming up very quickly. Below is all the latest Symposium information and has a link to the website for our new online registration form. Please show your support for the DRF by

attending and also gain an insight into the latest information from researchers worldwide.
B. I.



Mr Bill Inglis, President

2009 Dairy Research Foundation Symposium



The new Liz Kernohan Conference Centre is located at the University's Camden Campus and will be the venue for this year's DRF Symposium

For more info or to register online - follow link

A number of exciting changes have been implemented for the Symposium this year. One of which will be the venue. We are holding this year's event at the University of Sydney's new Liz Kernohan Conference Centre at Camden on **Wednesday 16th and Thursday 17th September**.

The new Conference centre is a fantastic venue named after the late **Liz Kernohan**, former Director of the DRF and who made an enormous contribution to Dairy Science.

The Symposium theme this year is '**Feeding for the Future**'. The program includes a variety of technical sessions, the Annual Dinner and a farm visit amongst other items. The Annual Dinner is also the forum for presenting the **Milk Marketing NSW Dairy Science Award** and

a great networking opportunity.

The four main technical sessions of the symposium are as follows:

Feeding for maximum dry matter intake

This session features Dr **Fernando Bargo**, from Elanco in South America and **Santiago Farina** from the FutureDairy project.

Feeding for maximum profit

Speakers within this session include **Joanne Bills** from Dairy Australia and **Basil Doonan**, a private consultant from Tasmania.

Feeding and reproduction

A highlight of this session will be Professor **John McNamara** from Washington State University and the University of Sydney's, Associate

Professor **John House**.

Feeding in the future

Featured in this session is Associate Professor **Ian Yule** from Massey University, New Zealand, Dr **Kendra Kerrisk** from the FutureDairy project and **Mark Billing** a farmer from Victoria.

The Young Scientists session has become a tradition of our Annual Symposium and this comprises short presentations by a dozen young scientists. Both students and farmers are given the opportunity to interact more directly through this.

Another new feature this year will be a 'workshop' session in which the attendees will have the opportunity to meet in small groups to discuss key points, messages and issues in relation to what was presented in the technical sessions.

Diary dates

The Dairy Research Foundation Newsletter is published in February, June and October

The 2009 DRF Annual Symposium is to be held Wednesday 16th and Thursday 17th September at the new Liz Kernohan Conference Centre

The Dairy Research Foundation is on the Web! www.vetsci.usyd.edu.au (find under 'quicklinks')

The FutureDairy website can be located at www.futuredairy.com.au

FutureDairy 2 update

Precision Farming

AMS Progress

The Camden AMS site is currently closed for public access whilst the facility is being upgraded. The facility upgrade includes the installation of a new prototype AMS. The closure period will cover the time taken to install the new technology, modify and reconstruct the dairy layout, test the technology and train addition cows to the system. The new prototype is being developed for voluntary and distributed milking under Australian conditions and is an evolution from current AMS units that the new prototype will milk many more cows than the current AMS technology. The new prototype is being developed by DeLaval.

FutureDairy involvement has been limited to date to consultations with DeLaval with regard to the functionality of the new concept. Data from the Camden AMS research farm has contributed to DeLaval's understanding of AMS in an Australian (pasture-based) environment with particular reference to potential throughput, cow traffic and animal behaviour. FutureDairy will carry out on-farm testing of the new prototype with a herd of cows to determine the feasibility, applications and impacts of the new technology.

Meanwhile the current AMS technology continues to milk the herd throughout the day and night with milking as a background operation and farm systems research continuing with limited disruptions.



Cow getting milked voluntarily in a VMS at EMAI

AMS Management Guidelines

A total of 7.5 years experience with pasture-based AMS has provided Dr Kendra Kerrisk with a wealth of knowledge around the farm system that sits around the AMS. Kendra has developed a comprehensive set of management guidelines that will be made available to the industry within the next three months.

The guidelines cover many different aspects of farm management that require consideration if/when an AMS is adopted. Some topics covered in the guidelines include:

- Fair expectations and planning for a successful start-up
- Labour and lifestyle impacts
- Production benefits
- Farm and dairy layout
- Incentive management
- Machine utilisation & Milking frequency
- Training cows and heifers
- Oestrus and Mastitis detection

and management

- Realities and impacts of AMS.

In the future milking will become a background operation and will no longer dictate the start and finish times of the day but the system will impact on many other aspects of the farm operations. It is extremely important that farmers are knowledgeable and have appropriate expectations of the technology.

To help support early adopters and people contemplating adopting AMS we have also recently set up an email based AMS discussion group. The purpose of the discussion group is to allow farmers to extract information from researchers, industry reps, manufacturers and other farmers with regard to all aspects of AMS. We also see this as a important forum to allow farmers to learn from each others experiences which greatly increase the level of industry knowledge as the number of farmers adopting AMS increases.

It may be of interest to note that over the past two months we have seen three new AMS farms be commissioned. These are located in Western Districts of Victoria, North Victoria and Far North Queensland. People interested in joining the discussion group should send a request for registration to the **FutureDairy Google Group** by email to Darold Klindworth at or Kendra Kerrisk at the below email addresses.

darold.klindworth@dpi.vic.gov.au

kendrad@usyd.edu.au



FutureDairy 2 update

Feedbase

The FutureDairy 2 Feedbase program is structured in three major areas of work: Modelling, Field Research and Activities on commercial farms. The three areas are interrelated to address the challenge of increasing productivity from increased use of home-grown feed.

The drivers of the specific activities are the major issues raised by dairy farmers in relation to technology adoption,

as follow:

Nutrient utilisation: Nitrogen and water interactions.

Forage crop feeding and utilisation: forage options; quality; animal preference; nutritional impact of CFR; animal performance.

Flexibility in CFR/CFS management: CFS strategy; forage planning; crop management; feeding strategies in CFS; concentrate level.

Commercial application proof: real data from commercial farms: forage planning and CFR application on farm.

The topics 1, 2 and 3 are being addressed by a combination of Modelling and Field research work at Camden. The commercial application proof requires working together with farmers in key target regions where the potential for adoption of this technology is the greatest.

Modelling update

As reported in the previous edition of this Newsletter, we are testing the capability of existing simulation tools to predict the behaviour and impact of implementing Complementary Forage Rotations in pasture-based dairy systems.

The CSIRO simulation model APSIM appears as a promising tool to simulate complex forage rotations.

Dr Rafiq Islam used the model to test maize response to Nitrogen against real data obtained

from field research (plots) conducted at Mayfarm in 2009. The APSIM modelled the trend and relative responses to increasing levels of N well, but the absolute forage yields were much lower than actually obtained in the plots.

Field research: Corstorphine

The second year of the Whole Farm Study which is testing the potential of milk from home grown feed has finalised with a milk production of 35,900 L/ha using only 1,370 Kg concentrate/cow/year.

The CFR area yielded 35.6 t DM/ha in this second year, which came from 11.4 t from the combination of winter grazable forages (Brassica/Clover) and 24.2 t from the maize cut for silage.

It is of importance to determine if this intensive farm system could be causing a greater impact on the environment and some specific studies are

being carried out to bring more light on this issue.

Preliminary evaluations are showing that, in terms of Nitrogen Balance, the CFS system has a lower potential risk than a pasture only system that uses the same amount of N fertilizer (380 kg/ha/yr). This is because a proportion of the feed produced in the CFS farm comes from legumes, therefore reducing the need for N fertilizer use.

This was possibly due to the use of a combination of CFR (35% of the farm area) and Pasture (65% of the farm area).



Please send us your feedback before the next Newsletter which is due to be distributed in October 2009

**Corstorphine Dairy:
milk production of
35,900 L/ha
achieved using
only 1,370 Kg
concentrate/cow/
year**



Cows grazing pasture at Corstorphine Dairy

FutureDairy 2 update

Feedbase (cont')

On-farm activities

Two key regions have been identified based on their relatively strong reliance on irrigation: the Hunter Valley in NSW and the Northern Victoria region in Victoria (with potential links to southern Riverina).

A new project between FutureDairy and NSW DPI is being launched in the Hunter Valley. Project leader Assoc. Prof. Yani Garcia met with DPI NSW Extension staff (Kerry Kempton, Anthea Young, Michael Ison and Neil Griffiths) at

Tocal in June to fine tune project commencement.

The project will involve monitoring of farms that use complementary forages in some way to increase productivity. It comprises 6 commercial farms in the Hunter Valley, 3 close to Tocal and 3 in the Upper Hunter (Denman).

FutureDairy will resource the fortnightly monitoring on farm as well as assist in the initial planning of forage utilisation. All

farmers and technical person involved will visit FutureDairy at Camden in July.

Another project is being developed in Northern Victoria in collaboration with Murray Dairy, DPI Vic researchers (Tatura RS) and potentially the Victorian-based project 3030.

The project will include a new PhD program to evaluate issues of technology adoption in commercial farms.



**For further
information please
contact us on 02 9351
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or by emailing us at
vetdrf@usyd.edu.au**



Camden campus postal address

The postal address for the University's Camden Campus has been changed by Australia Post. All mail will be redirected to address for a period of 12 months.

Our new postal address is:

**Dairy Research
Foundation
PMB 4003
Narellan NSW 2567**

Staff, Students and Visitors

In July we have an occupational trainee coming to work with us for 5 months from France.

Fabian Pyra is an Agricultural Engineer Student at the Institut Polytech-

nique LaSalle Beauvais and will be here to increase his skills in the development and execution of research activities.

There is the possibility of other trainees from

France and the Netherlands spending time with us later in the year.

This is a great indication of our growing reputation worldwide.

***New project
between
FutureDairy
and
NSW DPI
being launched***

Do you have a question?
Please contact the Dairy Research Foundation at:

02 9351 1631

or us at:

vetdrf@usyd.edu.au

FutureDairy 2 update (cont)

Intercropping maize with forage rape

Although some crops such as cereals and sugar beet leave little mineral nitrogen (N) in the soil after harvest, other crops such as maize, some vegetable crops and legumes either leave some N or leave residues that release N during autumn-winter periods. Intercropping may be a useful way to use this residual N and potentially reduce nutrient pollution from farming while maintaining high forage yields.

The legumes in particular can leave substantial amount of N for the following crop. The N fixation ca-

pability of soybean increases to a maximum level as leaf nodes develop; remains at maximum rate until flowering and then declines to practically nothing by the end of grain filling stage. Thus, when soybean or legumes are harvested at flowering, more N may become available in the soil via decomposition of residues and nodules in the soil which can be used by the next crop.

There is a potential to use this residual N if autumn forage crops are grown after harvesting maize or legumes in late summer. Autumn and winter seasons are particularly critical for Australian dairy farmers as pasture availability is limited. Farm-



Assoc. Prof. Yani Garcia shows the intercrop of forage rape and maize in early autumn.



Staff and students involved in the feed-base research at FutureDairy

ers use brought-in feed to sustain milk production during this period with the consequent increase in production cost.

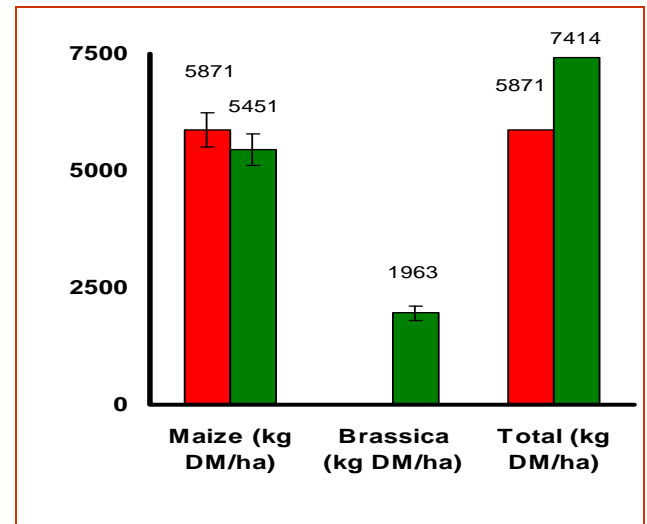


Fig 1. Biomass yield of sole maize and maize-brassicas (forage rape) combination

The FutureDairy project is investigating forage options for farmers during this critical period as well as way to increase the efficiency of use of N and water. One study conducted by research fellow Dr Rafiq Islam is looking at intercropping as a way to increase both forage yield in early autumn and N capture from the soil.

Maize was sown both as a sole crop and intercropped with forage rape in late February using 100 kg N/ha for the sole maize crop plus 70 kg N/ha for the forage rape. The plots were harvested 60 days after sowing (April 20th) with a forage yield of 7,400 kg DM/ha for the maize crop intercropped with forage rape (see photo) and 5,900 kg DM/ha for the maize only (Fig 1).

The regrowth of the forage rape was harvested again in late June with forage yields exceeding 4 t DM/ha (data not yet available). This means that the plots are well on track to achieve over 15 t DM/ha before the maize is planted in October!

Investors in the FutureDairy Project



FutureDairy 2 update (cont)

Nitrogen Use Efficiency of Maize in Complementary Forage Rotation

FutureDairy has achieved over 40 t DM/ha through a complementary forage rotation (CFR) using a high levels of N fertiliser (~600 kg/ha/year). While this high

environment– a sustainability issue. Our CFR concept would be more appealing to farmers and therefore become a more attractive option if a) the efficiency of production could be increased by using less N/ha and/or; b) environmental risks were minimised.

Although N management is

maize (most work done on grain). Moreover, there is no information in the literature on N management of triple crop CFR's.

To properly address the above issues a full range of N input in 3-crop CFR comprising maize, forage rape and a legume was used. This CFR has proven to be extremely productive as a standalone forage

for early-sown crops and from 3 November 2008 to 2 March 2009 for late-sown crops. Pre-sown N was applied as urea at 0 or 135 kg/ha followed by 0, 79 or 158 kg N/ha applied at V6 (6 leaf stage) for both pre-sown N treatment.

The response to increased level of N at V6 was almost always higher when of pre-sown fertiliser (135 kg

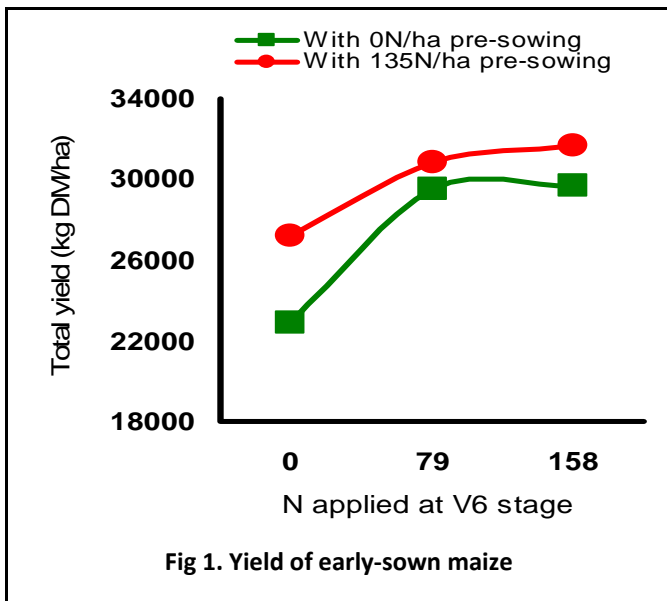


Fig 1. Yield of early-sown maize



N deficient crop (right)

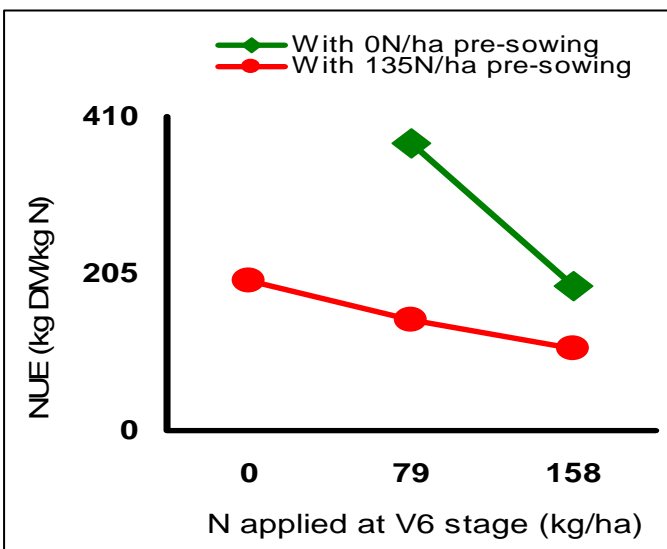


Fig 2. Nitrogen use efficiency of early-sown maize

rate of N may lead to highest forage production, it can also impact on both cost of production - an economic issue, and the

an extensively researched issue in agriculture, there are limited works on this aspect in relation to forage

rotation and also feasible in a complementary forage system (CFS = CFR + pasture).

The aim of the study led by Dr Rafiq Islam was to quantify N response curves both within each crop in the CFR and between crops within the CFR (residual effects), but only the results of our first crop maize has been included here. Maize was grown at Mayfarm site (see photos) from 20 October 2008 to 16 February 2009

N/ha) had been applied (Fig 1). This yield response to N was higher in late planted maize than early-planted maize. The response seems to flat at ~80 kg N/ha applied at V6.

Nitrogen use efficiency (NUE) falls sharply from ~400 kg to ~200 kg DM/kg N when increased levels of fertiliser N were applied at V6, for both early and late sown maize (Fig 2).

FutureDairy 2 update (cont')

But the rate of decrease in efficiency to increase level of N was also lower. Applying 135 kg N pre-sowing plus ~80 kg at V6 resulted in between ~8 and ~11 t DM/ha for early and late-sown maize, respectively (Fig 3).

The results highlight the importance of applying N both before and after sowing. This is in accordance with Future-

Dairy management guidelines.

If the early sown (Oct 20) maize fails for any reason, biomass yield of maize would not be affected if re-sown within 15 days (i.e. 3 Nov). However, how this affects the following crop remains to be seen.

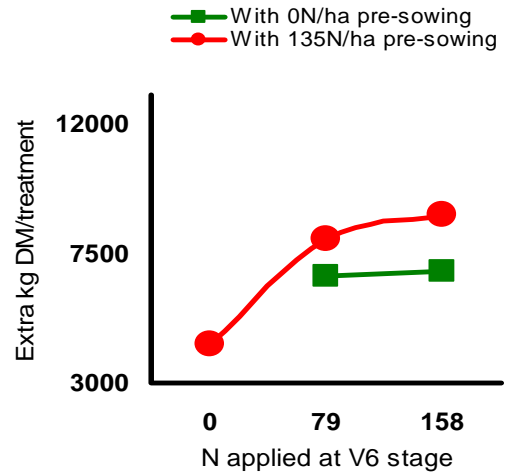


Fig 3. Marginal yield increase (kg DM/treatment) in early-sown maize

Forage Preferences by dairy cows

In the previous DRF Newsletter Dr. Ajantha Horadagoda summarised data from her study on forage legume preferences by grazing cows.

In this trial 3 legumes (cow peas, soybean and lablab) were compared. The pie graph (Fig 1.) indicates the cow preferences. Soybean was the most preferred (65%) when compared to cowpeas (18%) and lablab (17%).

indicate how the cows first grazed the soybean leaving cow peas and lablab. However, when soybean was over they grazed the rest very well.

The soybean variety used was "Intrepid" from NSW, DPI at Narrabri, the sowing rate was 80kg/ha. Plots were fertilized with DAP (140kg/ha) prior to sowing. Soybean had a vigorous vegetative growth and gave dry matter yield around 5t/ha with in 8 - 9 weeks, also these legumes improved the soil fertility.

The average nutritive

The pictures below also

value of the three given below. First samples legumes which were harvested at weekly intervals were collected 5 weeks after sowing which was done on 08/12/2008.

Cow preference to forage legumes

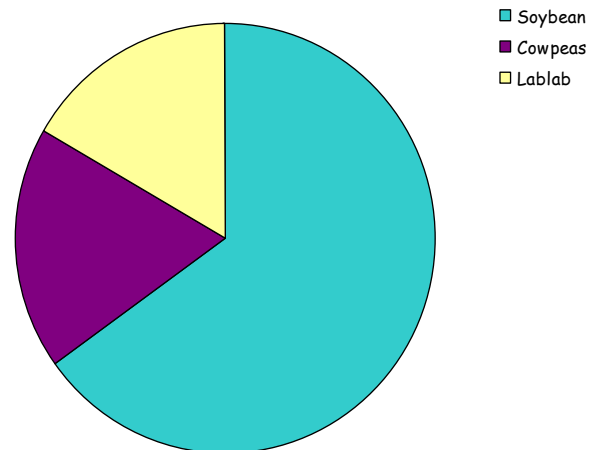


Fig 1. Relative forage preference (% of time spent grazing)



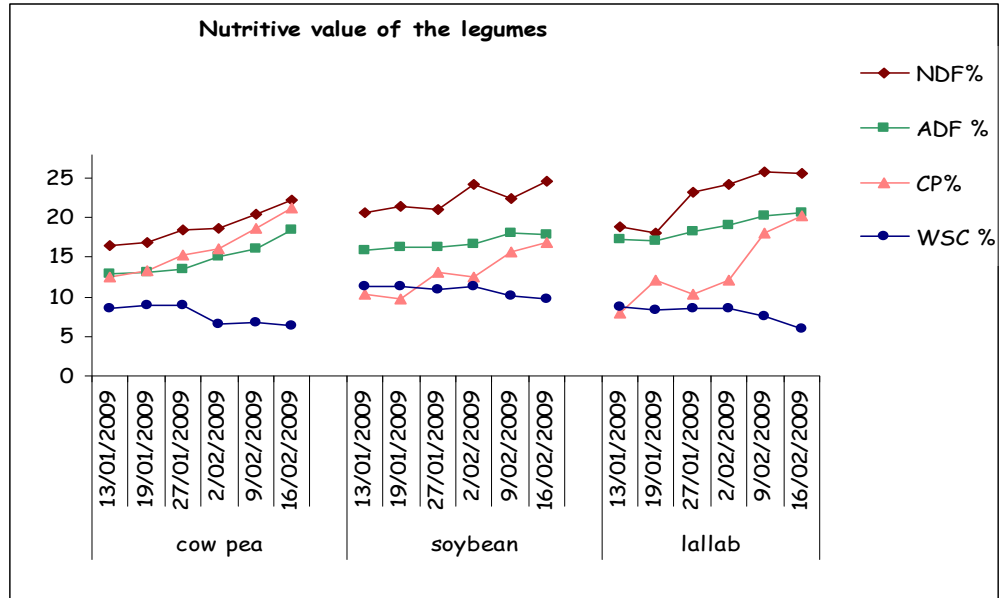
Cows grazing soybean



Soybean: a very palatable forage

Forage Preferences by dairy cows (cont')

Soybean had higher water soluble carbohydrates and lower nitrate-nitrogen which could have led to higher cow preference. Soybeans with the erect stems didn't get damaged much after the first grazing. However, lablab and cow peas lost more plants after grazing.



Feeding concentrate Flat vs. individual rate

The FutureDairy research team has found that it is possible to achieve higher milk production without increasing the amount of total concentrate fed each day. This was done by allocating feed individually rather than fixed rate feeding.

The study was conducted at EMAI under conditions of restricted access to pasture and maize silage, a

common occurrence on Australian dairy farms.

It compared two groups of cows which received the same total dry matter (DM) on offer each day. All cows in the fixed rate group received the same amount of concentrates, based on the average requirements of the herd (about 5kg pellets/cow/day).

Cows in the individual rate group were fed different amounts of concentrates, based on each individual cow's requirements. The amount fed was 2-7kg DM/

cow/day, with an average of 5kg DM/cow/day.

Cows in both groups grazed Lucerne, during the morning and were supplemented with different levels of maize silage to top up all cows to the same level of total daily dry matter offered.

The milk yield of the cows that received concentrates based on individual cow requirements was 9% higher than the cows fed a fixed rate. Individually fed cows produced 3% more milk and 7% more milk solids. There was no difference in milk protein yield.

The increase in production is significant, and has practical implications for dairy farmers.

When feed intake is not limited, milk production drives intake. That is, the higher producing cows eat more. However, when feed is restricted, the reverse is true – milk production will be determined by total amount of feed that each

cow eats. So cows in early lactation, particularly those with higher genetic potential for milk production tend to compensate for the reduced intake by using more body reserves.

For dairy farms where cows are fed silage for a limited time after the morning milking, and then moved to a paddock with restricted pasture availability, this means high yielding cows have little chance of eating more to compensate for their higher requirements.

Research results suggest a better approach would be to feed concentrates based on individual requirements and also ensure that cows have access to at least one other feed with less restrictions – either pasture or silage giving the higher producing cows the opportunity to eat more.



Yani Garcia checks cows grazing restricted amounts of pure Lucerne pasture at EMAI, NSW DPI.



Postgraduate Student updates

Santiago Farina is currently working on the evaluation of the use of either stocking rate or milk yield per cow to increase milk production/ha on a pasture based system. Below is an update of his research.

From the results of the Feeding Study conducted in EMAI N^o 9 Dairy (2006 to 2008) it was clear that stocking rate was the option that lead to a higher increase in milk production per ha with a more efficient use of supplementary feed. Increasing milk yield per cow, on the other hand did not lead to the expected lift in milk per ha, as the individual targets could not be reached.

The main factor explaining milk production was the variation in ME of the diet. The content of ME showed a particular effect during the summer months, when kikuyu was the dominant pasture species with typical lower ME and NDF values than the rest of the year.

Both during the summer and winter months it was the quality of pasture which had the strongest effect on the whole diet ME, regardless from the level of concentrates. This shows how important is to maintain a high pasture quality if a good response in milk is expected on a pasture based dairy.



PhD student Santiago Farina

For further details of this research please contact Santiago at sfarina@camden.usyd.edu.au.

Ravneet Jhaji is researching an important aspect of determining the efficiency of feed utilisation in grazing animals. That is, the accurate estimation of intake and diet composition.



PhD student Ravneet Kaur Jhaji

An experimental trial was conducted to check the accuracy of 'n-alkane technique' for estimating diet composition and intake, using sheep as a model. Animals were fed contrasting diets with different levels of three forages (ryegrass, lucerne hay and maize silage) and a concentrate (dairy pellets).

The study revealed a close association between actual and estimated data for both intake as well as diet composition, provided that faecal recovery rates of alkanes of actual data was used.

The technique had been used before but not to estimate proportion and total intake of complex diets on individual animals.

For further details of this research

please contact Ravneet at ravn8442@usyd.edu.au.

Daniel Dickeson finished 8 trials on pasture allocation in April this year and is currently in the process of putting his results together.

Daniel believes that there will be some very exciting information that will emerge from the trials. Information that will be of importance to both researchers and farmers.

The trial runs involved mapping out pasture grazing areas for both accurate and inaccurate pasture allocations. Voluntary movement of the cows was studied to see a comparison of the two allocations and to determine what works best. Pre and post grazing pasture measurements were done using a C-DAX pasture meter. Pasture samples were taken each day and night for pasture analysis to show similarities in pasture quality. All feed management and animal production data was recorded to see performance in the system for each allocation type.

For further details of this research please contact Daniel at daniel.d@usyd.edu.au.



Master student Daniel Dickeson

2009 Dairy Research Foundation Symposium

Feeding for the Future

Wednesday 16th and Thursday 17th September
Liz Kernohan Conference Centre, University of Sydney, Camden

Day 1	Wednesday 16 th September	Day 2	Thursday 17 th September
9.30- 10.00	Registration coffee/tea	8.00-8.30	Coffee and display
10.00-10.30	Welcome	8.30-10.00	Session 4: Feeding and reproduction
10.30-12.00	Session 1: Feeding for maximum DM intake	8.30-9.20	Latest advances in nutrition and reproduction <i>Prof. John McNamara, Washington State University, USA</i>
10.30-11.20	Maximising DM intake per cow in pasture-based systems <i>Dr Fernando Bargo, Elanco South America</i>	9.20-9.40	Feeding and reproduction in Australia <i>Assoc. Prof. John House, Director Livestock Research and Teaching Unit, USYD</i>
11.20-11.40	Maximising DM intake per ha in pasture-based systems <i>Santiago Farina, FutureDairy, USYD</i>	9.40-10.00	Successful reproduction in practice: a farmer's viewpoint
11.40-12.00	Maximising DM intake in practice: a farmer's viewpoint	10.00-10.30	Coffee break
12.00-13.00	Lunch	10.30-12.00	Session 5: Feeding in future systems
13.00-14.30	Session 2: Feeding for maximum profit	10.30-11.20	Technological innovations in future feeding systems <i>Assoc. Prof Ian Yule, Massey University, New Zealand</i>
13.00-13.35	The context to maximise the business: Dairy industry and Market overview <i>Joanne Bills, Dairy Australia</i>	11.20-11.40	Feeding in voluntary milking systems <i>Dr Kendra Kerrisk, FutureDairy, USYD</i>
13.35-14.10	Understanding how feeding decisions impact on profitability <i>Basil Doonan, Dairy System consultant, Tasmania</i>	11.40-12.00	Practical aspects of feeding planning: a farmer's viewpoint <i>Mark Billing, 'Craigends', Larpent, Vic.</i>
14.10-14.30	Feeding for profit: a farmer's viewpoint	12.00-12.45	Lunch
14.30-15.00	Coffee break	12.45-14.15	Session 6: Workshop
15.00-16.30	Session 3: Young Scientists 5 min presentations by 8 young dairy scientists from Australia and 4 young dairy scientists from Italy		Discussion groups, General discussion and conclusions
19.00	Symposium Dinner <i>Gledswood Homestead, Catherine Fields, Camden</i>	14.15-16.30	Session 7: Practical aspects of feeding high production dairy cows in a feed-lot system Farm visit to Leppington Pastoral Company (Intensive feed-lot operation with >2,000 cows)

DAIRY RESEARCH FOUNDATION



1959 - 2009

**Celebrating 50 years of service
to the Dairy Industry**