



# Focus Day

LINCOLN UNIVERSITY DAIRY FARM

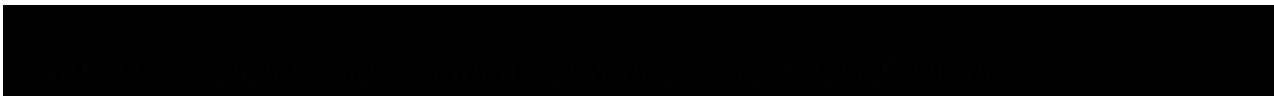
## Information Handout

### 3<sup>rd</sup> February 2005

For further information visit: [www.siddc.org.nz](http://www.siddc.org.nz)

or

Contact: Corrigan Sowman  
Dexcel Consulting Officer – Canterbury  
Ph: 027 499 9024



## LUDF Production Summary

Production & Financial Targets for this season (at \$4.00 payout)

	LUDF	My Farm
MS/ha	1750	
MS/cow	434	
F.W.E	\$2.35	
E.F.S	\$2530	
R.O.A (cash)	6.2%	

Annual Nitrogen Fertilizer use

	LUDF	My Farm
Fertilizer	200 kg N/ ha	
% Of farm to which nitrification inhibitor applied	50%	

**Summary to 31 Jan 05**

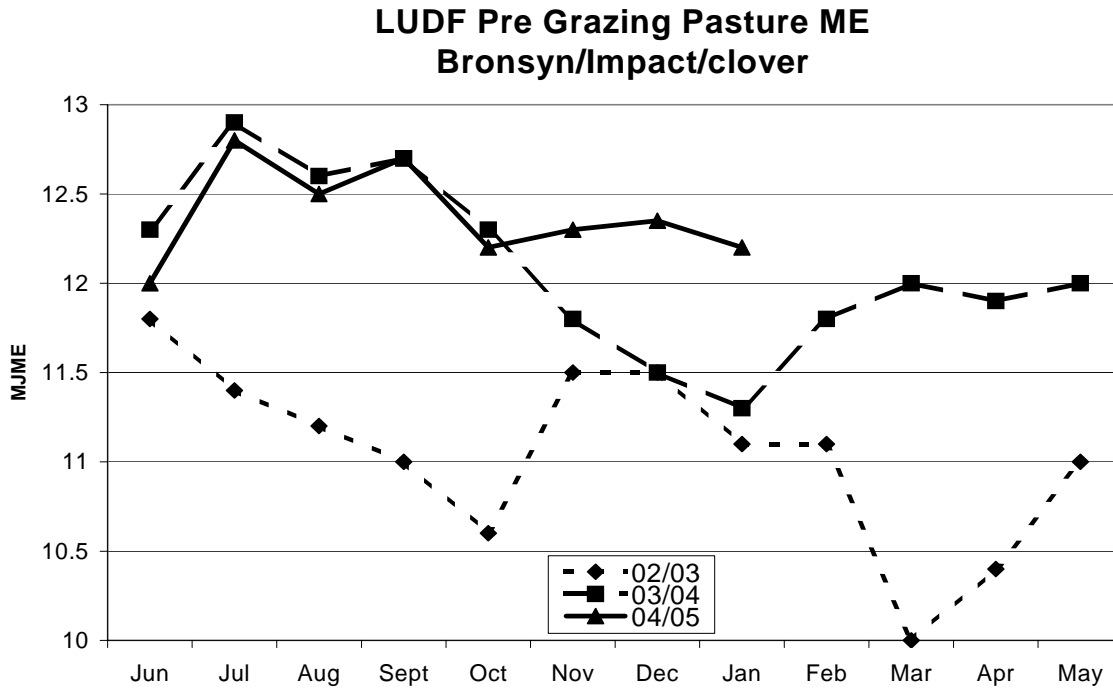
	LUDF 03/04	LUDF 04/05	My Farm
Cows to calve 1 June	667	675	
Max No cows in the vat	635	651	
Max No Cows milked	644	651	
Cows milked in vat 31 Jan	605	644	
Max No cows milked / ha	4	4	
MS / Cow	279	281	
MS / ha	1116	1134	
Kgs of N applied /ha	133	116	
Pasture grown to date/ha	13.2t	12.0t	
Cow grazing days wintered on	8400	9800	
Supplements fed /cow	131	88.4	
Supplements fed /ha	524	353.6	
Silage made on Dairy Platform kg DM /cow	85	232	
Ha harvested for silage	37 ha	95 ha	
Silage made on Dairy Platform kg DM /ha	340	929	
Area re-grassed (ha)	15	10	

**MS/ha to 11 Nov –2.5% behind last year**

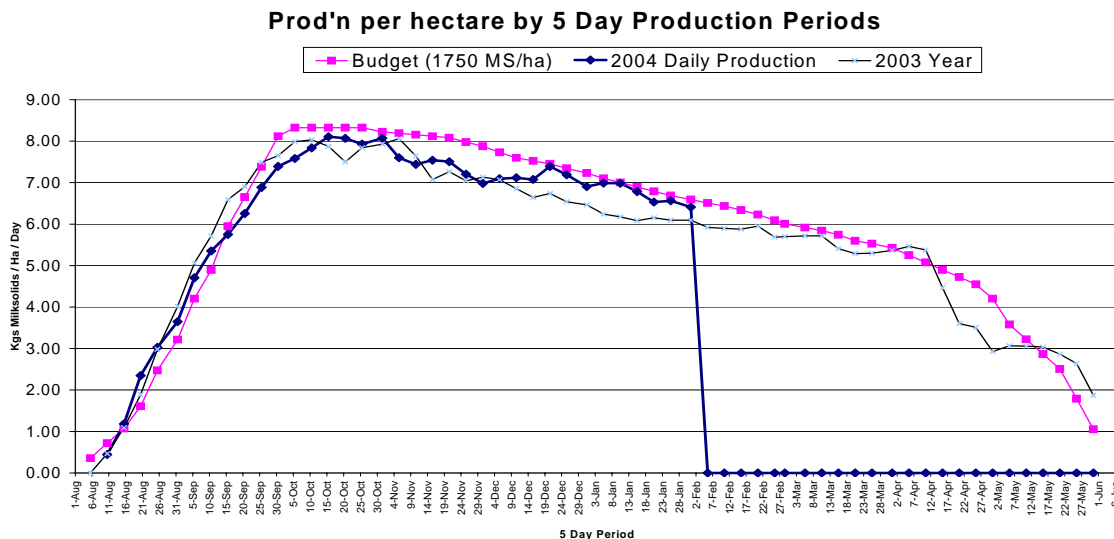
**MS /ha to 31 Jan 1.6% ahead of last year.**

Current daily production 1.62 MS / cow and 6.5 MS /ha (compared with 1.60 MS/cow and 6.0 MS/ha.

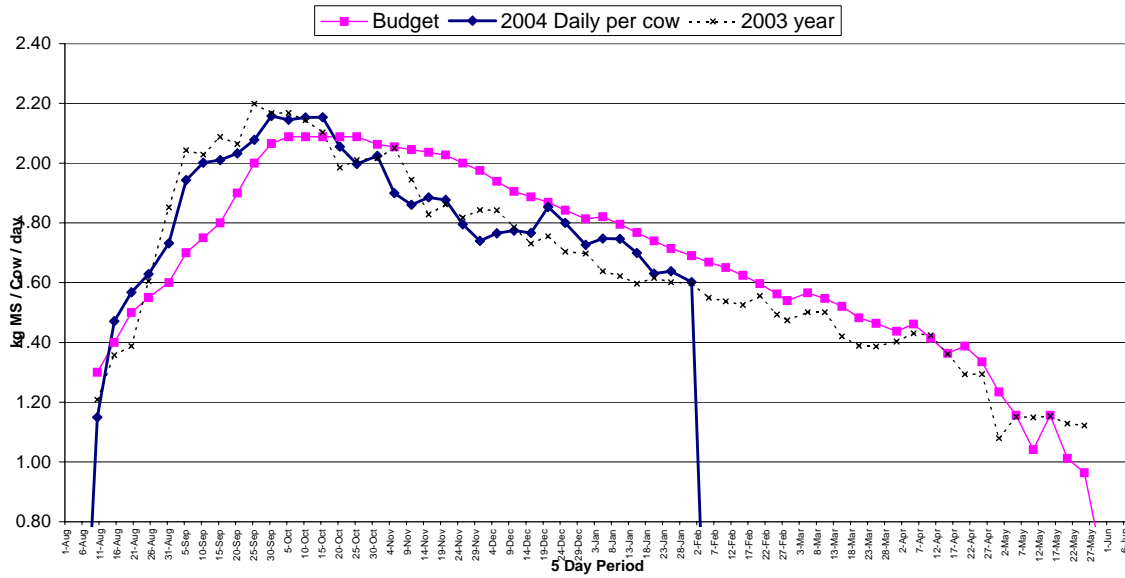
**Production: driven by Pasture Quality plus cow numbers**



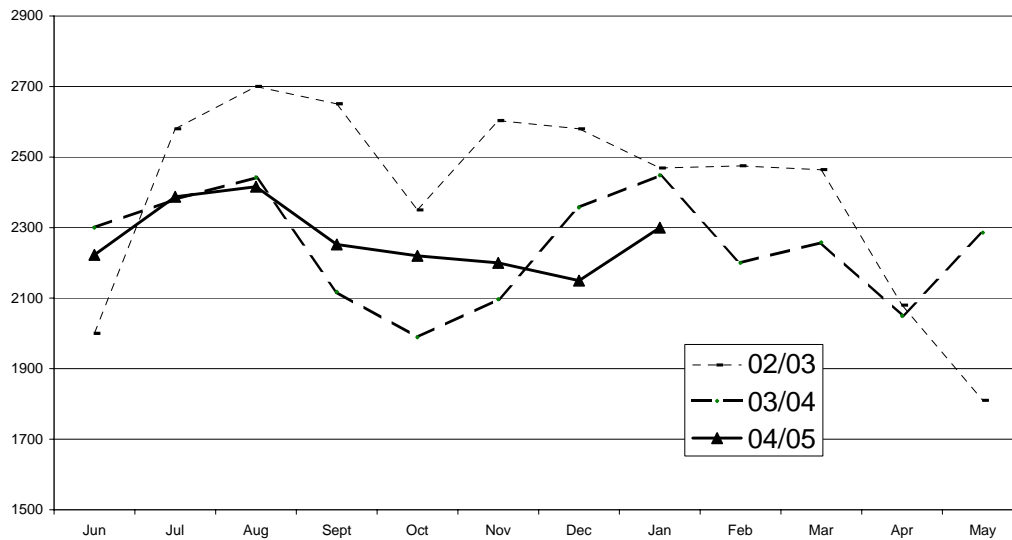
The major improvement has been that ME levels have remained above 12. This has been achieved by continuing to focus on residuals and by harvesting any pasture surpluses within a week of when they would normally be grazed.



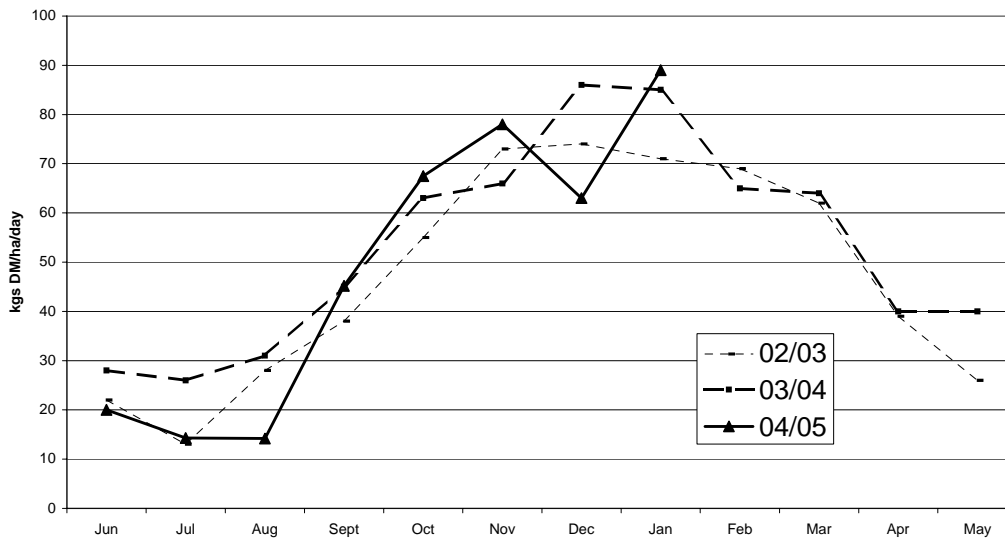
### Kg MS Production / Cow / Day 2004-2005 Season



### LUDF Average Pasture Cover



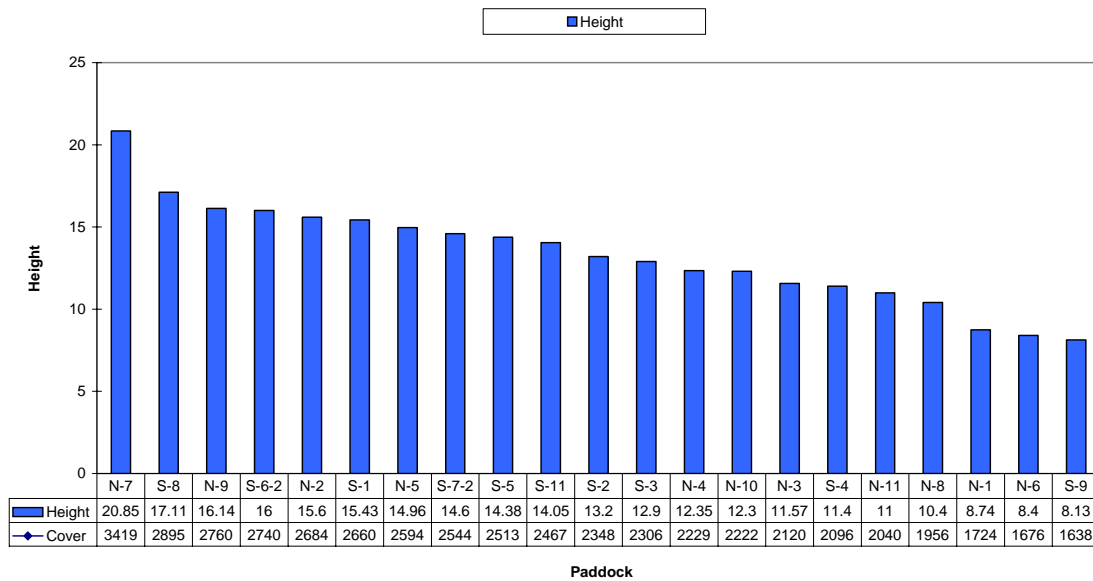
## LUDF Pasture Growth



## Current Feed Wedge

Farm Feed Wedge - Week Starting

31-Jan-05



Current pre-grazing cover is a height of 20 (or 3300 kgs DM/ha). This is required because of there only being 152 ha in the milking round ( 9.5 ha out for re-grassing) and we still have 4 cows/ha. Currently we are allocating 7.6 ha per day, nominally a 20 day round with the aim to be on 23 days by the end of the month.

Supplement in the form of grass silage is being put in to allow us to continue to milk all the cows we currently have and to allow us to increase the round length by the end of the month. We have large reserves of supplement, which need to be consumed, and currently only 85 kgs/N/ha left to use this season. Applications of N will begin again in late February.

***Are 8 clicks “close enough” when the target residual is 7?***

1 click = 140 kgs DM/ha (using  $x140 + 500$  equation)

We are currently allocating 7.6 ha/day

140 kgs x 7.6ha = 1064 kgs of DM not eaten from the paddock.

1064 kgs DM / 644 cows = 1.65 kgs DM/cow of lost intake or 5.5 bales of silage that do not have to be fed.

8 “clicks” now becomes the residual down to which the cow will graze. If the pre-grazing cover is 20 “clicks” (or 3300 kgs DM/ha) the available feed will be lowered by 140 kgsDM/ha and the cows will be under fed by 1.65 kgs/cow unless this is replaced by supplement.

ANSWER – **NO!**

***Initial Mating Results (scanned on 27 Jan)***

195 Empty from 651 cows tested

Pregnancy Rate = 70% at end of eight weeks

First round ovsynch – 29 empty out of 102

Pregnancy Rate = 72%

Compared with

453 other cows were inseminated in the first 3 weeks of which 138 still not in-calf after 8 weeks. Pregnancy rate for this group after 8 weeks is 69.5%.

Full analysis of results at May Focus day.

**The challenges for the next 4 months are:**

- 1) To maintain the current cow numbers for as long as possible.
- 2) To address the pasture residual issues resulting from height of cutting when made into silage.
- 3) Feeding out the supplement with out losing the benefits of the extra feed through losses due to utilization or substitution.
- 4) To get the best results from the last 85 kg N still to be applied
- 5) To set the farm up for an even better season next year.

# Re-designing Soil Nitrogen Management to stop the leaks. What results are emerging from eco-n research?

Keith Cameron, Hong J Di, Jim Moir, Richard Christie and Ron Pellow  
Centre for Soil and Environmental Quality, Lincoln University and  
Ravensdown Fertiliser Co-operative Ltd.

The recent report by the New Zealand Parliamentary Commissioner for the Environment, called "Growing for Good", examined the impacts that the intensification of farming is having on the New Zealand environment. The report highlighted the adverse impacts that nitrate leaching can have on water quality and called for a 're-designing for sustainability' of New Zealand farming in order to reduce these impacts and achieve more sustainable farming systems.

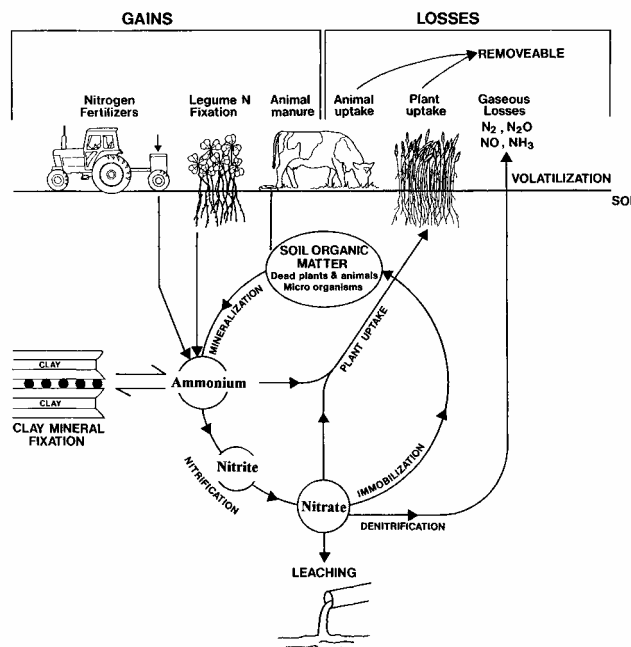
The development of 'eco-n' technology by Lincoln University and Ravensdown Fertiliser Co-operative Ltd is a significant step towards 're-designing for sustainability' as it improves the efficiency of the nitrogen cycle, reduces the environmental impacts of dairy farming and at the same time increases farm productivity. Eco-n enables us to progress from simply applying more nitrogen fertiliser to meet plant demand, to developing new ways of improving the efficiency of the soil nitrogen cycle by reducing the 'leaks' from the soil.

Our research results show that *eco-n* can:

- Increase spring pasture production by 20 per cent
- Increase annual pasture production by 15 per cent per year.
- Reduce nitrate leaching by 60 per cent
- Reduce cation leaching by 50 per cent
- Reduce nitrous oxide emissions (a potent greenhouse gas) by 75 per cent.

## ***Nitrogen Losses from Grazed Pasture***

Nitrate nitrogen and nitrous oxide are the most environmentally significant losses of nitrogen in grazed pasture. 90% of nitrate leaching comes from the urine patch, and 75% of agricultural nitrous oxide emitted in New Zealand is directly or indirectly linked to urine patches.



**Figure 1.** The nitrogen cycle in grazed pasture systems (from McLaren and Cameron, 1996).

### ***The role of eco-n in grazed pastures***

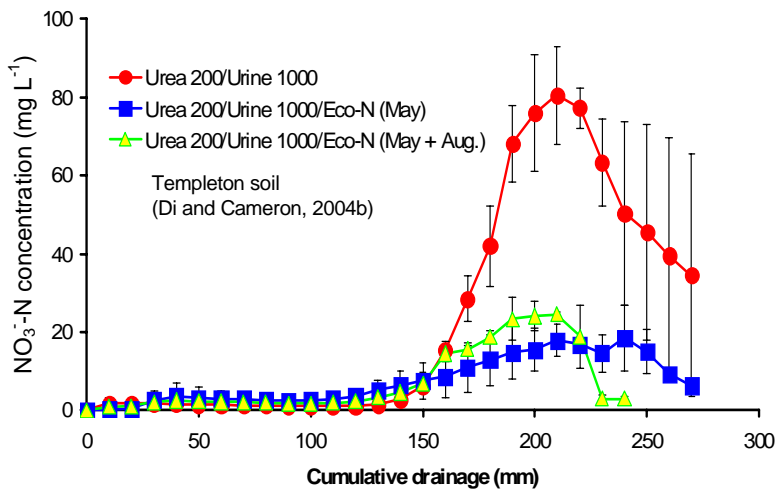
Eco-n slows the nitrification process by reducing the activity of the Nitrosomonas bacteria that convert ammonium into nitrate. This results in more plant available ammonium in the soil, and less leach-able nitrate nitrogen (Figure 1).

The development of eco-n has enabled the application of a nitrification inhibitor to the entire surface area of grazed pasture, slowing the conversion of ammonium to nitrate and thus reducing the concentration and amount of nitrate nitrogen in the soil solution. This also leads to a reduction in the conversion of nitrate to nitrous oxide.

### **Reduced Nitrate Leaching Losses**

Our published research shows that eco-n can reduce nitrate-leaching losses by 60% (Figure 2). This means that there is more nitrogen retained in the soil for plant use and less risk of water pollution.

**Figure 2.** Eco-n reduces nitrate leaching (Di and Cameron 2004).



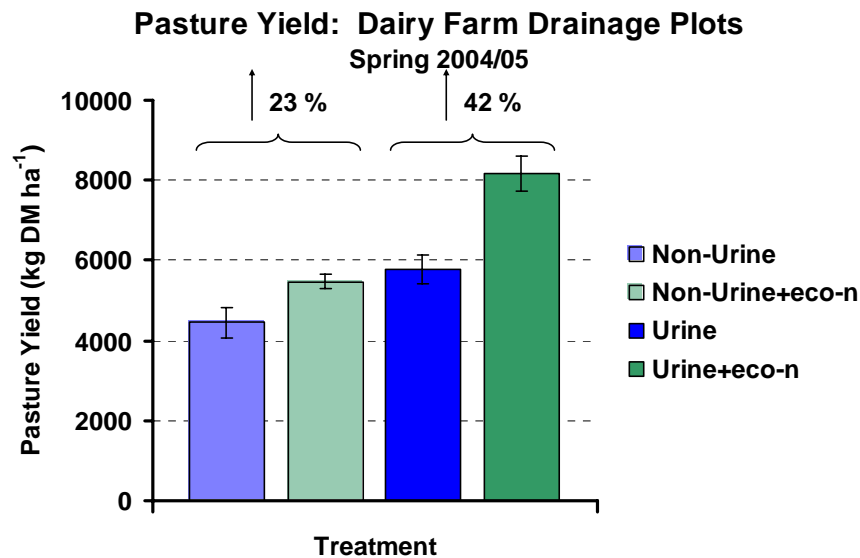
### **Increased Annual Pasture Production**

Pasture yield increases occur because of the reduction in N losses and subsequent increase in plant-available nitrogen in the soil. Whole paddock measurements under dairy grazing suggest annual production lifts of 10% to 15% are likely to occur.

### **Increased Spring Production**

Plant responses in the spring have been very significant; with increases of over 20% being recorded on the Lincoln University dairy farm pasture plots (Fig 3). Increased pasture production is being achieved between urine patches as well as from within the urine patches. This extra growth in the spring is particularly valuable.





**Figure 3.** Spring pasture response to 'eco-n' applied in May and August.

### Pasture Quality

The application of eco-n to grazed pasture has had no effect on pasture quality, with no significant variation in the concentration of calcium, magnesium, or potassium, and no effect on crude protein or metabolisable energy. As expected, there is some variation between urine patches and non-urine patches, but these do not change with the application of eco-n.

### Cost effectiveness of eco-n

The application of eco-n in the autumn and again in the spring can reduce nitrogen losses and increase pasture production. The additional feed produced with eco-n can be compared to the cost of purchasing feed, the cost of growing additional feed (typically with urea) or the value gained by converting additional feed into milk production (Table 1).

**Table 1.** Comparative cost of additional feed sources

Source of additional feed	Cost per kg DM
ECO-n (used as recommended in autumn and winter)	6-10 cents/ kg DM
Urea	10-15 cents / kg DM
Bought in feed	15-20 cents / kg DM

Converting additional feed produced with eco-n directly into milk production is the most efficient means of harvesting and valuing the additional feed. At a payout of \$4.00 / kg milksolids, and a typical conversion ratio of 15 kilograms dry matter per kilogram milksolids, a 10% increase in pasture production provides an additional \$223 / hectare net income (Table 2).

**Table 2.** Return on investment with eco-n at 10% and 15% increased pasture production<sup>1</sup>

	Return with 10% increase in Pasture Production	Return with 15% increase in Pasture Production
Increased pasture production	1300 kg DM /ha/yr	1950 kg DM/ha/yr
Additional Milksolids	87 kg MS/ha/yr	130 kg MS/ha/yr
Total gross return	\$347 /ha/yr	\$520 /ha/yr
<b>Net return</b>	<b>\$223 /ha/yr</b>	<b>\$396 /ha/yr</b>
Return on investment	179%	319%

Note:<sup>1</sup> (Based on current production of 13,000kgDM/ha/year and \$4.00 / kg MS)

## ***Eco-n vs. Urea***

Dairy farmers who produce around 13,000–15,000 kg DM hectare a year and apply *eco-n* can expect increased pasture production. Higher N users (at around 200 kg/ha) and who produce very high pasture yields such as 18,000 kg DM hectare a year should be able to apply *eco-n*, reduce their N inputs, and still have similar levels of pasture production.

### **When should *eco-n* be applied?**

*Eco-n* should be applied to recently grazed (short) pasture where it can more quickly get into the soil, and receive 10 mm of rainfall or irrigation soon after application to wash it into the soil. Treat in a similar manner to fertiliser by not applying while stock is in the paddock and allowing it to be washed in before regrazing. It is unlikely to have any effect on animals if grazed after application, but its effectiveness will be reduced if it does not reach the soil.

Application in fine particle suspension form is necessary because it is vital to ensure even coverage of the whole grazed pasture soil area. Timing is very important. The April/May application covers the high-risk leaching period over winter, while the August/September dressing ensures coverage through spring. The product is not persistent over long periods, however three to four months of protection per application is achieved.

Ravensdown closely manages the application of *eco-n* through the use of approved spray applicators that can provide proof of placement. This means that the product is sold on a per hectare applied cost basis. Taking this approach allows Ravensdown to ensure that *eco-n* is applied appropriately (at the right rate and time) and on farm types where it will be economically effective. The accurate recording of where all product is applied also allows further studies on a regional and national basis in relation to the environmental benefits, particularly for greenhouse gas inventory calculations.

### **Conclusions**

The development of *eco-n* enables farmers to improve the efficiency of the soil nitrogen cycle, reduce the environmental impacts of dairy farming and at the same time increase farm productivity and profitability. *Eco-n* represents a significant step towards 'redesigning NZ farming systems for sustainability', as requested by the NZ Parliamentary Commissioner for the Environment.

*References are available by calling the Ravensdown Customer Centre, 0800 100 123.*



## **Increase Pasture Production By Reducing Nitrogen Losses**

**For more information, or to order *eco-n* for your farm,  
please call the Ravensdown Customer Centre 0800 100 123.**

# IRRIGATION – SYSTEM, MANAGEMENT AND FUTURE IMPROVEMENT, LINCOLN UNIVERSITY DAIRY FARM

## THE SYSTEM

### (a) South Block

- Well 300mm, 93m deep, static water level 1.5m bgl
- Pump 100kW, variable speed control
- Supplies centre pivot, long laterals, orchards, BHU
- Flow Rate 51.4 l/s

### (b) North Block

- Well 300mm, 89m deep, static water level 4m bgl
- Pump 68kW, soft start
- Supplies centre pivot, long laterals, dairy, stock water
- Flow Rate 62.5 l/s

## IRRIGATION PERFORMANCE

South centre pivot has been evaluated as part of the SFF Project SFF 02-051 “On-Farm Irrigation Evaluation”.

### (a) The Test

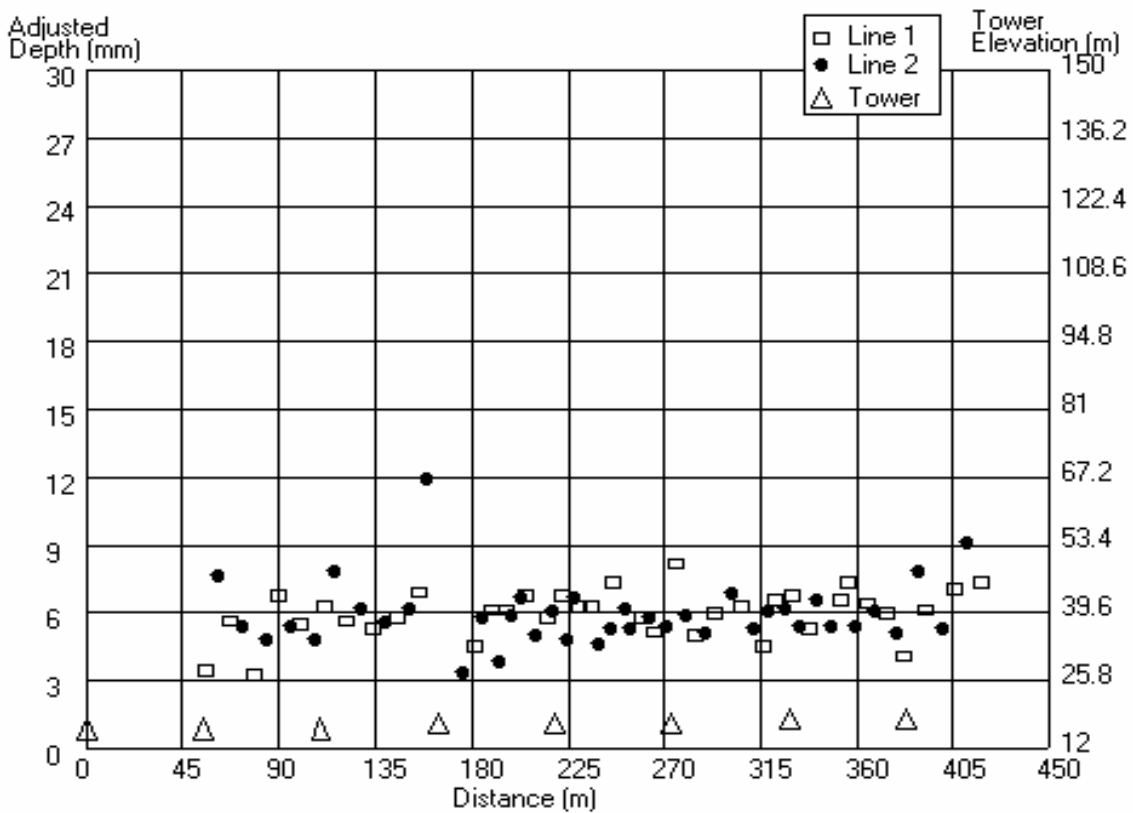
Date	October 5, 2004
Distance travelled during test (m)	25.0m
Time taken during test (minutes)	16.7
Speed of end wheels (m/min)	1.5
Irrigator speed (% of full) during test	50.6
Water Meter flow rate (L/s)	N/A
Hours per rotation	27.6
Hours Irrigating per rotation	27.6
Collector opening diameter (mm)	90.0
Test Position (degrees)	314
Does the irrigator 'get behind'?	No
Is the irrigator movement jerky?	No

(b) Results

Ave. Wt. Low Catch (ml)	30.8
Radial DUlq	0.80
DU Description	fair
Christianson Uniformity (CU)	0.86
Distance Adjusted Depth (mm)	6.1
Irrigator Flow from collectors (L/s)	34.2
Design Flow (L/s)	37.5
System Capacity (L/s/ha)	0.6
Design Capacity (L/s/ha)	0.66
Soil Infiltration rate (mm/hr)	15.0 (approx.)
Application rate 2/3 radius (mm/hr)	29.2
Application rate end tower (mm/hr)	43.8
Design Pressure (kPa)	296
Pressure above first regulator (kPa)	410

\*\* Pressure reading on pivot control panel at variance with measured pressure at first regulator.

\*\* Sand trap at end of center pivot was full.



## **IRRIGATION MANAGEMENT**

- (a) Tools
  - Aquaflex soil moisture sensors installed in paddocks N1, S7 and S9.
  - Measure soil moisture and soil temperature
  - Data available via internet site
  - Updated by Lincoln Ventures to the internet site
  
- (b) Management Results
  - Aquaflex data not current, N1 up to 22 November 2004, S9 up to 2 December and S7 no data for 2004-5.
  - Internet access not simple or operator friendly
  - Require periodic software update (uninstall old and install new)
  - Aquaflex has not been used to make irrigation management decisions
  - Soil moisture record of historical use only.

## **ISSUES and PROPOSED FUTURE DEVELOPMENT**

- (a) North Block – long laterals and centre pivot must run together. Should be variable speed control so long laterals can run independently because they will always need to start before the centre pivot.
- (b) South Block – no flow meter therefore no record of water delivered to the south block. When other users are also operating is the south block receiving the required 51.5 l/s?
- (c) Investigate pressure variance on centre pivot irrigator.
- (d) Carry out more regular maintenance (sand trap, crooked drops etc).
- (e) Evaluate the North pivot and long lateral systems.
- (f) Aquaflex is not being used to assist with irrigation management. The data is outdated, not updated regularly and is not easily accessed by the manager.  
One Aquaflex is not operating, why?
- (g) Make greater daily use of Aquaflex soil moisture sensors.

# Why consider different rosters?

## Financial Considerations and Implications of Rosters

1. What are the differences in actual staff required between the range of roster options you may use?
2. What is the quality of relief staff available in your area, are they suitable to have responsibility or do they need supervision?
3. What is the importance and value of permanent relievers to your business?
4. How many relievers are needed to cover all possibilities?

## Operational Considerations and Implications of Rosters

1. How many days all permanent staff are rostered on, may be an important aspect of your roster to allow opportunities for team meetings, and ensure the full compliment of skills are available for certain tasks.
2. Does the roster used cater for job variety? Ultimately should we be rostering jobs within the roster to ensure job variety and satisfaction?
3. How does the roster maintain sufficient skill base rostered on to complete tasks and provide the ability to deal with extra work, unexpected work, or unforeseen sick/special leave?
4. Communication between staff taking rostered time off and those returning from time off needs to be a consideration, how do people get back up to speed with events, or ensure information is available even though the person may not be available?
5. How does the roster cater to the seasonal nature of your farming system? Would different rosters for different times of the year cater better to the needs of the business?

## Social Considerations and Implications of Rosters

1. Rosters are about people and for people – therefore they need to be very employee-focused and this can be challenging for many employers.
2. Rosters can help make or destroy teams – they bring VALUES to the fore, by dealing with issues such as fairness, equity, team vs. individual focus, cooperation for example.
3. The Planning of rosters – who is involved? - Preferably all employees, not just a dictated roster system imposed on staff.
4. The roster this season may be different from last year and next year – WHY? Changing circumstances, such as skill mix of employees, preferences etc
5. Rosters can vary through the calendar year  
Eg on the LUDF – Winter 6 on 2 off  
- August & September 6 on 2 off 5 on 1 off  
- Remainder of season 11 on 3 off (weekends)
6. Rosters should be clearly displayed in the workplace – so that all can see who is on when, and allow negotiated change to occur.
7. Minimal negotiated change generally gives best results.

8. Rosters can include consideration for planned “sleep-ins” or rotating of duties within the week.

Eg 1 staff member fetches the cows or 1<sup>st</sup> herd, 2<sup>nd</sup> and 3<sup>rd</sup> staff members start 20 minutes later, 4th staff member starts work at 7am or 8am etc on other duties.

Eg Staff are rostered to NOT milk on certain afternoons etc.

### **Do Dairy Farm Employers have Social Responsibilities?**

Fact: Dairy farms employ large numbers of staff.

Fact: Many staff are young people on a steep learning curve of life skills.

Fact: Many young staff are strongly influenced by others / peers.

Fact: There is a strong perception especially outside this industry that dairying is anti-social and detrimental to a social life.

Fact: The majority of staff CHOOSE to live on-farm and the overlap of private life with work is strong.

Fact: Dairy farm employees often work long hours with very early starts.

Successful employers learn to wear several different hats in working with their staff – tutor, educator, colleague, careers guidance & planner, counsellor, investment adviser, relationship guidance, policeman, parent, banker, friend, confidante.

We are not advocating these roles for employers, just recognizing them as part of the dairying employment scene.

### **What are key limiting factors to you in regards to a good roster and reliever policy for your farm?**

Is it:

- The location of your farm?
- Your positions may require further definition, identifying weak areas?
- Your manager is included in the roster?
- Your manager is not included in the roster?
- You can't afford relief staff?
- The size of my team?
- The size of my farm?
- The size of my shed?

What can you change to develop best practice in this area of rostering and relief employment?

## Assumptions to LUDF Roster Options & Costings

- 2 weeks leave is taken during the 9 months, 1 week taken during the winter period.
- 3 days of each weeks leave is covered by farm staff, 4 days require reliever.
- For 4 staff, this means 8 weeks total annual leave during the season, or 32 days requiring relievers for annual leave.
- Covering stats for 4 staff means 11 days x 4 staff = 44 days, and assume half of these are midweek, and therefore require relievers = 22 days.
- The availability of relief milkers.
- \$70/day cost of reliever.
- Weekends just chores only.
- 3 required on farm at any one time.

### Summary of LUDF Roster Options

<b>Roster Option</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Days reliever required/month	14	14.5	11	23
Reliever as % of fulltime position	51%	53%	40%	83%
Cost of relieving staff	\$9616	\$9959	\$7555	\$12706
Number of consecutive days/week all staff rostered on	1	3	1 or 2	5

### Employment Expense Categories for LUDF

Salaries & Wages – permanent & relieving

Special contracts (e.g. calf rearing)

Bonus payments – milk quality, other

Accrued leave

Accommodation

ACC

Recruitment

Training & Development

Protective Clothing



# Lincoln University Dairy Farm - Roster options and Costings

**Assumptions:** 3 staff required on, 2 milking: Relievers used if 2 staff or more are off; manager included on roster; 2 wks leave during milking season;

## OPTION 1

### Month 1

	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
<b>8 on 2 off 8 on 3 off</b>																															
staff 1	x	x	x	x	x	o	o	o	x	x	x	x	x	x	x	x	o	o	x	x	-	x	x	x	x	x	o	o	o	x	x
staff 2	x	x	o	o	x	x	x	on leave this week					o	x	x	x	x	x	x	x	x	x	x	o	o	x	x	x	x	x	x
staff 3	x	x	o	o	x	x	x	x	x	x	x	x	o	o	o	x	x	x	x	x	x	x	x	o	o	-	x	x	x	x	x
Manager	o	x	x	x	x	x	x	x	x	o	o	x	x	x	x	x	x	x	x	o	o	o	x	x	x	-	x	x	x	x	o
routine relieving				R	R								R	R	R									R	R						
Relievers for stats or Annual Leave								R	-	R	R	-	R	R						R						R					

= ave 14 days per month requiring a Reliever (126 days of employment over a 9 month season, = 51% of a fulltime position)

**\$9,616**

\$70 /day for relievers

## OPTION 2

### Month 1

	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<b>11 on 3 off, always weekends 9 months</b>																																
staff 1	x	x	x	x	x	o	o	o	x	x	x	x	x	x	x	x	x	x	x	o	o	o	x	x	x	x	x	x	x	x	x	
staff 2	x	x	x	x	o	o	o	on leave this week					o	o	x	x	x	x	o	o	o	x	x	x	x	x	x	x	x	x	x	
staff 3	x	x	x	x	x	x	x	x	x	x	x	o	o	o	x	x	x	x	x	x	-	x	x	x	-	o	o	o	o	x	x	x
Manager	o	x	x	x	x	x	x	x	x	x	x	x	o	o	o	x	x	x	x	x	x	x	x	x	-	x	o	o	o	x	x	
routine relieving						R	R						R	R						R	R					R	R	R				
Relievers for stats or Annual Leave								R	-	-	-	R	R	R						R							R	R				

= ave 14.5 days per month requiring a Reliever (131 days of employment over a 9 month season, = 53% of a fulltime position)

**\$9,959**

\$70

## OPTION 3

### Month 1

	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
<b>5 on 2 off, 6 on 1 off not all weekends!</b>																															
staff 1	x	x	x	x	x	o	o	x	x	x	x	x	x	o	x	x	x	x	x	o	o	x	x	x	x	x	x	o	x	x	x
staff 2	x	x	x	x	o	o	o	on leave this week					o	x	x	x	x	x	o	o	x	x	x	x	x	x	x	o	x	x	x
staff 3	x	x	o	o	x	x	x	x	x	x	o	x	x	x	x	x	o	o	x	x	-	x	x	x	o	x	x	x	x	x	o
Manager	x	x	o	x	x	x	x	x	o	o	x	x	x	x	x	x	o	x	x	x	x	x	o	o	-	x	x	x	x	x	o
routine relieving				R		R														R											R
Relievers for stats or Annual Leave								-	R	R	R	-	R	R						R						R					

= ave 11 days per month requiring a Reliever (99 days of employment over a 9 month season, = 40% of a fulltime position)

**\$7,555**

\$70

## OPTION 4

### Month 1

	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED	TH	FRI	SAT	SUN	MON	TUE	WED
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
<b>5 on 2 off, 6 on 1 off always weekends</b>																															
staff 1	x	x	x	x	x	o	o	x	x	x	x	x	o	x	x	x	x	x	x	o	o	x	x	x	x	x	o	x	x	x	x
staff 2	x	x	x	x	x	o	o	on leave this week					o	o	x	x	x	x	x	o	o	x	x	x	x	x	x	o	x	x	x
staff 3	x	x	x	x	x	o	x	x	x	x	x	x	o	o	x	x	x	x	x	o	x	-	x	x	-	x	o	o	x	x	x
Manager	x	x	x	x	x	x	o	x	x	x	x	x	o	o	x	x	x	x	x	x	o	-	x	x	-	x	o	o	x	x	x
routine relieving						2R	2R						2R	R						2R	2R						2R	2R			
Relievers for stats or Annual Leave								-	-	-	-	-	R	R								R				R					

= ave 23 days per month requiring a Reliever (203 days of employment over a 9 month season, = 83% of a fulltime position)

**\$12,706**

\$70