SIDDC
South Island Dairying Development Centre

Partners Networking To Advance South Island Dairying

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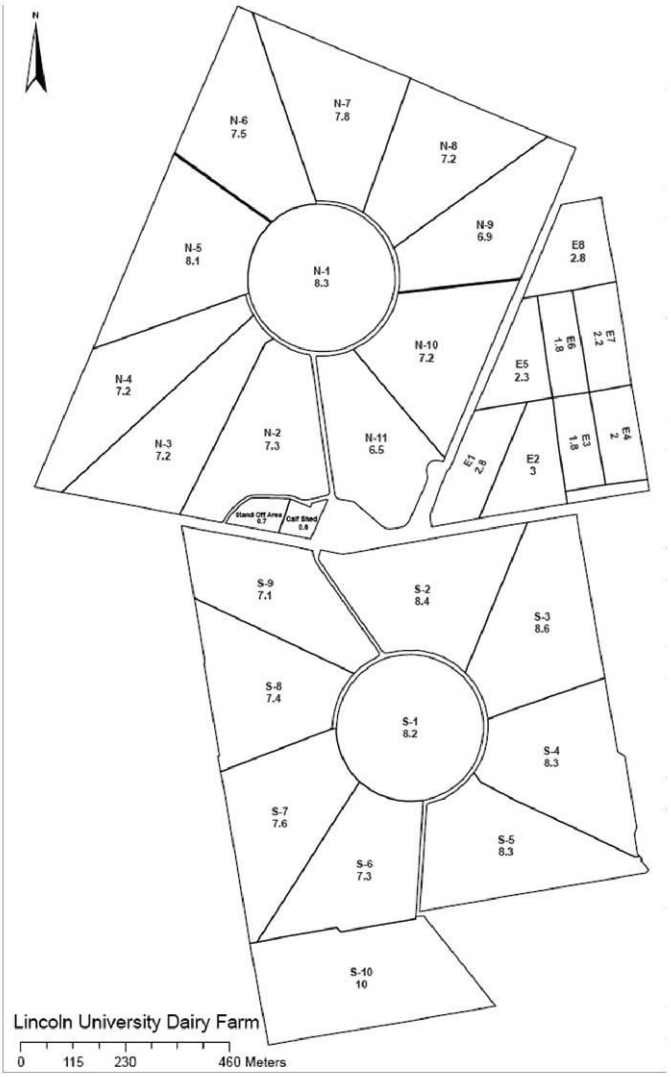
Phone: +64 3 325 3629
Fax: +64 3 325 3603
Email: office@siddc.org.nz
www.siddc.org.nz

Lincoln University Dairy Farm Focus Day 24 February 2011



Staff

Peter Hancox – Farm Manager
Andre Scholtz – Herd Manager
Kenny Oluboyede – Farm Assistant
Richard O'Brien – Farm Assistant

LUDF Hazards Notification

1. Children are the responsibility of their parent or guardian
2. Normal hazards associated with a dairy farm
3. Other vehicle traffic on farm roads and races
4. Crossing public roads
5. Underpass may be slippery

Please follow instructions given by event organisers or farm staff

Introduction

The 186 hectare irrigated property, of which 160 hectares is the milking platform, is a former University sheep farm. The spray irrigation system includes two centre pivots, small hand shifted lateral sprinklers, and k-lines. The different soil types on the farm represent most of the common soil types in Canterbury.

Key objectives

1. To develop and demonstrate world-best practice pasture based dairy farming systems and to transfer them to dairy farms throughout the South Island.
2. To operate a joint development centre with SIDDC partners, where the practical application of new technologies can be developed and refined.
3. To use the best environmental monitoring systems to achieve best management practices under irrigation, which ensures that the industry's annual profit from productivity target is achieved in a sustainable way and that the wider environment is protected.
4. To continue the environmental monitoring programme and demonstrate technologies that will ensure that the 3-year rolling average concentration of nitrate-N in drainage water from below the plant root zone remains below the critical value [16 mg N/L] that is specified in ECan's proposed regional rule as requiring reduction [Rule WQL18].
5. To use Environmental Best Practices [including 'eco-n' nitrification inhibitors] to protect the environment, while enhancing profitability.
6. To operate an efficient and well organised business unit.
7. To provide a commercial return exceeding the average weighted cost of capital on annual capital evaluations to Lincoln University.
8. To create and maintain an effective team environment at policy, management and operational levels.
9. To actively seek labour productivity gains through adoption of technologies and practices that reduces labour requirements or makes the work environment more satisfying.
10. To assist Lincoln University to attract top quality domestic and international students into the New Zealand dairy industry.

Specific objectives for the season 2010/11

1. To deliver a Dairy Operating Profit of $6,800/ha and Return on Dairy Assets of approximately 7.9% from a $6.93 payout – [milk price plus dividend] - with budgeted milk solids production of 288,000 kg and Cash Farm Working Expenses of $3.35/kgMS.
2. To improve water use efficiency for better integrating the technologies currently existing on the farm by ensuring useable decision making data is accessible to the farm management in a timely manner.
3. To increase the land area that effluent is applied to so that nutrients are better distributed and there is an increased range of contingency plan options. Also, ensure that nitrate losses are not greater on effluent areas than on non-effluent areas, and that there is no significant microbial contamination of the shallow aquifers.
4. To manage pastures and grazing so milkers consume / harvest as much metabolisable energy [ME] as practicable, with a target of 200 GJ/ha ME. For example, this could be achieved by consuming / harvesting 16t DM/ha with average ME 12.5.
5. To optimize the use of the farm automation system [Protrack] and demonstrate / document improved efficiencies and subsequent effect on the business.
6. To achieve a 6 week in-calf rate of 79% and 10 week in calf rate greater than 89% ie empty rate of less than 11%.
7. To continue to document and measure LUDF's influence on changes to defined management practices on other dairy farms.
8. To ensure specific training is adequate and appropriate to enable staff members to contribute effectively in meeting the objectives of the farm.

Ongoing research

- The effect of fertilisers & other farm inputs on groundwater. 10 groundwater monitoring wells sunk to monitor and manage the effect of fertiliser, grazing, irrigation and effluent inputs over a variety of contrasting soil types.
- Effects of eco-n on nitrate leaching and pasture production.
- Pasture growth rates, pests and weeds monitoring.
- The role of nutrition in lameness in Canterbury.
- Resource Inventory and Greenhouse Gas Footprint

Climate

Men Annual Maximum Temperature	32 °C
Mean Annual Minimum Temperature	4 °C
Average Days of Screen Frost	36 Days per annum
Mean Average Bright Sunshine	2040 Hours per annum
Average Annual Rainfall	666 mm

Farm area

Milking Platform	160 ha
Runoff [East Block]	14 ha

Soil types

	% Milking Platform
Free-draining shallow stony soils (Eyre soils)	5
Deep sandy soils (Paparua and Templeton soils)	45
Imperfectly drained soils (Wakanui soils)	30
Heavy, poorly-drained soils (Temuka soils)	20

Soil test results

Date	pH	P	K	S	Ca	Mg	Na
Dec – 01	5.8	30	11	34	8	23	12
Jul – 02	5.8	31	14	35	9	22	12
Oct – 02	5.9	35	8	29	8	21	12
Jun – 03	6.1	37	12	7	9	23	9
Jun – 04	6.4	37	13	11	9	22	10
Jun – 05	6.1	35	13	10	9	22	8
Jun – 06	6.3	33	15	9	10	27	11
Jun – 07	6.3	39	16	17	10	29	13
Jun – 08	6.1	36	12.4	9	10	29	12
Jun – 09	6.1	32	11	11	9	30	9
Jun - 10	6.0	32	10	6	10	32	10
Target Soil Test	5.8 – 6.2	30 – 40	5 – 8	10 – 12	4 – 5	20+	5 – 50

Soil Reserve K = 4.5 (Target = 0.8 – 1.2)

Fertiliser history

Date	Dressing	N	P	K	S	Mg	Ca
Season 2001/02		200	168	-	130	-	94
Season 2002/03		200	45	-	2	-	90
Season 2003/04		200	45	-	64	-	46
Season 2004/05		200	46	-	47	-	57
Season 2005/06	Non-Effluent	200	48	-	76	-	107
Season 2005/06	Effluent	0	30	-	53	-	67
Season 2006/07	Non-Effluent	200	49	-	89	-	110
Season 2006/07	Effluent	0	20	-	52	-	45
Season 2007/08	Non-effluent	200	44	-	73	-	96
Season 2007/08	North Effluent	12	22	-	37	-	48
Season 2008/09	Non-Effluent	245	53	-	88	-	115
Season 2008/09	North Effluent	0	22	-	37	-	48
Season 2009/10	Non-Effluent	225	45	-	47	-	20
Season 2009/10	Effluent	-	5	-	47	-	20

Pasture

- The milking platform was sown at conversion [March 2001] in a mix of 50/50 Bronsyn/Impact ryegrasses with Aran & Sustain white clovers, and 1kg/ha of Timothy.
- Individual paddocks are monitored weekly, & 12 paddocks [57% of area] have been renovated to maintain pasture performance. Pasture mixes on farm now include: 2 paddocks of Arrow plus Alto perennial ryegrasses, 5 paddocks of Bealey, 2 paddocks of Alto perennial ryegrass and 1 paddock Trojan - all with Kotare/Sustain white clovers.
- Annual Pasture consumption for 04/05 season calculated at 15.9t DM/ha,05/06 -16.1t DM/ha, and 06/07 - 16.4t DM/ha,
- Pasture and Crop Eaten (calculated via DairyBase) - 07/08 – 17.9 tDM/ha, 08/09 – 17.2 tDM/ha, 09/10 – 16.2 tDM/ha.

Irrigation and effluent system

Centre-pivots	127 ha
Long Laterals	24 ha
K-Lines	10 ha
Hard Hose Gun	14 ha
Total irrigated	175 ha
Irrigation System Capacity	5.5 mm/day
Length of basic pivot	402
Well depth	90m

Statistics

- A full rotation completed in 20.8 hours for 5.5 mm [at 100% of maximum speed].
- Average Annual Rainfall = 666 mm. Average irrigation input applies an additional 450 mm. Average Evapotranspiration for Lincoln is 870 mm/year.

Effluent

- Sump capable of holding 33,000 litres and a 300,000 litre enviro saucer.
- 100 mm PVC pipe to base of North Block centre pivot, distribution through pot spray applicators.
- System being developed to also apply effluent on to the South Block and outside the pivot.

Mating programme - Spring 2010

1,000 straws DNA proven Kiwicross [including heifers]. Expecting to rear 200 heifers [5 straws per heifer]. Likely six weeks AB, may use one week short gestation Jersey then follow with Jersey bulls. 10 weeks total mating [herd].

Herd details - February 2011

Breeding Worth (rel%) / Production Worth (rel%)	92 / 49% / 117 / 70%
Average weight / cow (Dec) – Herd monitored walk over weighing	458 kg
Calving start date	8 August 2010
Mid calving date	17 August 2010 (9 days)
Mating start date	25 October 2010
Empty rate (nil induction policy) after 10 weeks mating	13% 2009 [6 weeks in-calf rate 74%]

	2002/03	Average 03/04 - 06/07	2007/08	2008/09	2009/10	2010/11
Total kg/MS supplied	228,420	**277,204**	278,560	261,423	273,605	
Average kg/MS/cow	381	**425**	409	384	415	
Average kg/MS/ha	1414	**1720**	1744	1634	1710	
Farm Working Expenses / kgMS	$2.98	**$2.68**	$3.37	$3.88	$3.38	
Dairy Operating Profit/ha	$1,164	**$2,534**	$8284	$2004	$4696	
Payout [excl. levy] $/kg	$4.10	**$4.33**	$7.87	$5.25	$6.37	
Return on Assets	4.4%	**6.18%**	14.6	4.8%	7%	

Stock numbers	2002/03	Average 03/04 - 06/07	2007/08	2008/09	2009/10	2010/11
1 July cow numbers	631	**675**	704	704	685	694
Max. cows milked	604	**654**	680	683	660	669
Days in milk			263	254	266	
Stocking rate Cow equiv. / ha	3.75	**4.05**	4.2	4.3	4.13	4.18
Stocking rate Kg liveweight / ha	1,838	**1964**	2,058	2,107	1,941	1914
Cows wintered off No. Cows / Weeks	500 / 8	**515 / 7.8**	546 / 9	547 / 7	570 / 9	652 / 8.4
No. Yearlings grazed On / Off	0/118	**0/157**	0/171	0/200	0/160	0/166
No. Calves grazed On / Off	0/141	**0/163**	0/200	0/170	0/160	0/194
Est. Pasture Eaten (Dairybase) (tDM/ha)			17.9	17.2	16.2	
Purch. Suppl - fed [kgDM/cow]	550	**317**	415	342	259	
Made on dairy/platform [kgDM/cow]	0	**194**	95	64	144	
Applied N / 160 eff. ha			164	200	185	

Staffing & management

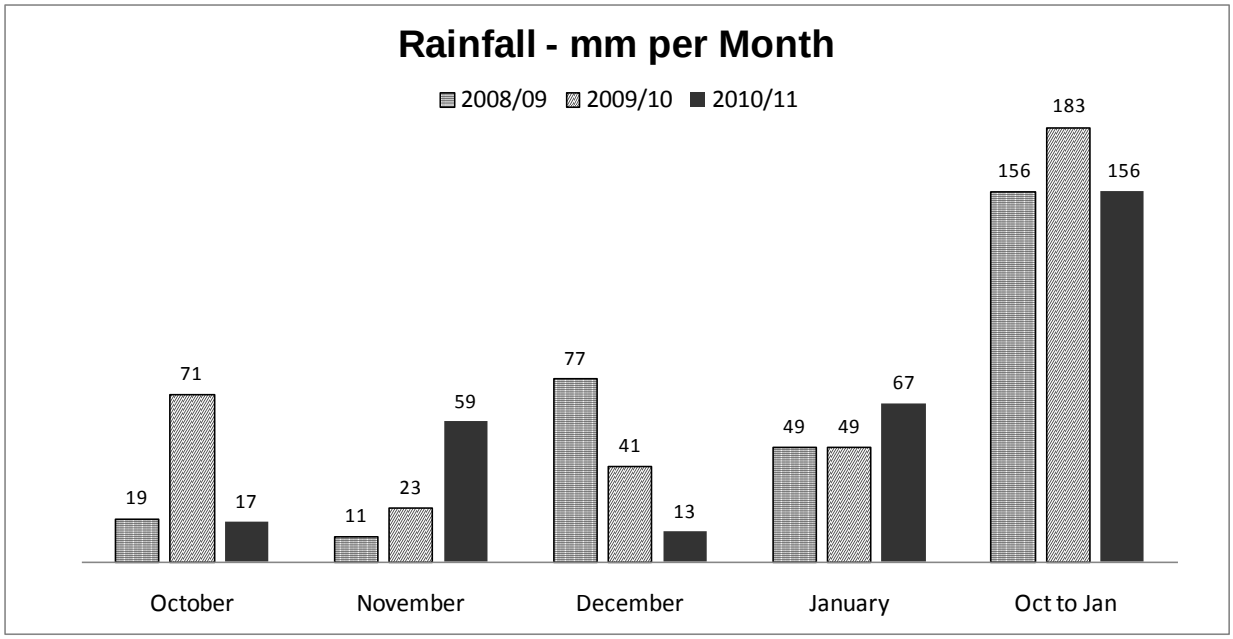
Roster System – 8 days on 2 off 8 days on 3 off

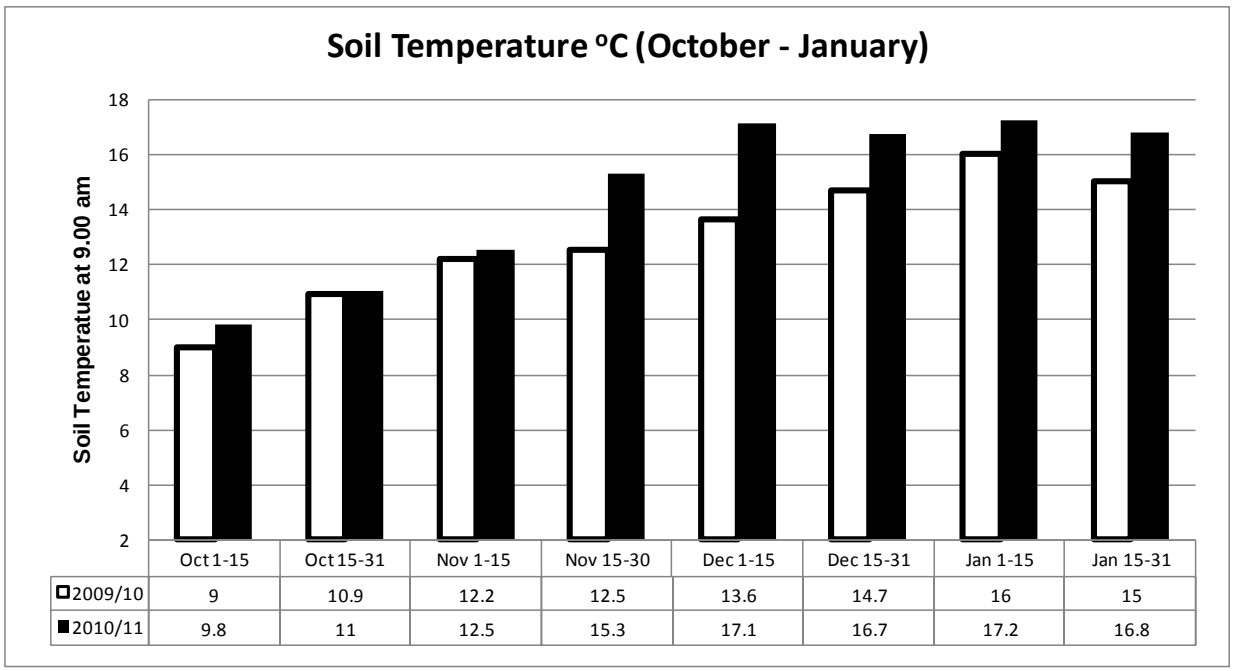
Milking Times – Morning: cups on 5.00 am
– Afternoon: cups on 2.30 pm

Contents

LUDF SEASONAL UPDATE

GROWING CONDITIONS - October to February





	Oct 1-15	Oct 15-31	Nov 1-15	Nov 15-30	Dec 1-15	Dec 15-31	Jan 1-15	Jan 15-31
2009/10	9	10.9	12.2	12.5	13.6	14.7	16	15
2010/11	9.8	11	12.5	15.3	17.1	16.7	17.2	16.8

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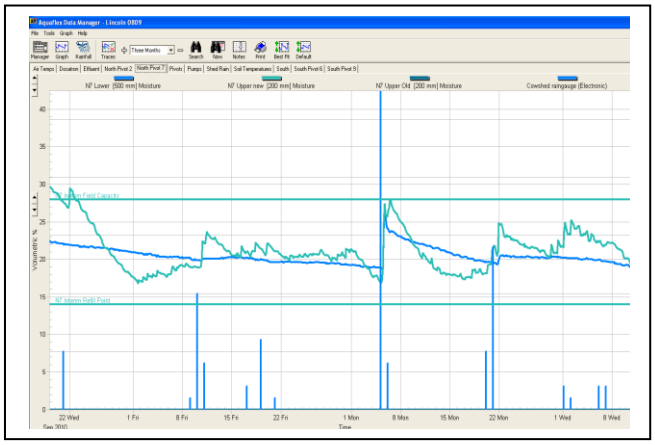
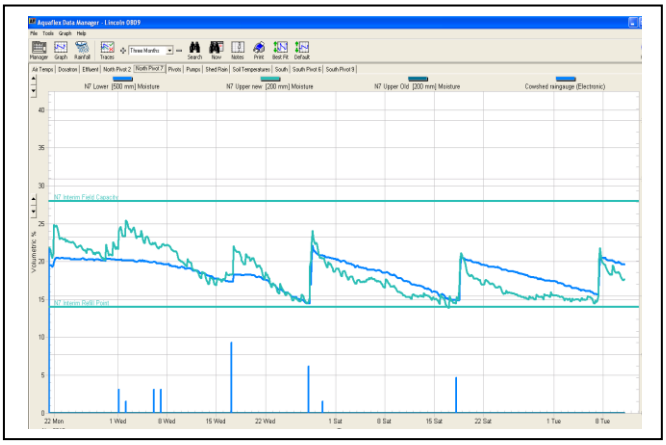
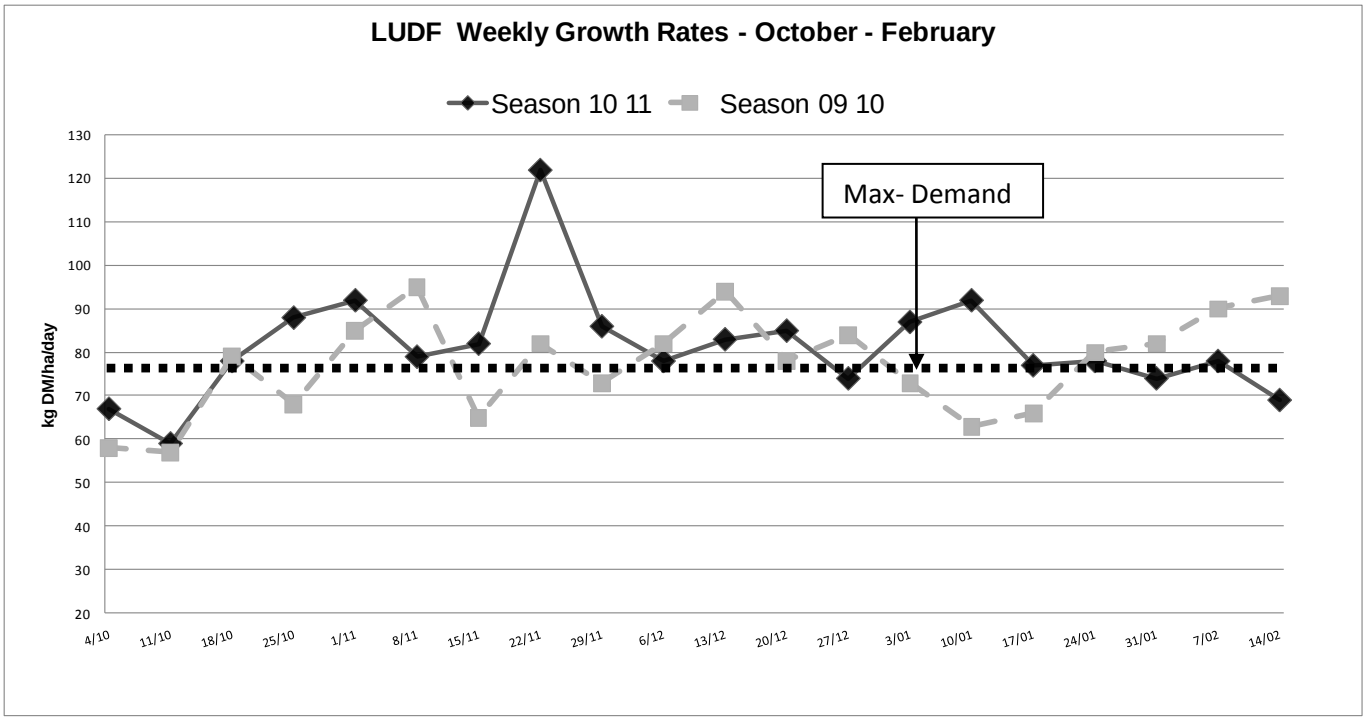
Aquaflex Data – Paddock N7

Period: September – November



Period: December - January



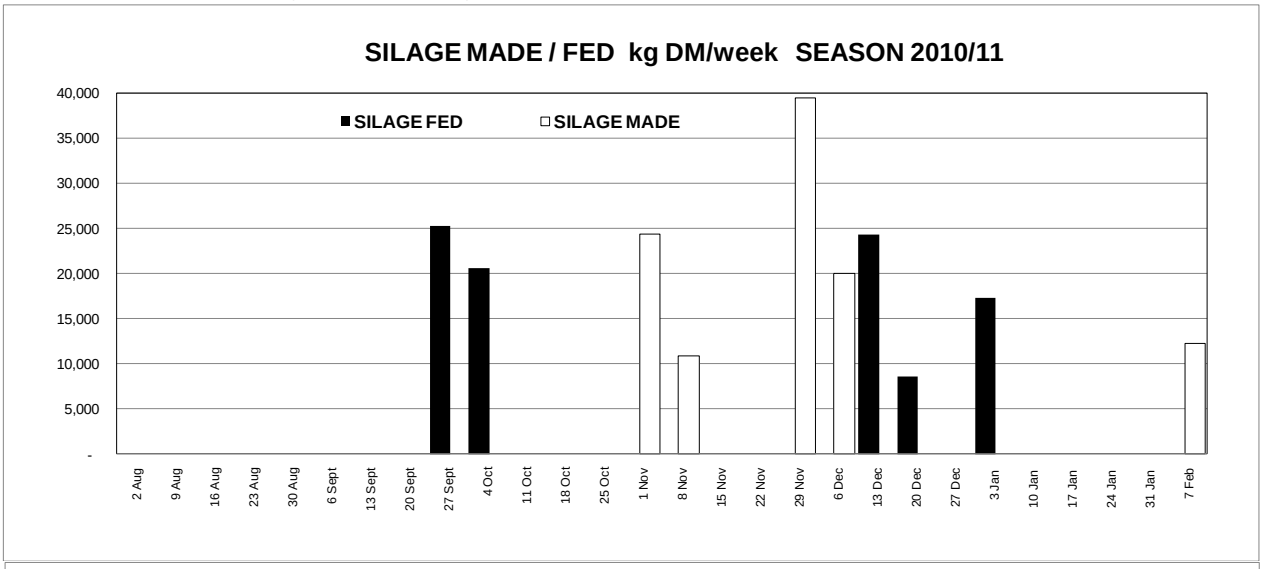


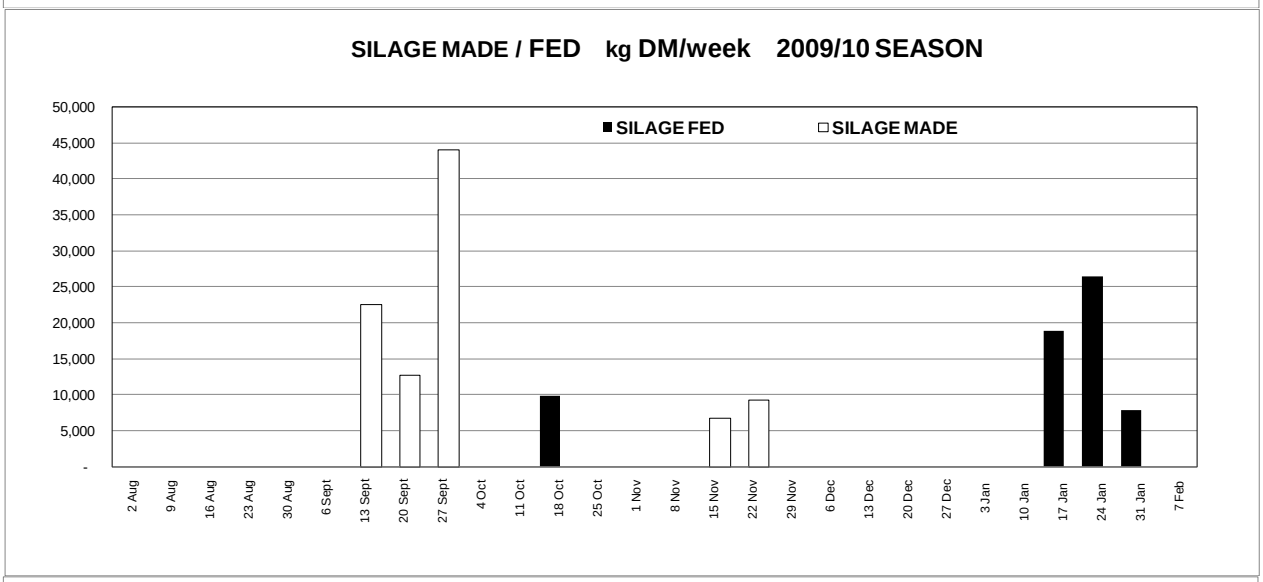
Comments:

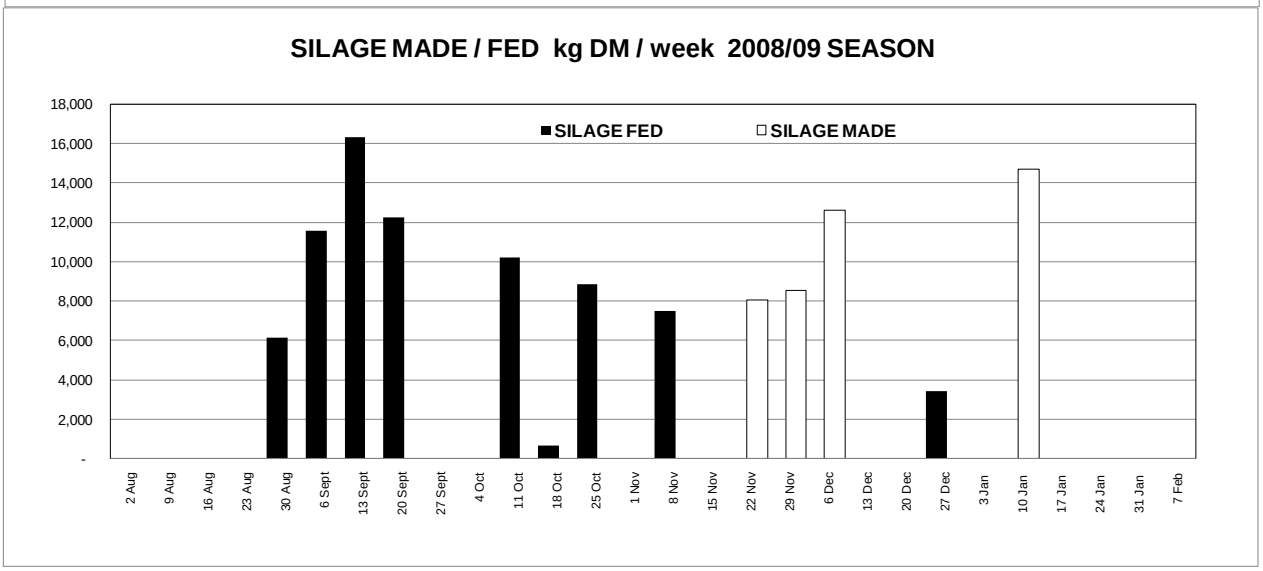
From October to mid February we grew 11,400 kg DM/ha compared to 10,830 kg DM last season (570 kg DM/ha more than last year). More pasture production occurred in October, November and January. In terms of growing conditions for grass this season has been slightly warmer than last year and a fraction dryer, however the main challenge has been the variability in growing conditions with big fluctuations in soil temperature within the week. Despite the higher grass growth measured compared to last season, pastures have been underperforming this season and the extra grass growth measured has not been translated into extra milk production. The reasons for this will be explored in the next session of this handout.

PASTURE MANAGEMENT

SILAGE MADE and FED (last 3 seasons):







Supplement fed to date (2010/11 Season)

	Fed	Made	Fed – Made
September	25.3 TDM	None	25.3
October	20.6 TDM	None	20.6
November	None	74.8	-74.8
December	32.9 TDM	20 TDM	12.9
January	17.3 TDM	None	17.3
Total to 14th February	96.1 TDM	94.8 TDM	1.3 TDM

FEED MANAGEMENT STRATEGY:

In terms of feed management at LUDF our aim is to grow and harvest as much very good quality pasture (>12 MJME/kg DM) as possible at each round. In achieving this we also have to take into consideration cow performance (in terms of milk production and cow condition) so the final strategy is a balancing act between maximizing pasture harvested per ha and cow performance. The main tools for us to achieve this are to set the round length that will maximize pasture growth at the different times of the season (e.g. 21 days in the spring time), maintain post grazing residuals at a consistent level throughout the season (around 1,500 kg DM/ha), and offer the cows the right pre-grazing of good quality grass at each grazing.

The farm stocking rate of 4.2 cows creates a maximum demand of approximately 77 kg DM/ha/day (over the 160ha milking platform). As growth rates fluctuate significantly week to week we make weekly decisions to deal with surpluses or deficit as they arise. In surplus conditions we identify and cut silage straight away so we avoid cows eating high covers (greater than 3100 kg DM/ha target pre-grazing). It is very hard for cows to properly clean up paddocks that have covers above the necessary pre-grazing.

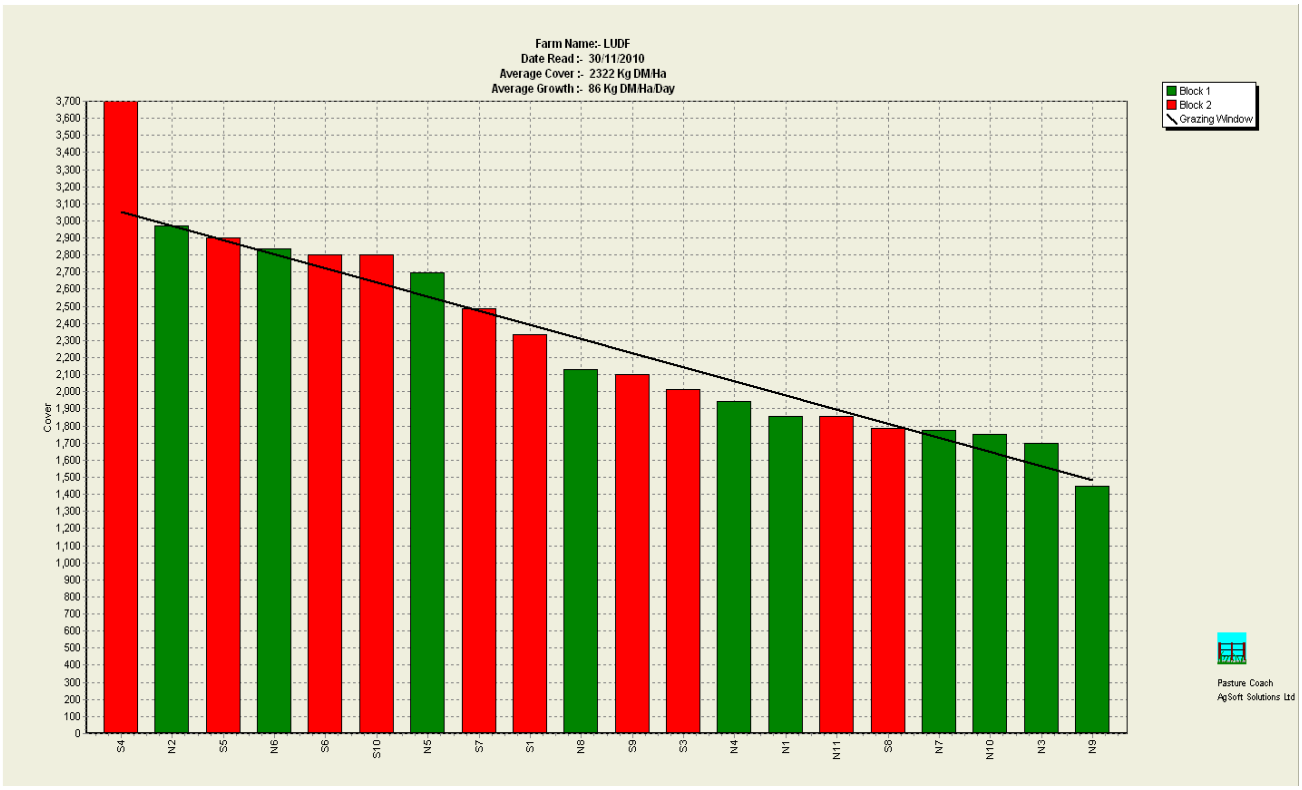
Similarly we are prepared to deal with feed deficits when growing conditions change. In an ideal situation we harvest the grass directly by the cows without interfering (cutting silage or feeding out), however the variability in growth rates means that we have to manipulate feed supply slightly some weeks. We take into account the coming week's weather forecast, with decisions reviewed during the week and changes made when required.

There are other alternatives we have considered to deal with fluctuating growth rates:

a) Manipulate round length; this strategy does not give us enough room to move since from October to end of February our target round length is between 20-23 days. A round length shorter than 20 days could end up in a bigger deficit at our stocking rate of 4.2 cows /ha; on the contrary a longer round length than 23 days would required pre - grazing covers higher than 3300 kg DM/ha which is likely to affect the ability of the cow to harvest the grass and also in some paddocks, pasture quality.
b) Reduce nitrogen use in (or prior to) periods of surplus (See comments on Nitrogen Policy session).

The following feed wedges illustrates the decision making process in late November / early December when silage was cut and then fed out 10 days later. On 30 November the feed wedge had 5tDM of surplus and the decision was made to cut silage from paddock S4 (the tallest column on the graph). APC in this paddock was 3700kgDM/ha. Despite the total surplus not being big, if cows grazed paddock S4 it was going to be difficult to achieve the target residual without affecting cow performance. Even with the likely small deficit lower down in the Feed Wedge we expected growth rates to exceed demand significantly as usually happens at this time of the year. However, growth rates dropped on the following week and on 7th of December the wedge had a feed deficit of 12.8t/DM; silage was fed to maintain the round length at 21 days and hold post grazing residuals above 1,480 kg DM/ha. Mowing S4 also helped achieve the desired post grazing residuals in this paddock.

FEED WEDGE 30 NOVEMBER – Growth Rate 86 kg DM/ha/day APC= 2322 kg DM/ha



Feed Wedge 7 December – Growth Rate – 78 kg DM/ha/day APC – 2174 kg DM/ha

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COST / BENEFIT ANALYSIS OF OWNING A MOWER at LUDF

Running and Capital costs of mower			**80 ha**	**Mowed**
Capital cost	$19,000			
Tractor (budget Manual)	$48.00 /hr	32hrs		$1,536
R & M	$10.00 /hr			$320
Staff Time @ 8km/hr	2.5 ha/hr	32hrs	$20 /hr	$640
Interest	8.00%			$1,520
Depreciation	10.00%			$1,900
Total cost of owning and running			**$74/ha**	$5,916
Contract mowing cost	$80.00 /ha			$6,400
Difference between contractors costs and cost of owning and running	Benefit to owning			$484

Sensitivity Analysis

Area mown / year	**Direct cost of owning and running the mower**
40ha	$117/ha
60ha	$88/ha
80ha	$74/ha
100ha	$65/ha

Other Points to consider:

Advantages of owning the mower:

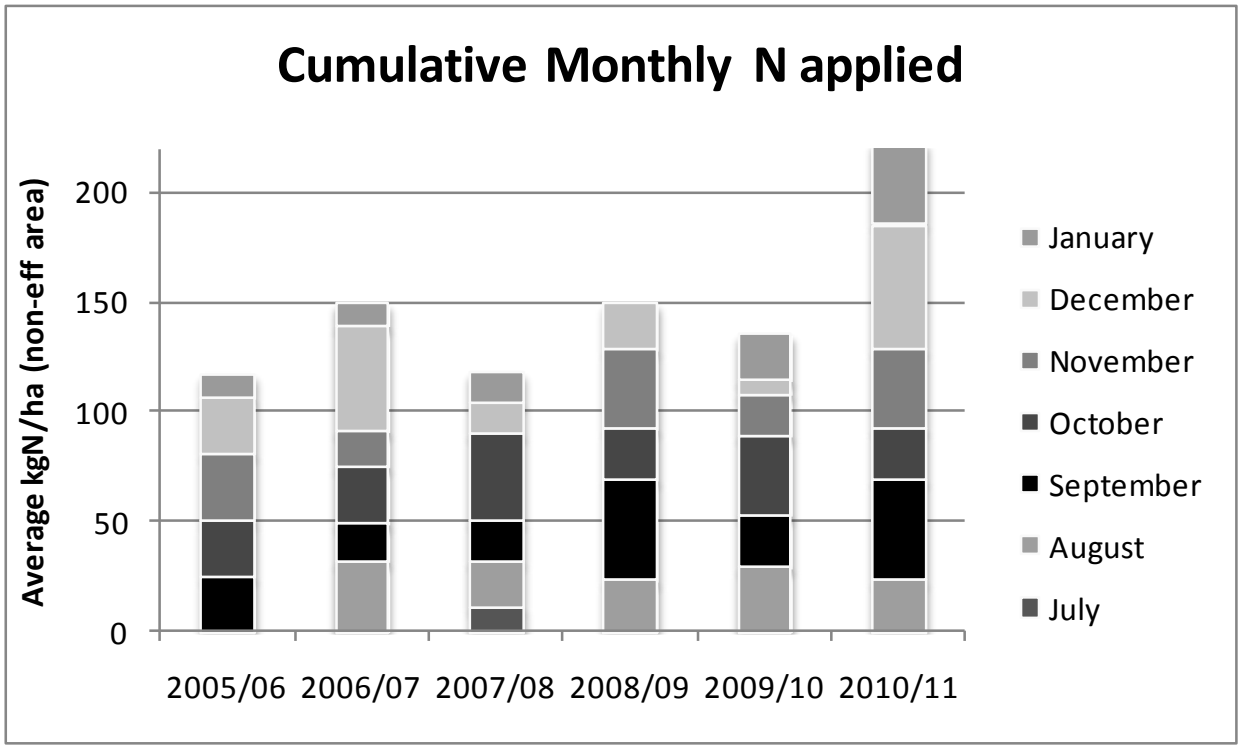
- Additional milk production as the result of mowing to normal grazing residuals – thus maintaining pasture quality. The residual after mowing has been very close to 7 rising plate meter "clicks" - making it much easier for the herd to maintain target residuals.
- Extra silage that we are likely to harvest when cutting paddocks lower (residuals of 1500kgDM/ha vs greater than 1800kgDM/ha). We have regularly seen the gap between feed available and feed harvested into baleage being 300kgDM/ha more than when the contractor's larger mowers were used in previous seasons. This has added up to approximately 24t DM

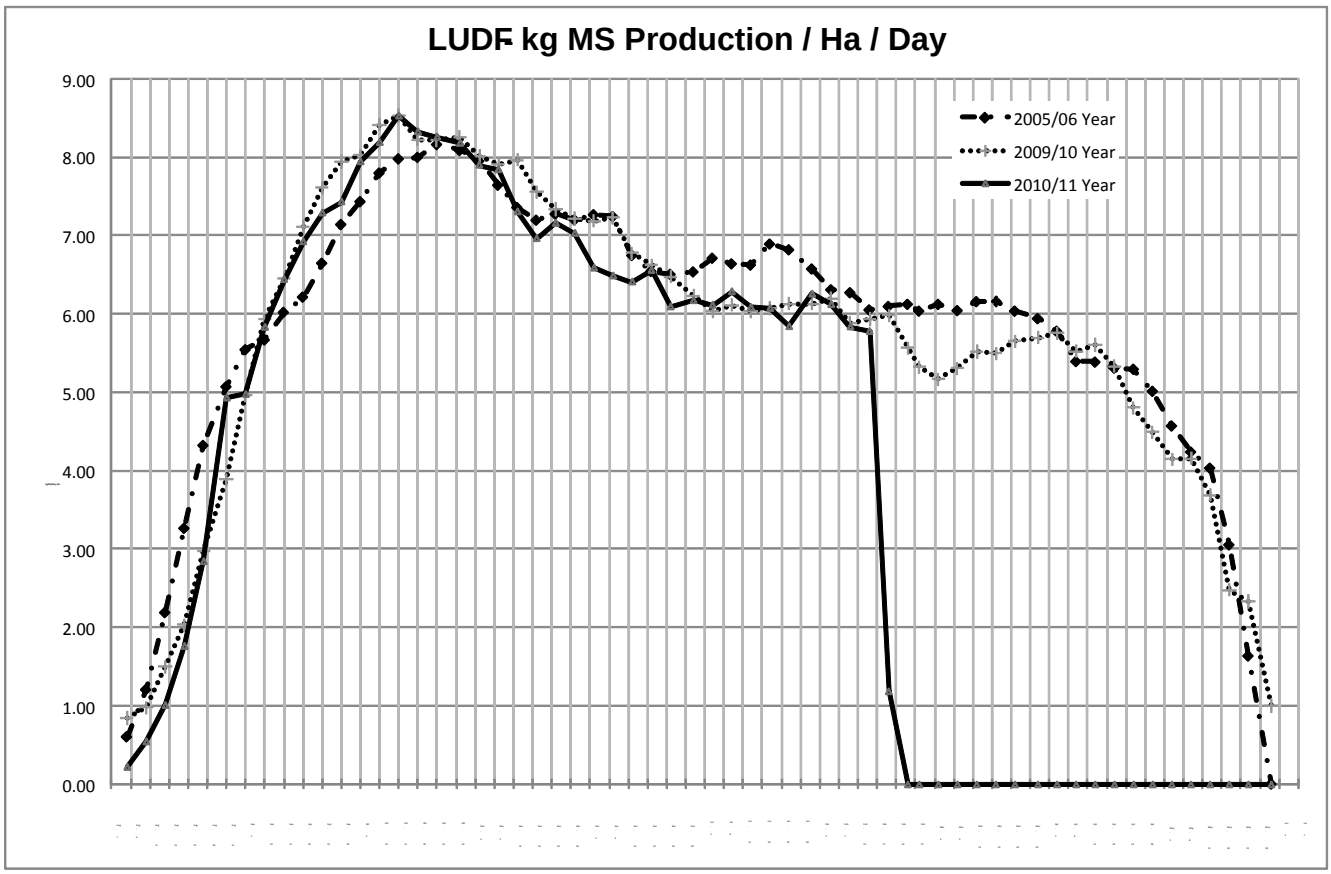
Disadvantages of owning the mower:

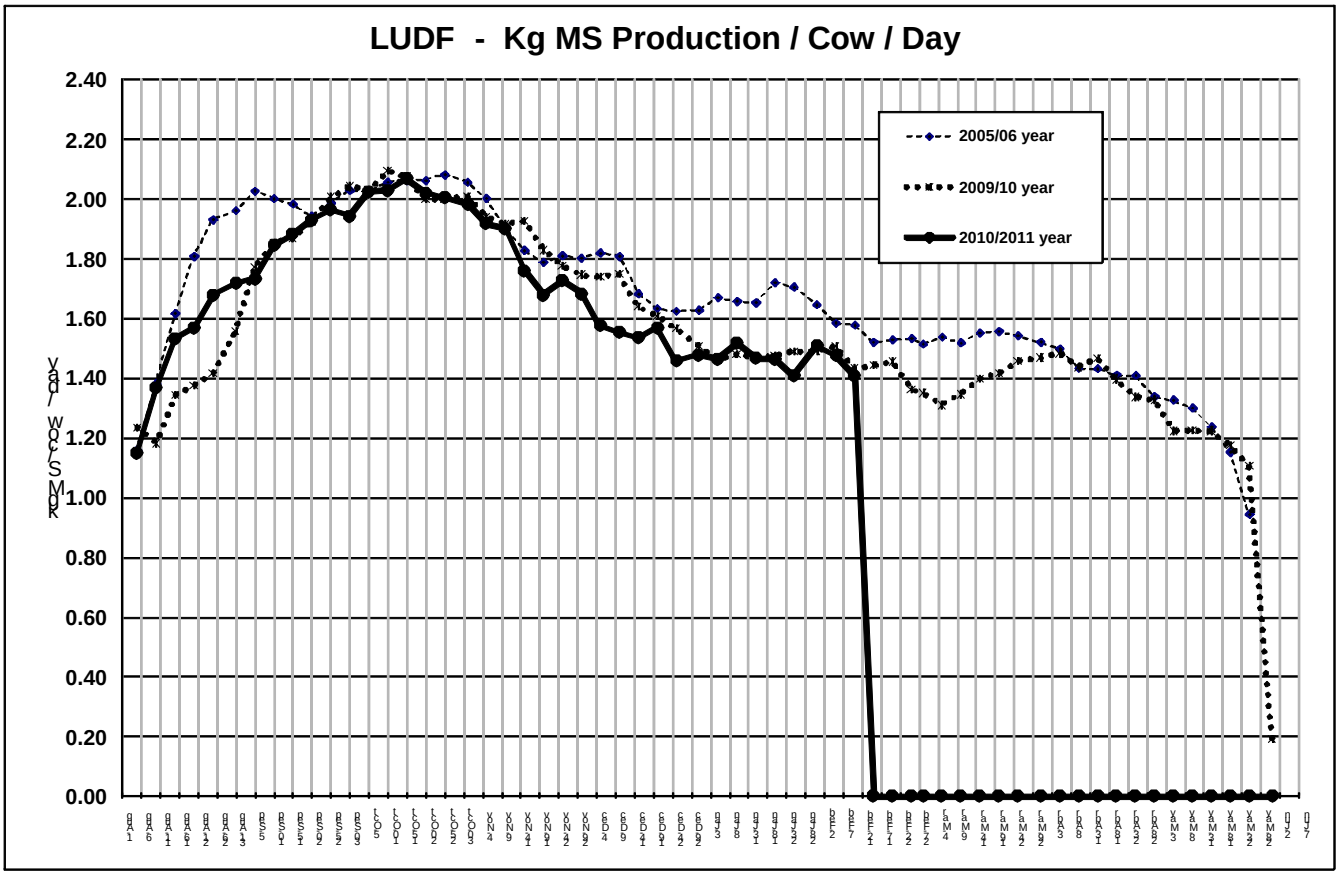
- Staff time: It has not been an issue for us this season but it can compete with staff time to do other activities on the farm
- Temptation to use the mower to correct inappropriate pasture management decisions. Because we have good policies on farm regarding this it is a risk but to date has not been a problem for LUDF.

NITROGEN POLICY

To date we have applied 222 kg N / ha in the non effluent (133 ha) area, equivalent to 185 kg N /ha over the total area of 160 ha. Compared to previous seasons, extra Nitrogen has been applied in November, December and January. In the past the policy was to cease Nitrogen applications when soil temperatures were above 16°C, as the clover fixation / soil supply was perceived to provides enough Nitrogen for pasture growth. A planned approach to grow more silage if available coupled with the lack of clover (see later in this handout) in the pastures this season has necessitated further applications of Urea.







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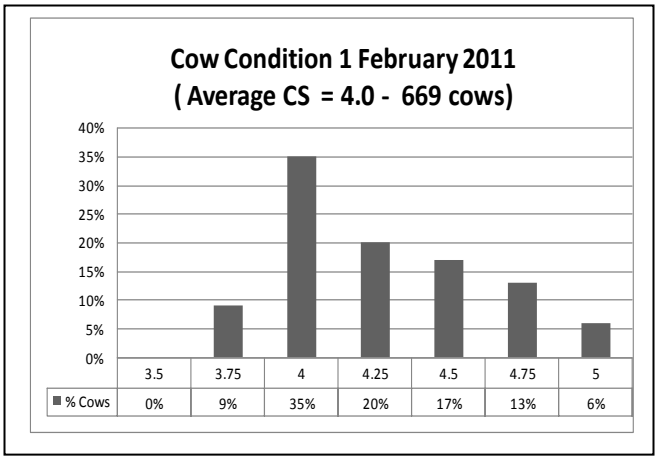
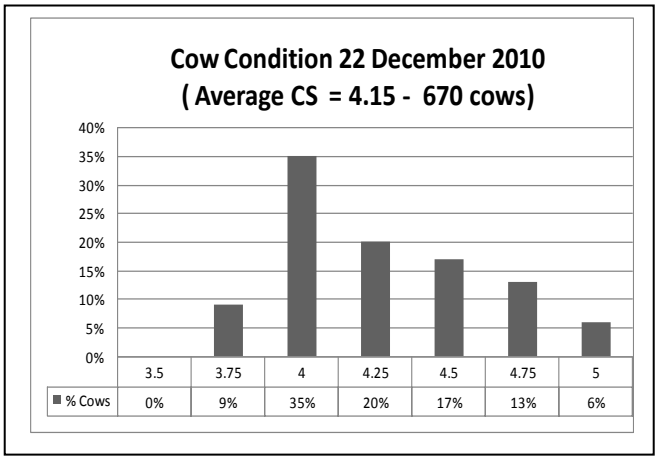
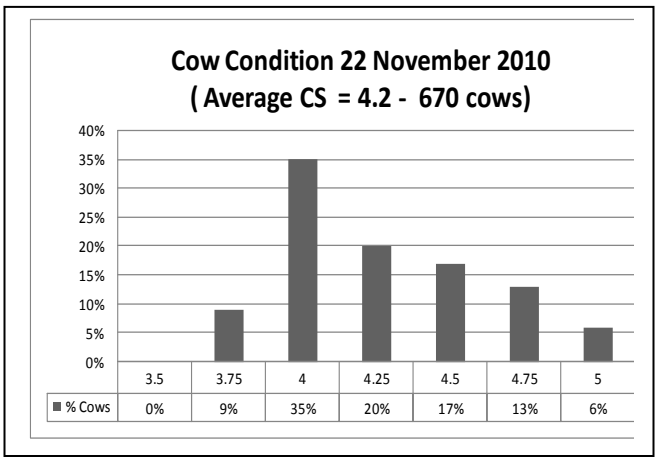
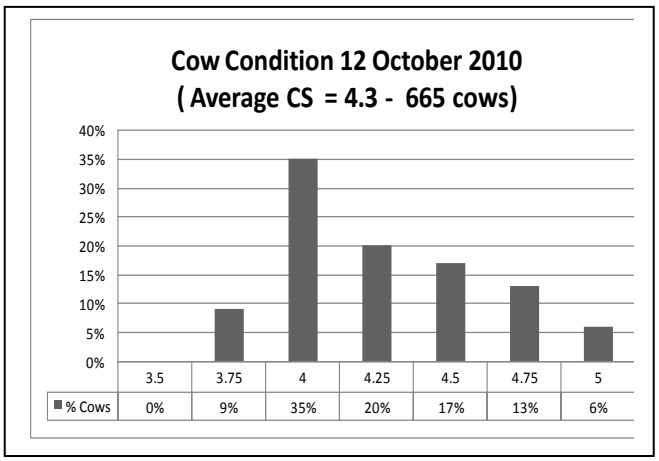
LUDF – COW CONDITION STRATEGY

COW CONDITION MONITORING









LUDF – BCS STRATEGY

In theory, if a dry cow is fed enough during the dry period she could put on 1 BCS in winter. For our crossbred cows (460 kg LW/cow) this means feeding about 4 to 5kg DM/day on top of their maintenance requirements, plus some allowance for wastage.

However, as is seen in many other Canterbury herds, it is very difficult to put on more than ½ a BCS during the winter period. The reasons for this being:

- Cows typically do not put on any condition in the month prior to calving - less energy is available for CS gain as the nutritional demand of the calf increases significantly, and daily intake is reduced due to the space taken by the calf.
- Weather conditions in the winter months (e.g. cold and wet) can increase cow demand for maintenance, reducing the energy available for condition gain.
- Feed utilization is a challenge in wet conditions and the budgeted feed available to the cows can be significantly reduced.

Therefore, despite being theoretically possible, IT IS RISKY to expect a 1 BCS gain in two months; LUDF does not want take this risk.

LUDF TARGETS:

- Calve mixed age cows at a Condition Score 5 (in at least 90% of the herd – NOT AVERAGE CS 5.0)
- Calve Rising 2 and 3 year olds at Condition Score 5.5

After calving pattern, cow condition at calving is one of the most important factors affecting reproductive performance. The difference in 1 BC unit at calving has been valued at $40 in terms of benefits in reproduction. There is also an extra 12-15 kg MS/ BC unit in the following season. The negative effect of lighter cows on reproductive performance will be seen over at least two seasons.

Our Drying off Decision Rules are based on:

Cows (4 years old and older)

Cow Condition	Dry off time (days before Calving)	Date cow needs to dry off (calving date 1-15 August)	Date cow needs to dry off (calving date 15-30 August)
3.5	100	20 April – 5 May	5-15 May
4	80	10-20 May	20 -30 May
4.5	60	NA	NA

Rising 3 year Old

Cow Condition	Dry off time (days before Calving)	Date cow needs to dry off (calving date 1-15 August)	Date cow needs to dry off (calving date 15-30 August)
3.5	120	1- 15 April	15 -30 April
4	100	20 April -5 May	5-15 May
4.5	80	10-20 May	20 -30 May
5	60	NA	NA

This strategy requires feeding the cows that are being dried off above demand and with good quality feed.

Other Strategies to Achieve Targets:

Once a day milking:

There is little research to support milking cows OAD towards the end of lactation to prevent condition score loss, however, OAD does reduce stress on cows walking to the shed, and energy used in walking a second time. Milking cows OAD will reduce milk production (per day) but the actual impact depends on the BW of the cow, current level of production, feed offered and whether lactation length can be extended OAD compared to a shorter TAD lactation to meet the above time for CS gain in the dry period. For this strategy to have an effect there needs to be 2-3 months in which OAD will occur; it could be an option for our light young cows. High levels of SCC may be a limiting factor for this strategy.

Milking cows 3 times every 2 days (16 hrs) is not likely to reduce milk production hence its effect on improvement of condition is minimal. There is some reduction in energy used for walking when they are not coming to the shed. For the LUDF this is not considered a practical strategy (at present).

Extra Feeding:

Growth rates in autumn will determine pasture availability; in addition LUDF has a significant amount of surplus supplement in the budget. Potentially cows could be fed more to increase milk production and cow condition, however high genetic merit cows tend to divert extra feed into milk production rather than cow condition.

SUMMARY POINTS:

- Monitor cow condition regularly (every 2-4 weeks as required)
- Light cows identified and monitored closely
- From early April light young cows (3.5) will be dried off and fed well on the milking platform or East Block.
- From mid April light mixed age cows (3.5) will be dried off
- Once a Day Milking of light cows from March will be considered

ANIMAL HEALTH AND COW WASTAGE – REVIEW OF THE SEASON

Deaths & Early Culling

Summary of Cow Wastage – Deaths

Month	Season 10/11	Season 09/10	Season 08/09
June	1	0	0
July	1	1	0
August	6	2	4
September	5	1	2
October	1	0	1
November	0	3	1
December	1	0	0
Total	**15**	**7**	**8**

Summary of Cow Wastage – Cull cows

	Season 10/11	Season 09/10	Season 08/09
June	0	0	0
July	0	5	0
August	1	8	4
September	0	4	5
October	5	0	3
November	6	1	3
December	2	5	3
Total	14	23	18

Summary of cows lost (Cull & Dead)

	Season 10/11	Season 09/10	Season 08/09
Cows on 1st June	694	688	704
Death to end December	15	7	8
Culls to end of December	14	23	18
Cows at 31 December	665	658	678
% lost	4.2 %	4.4 %	3.7%
Total cows lost from 1 Jun - 31 Dec	29	30	26

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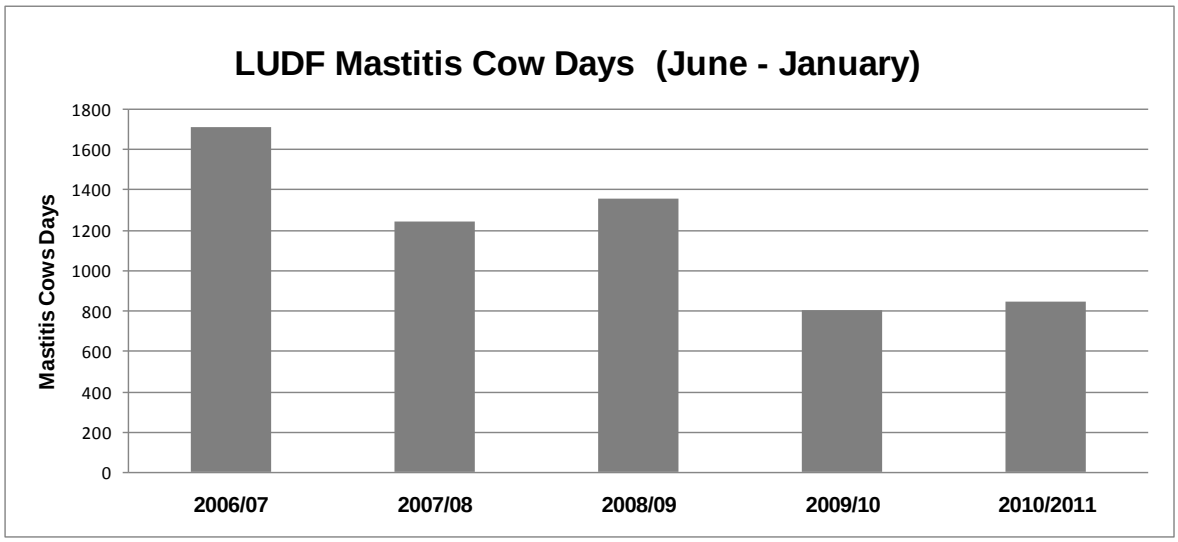

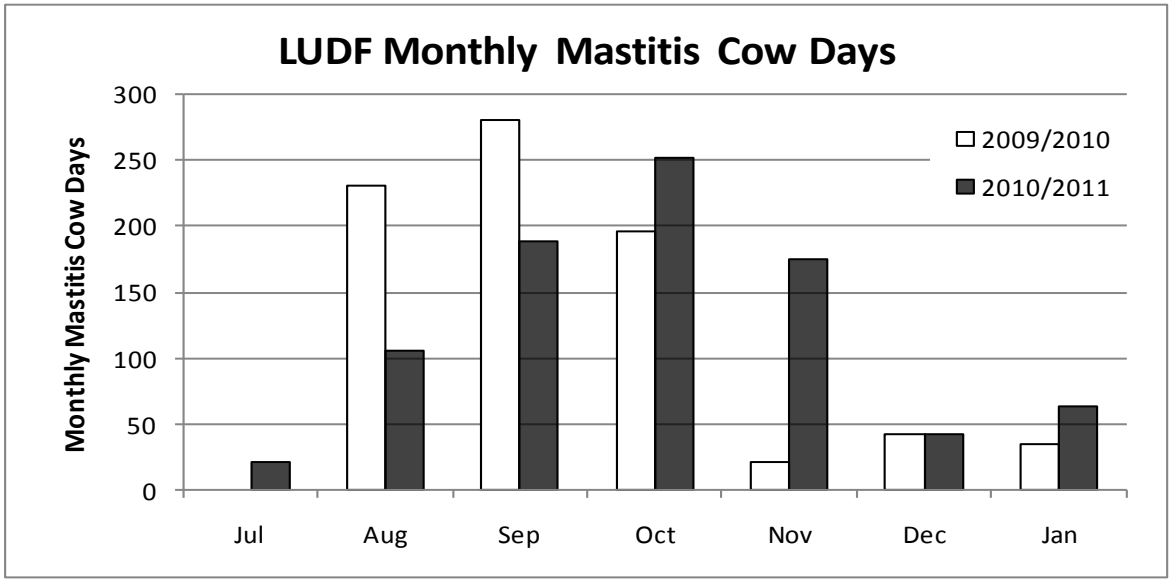

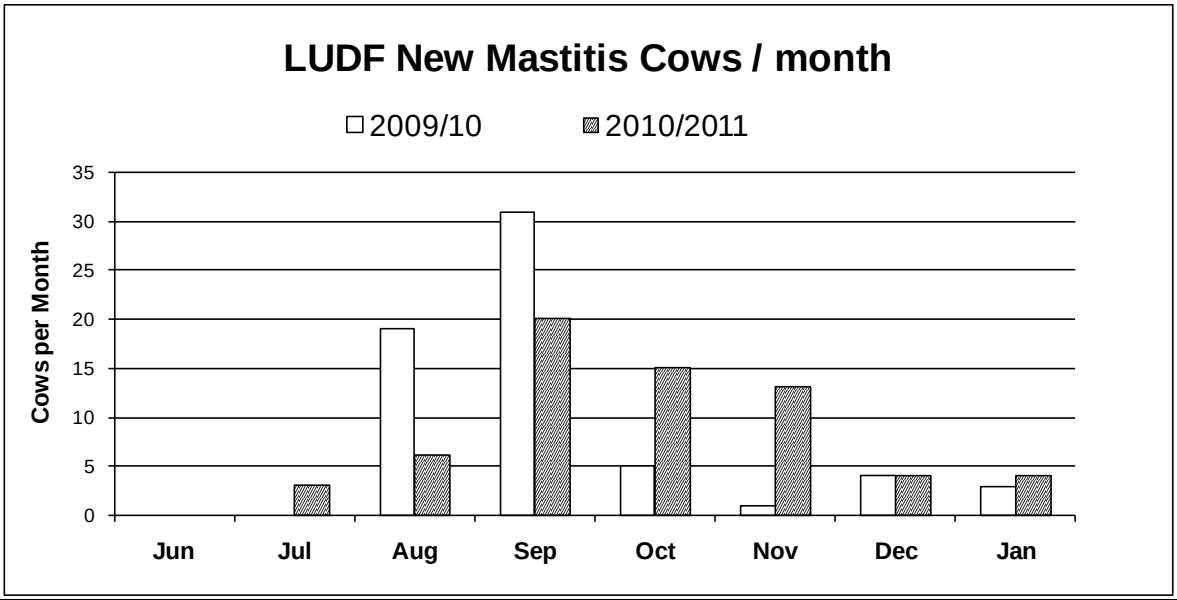

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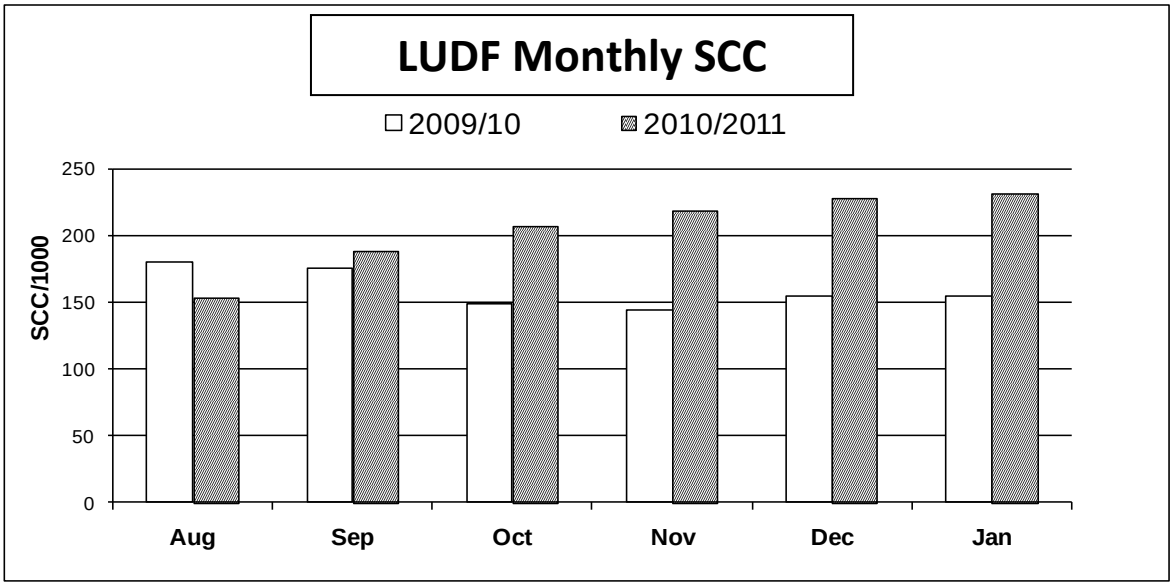

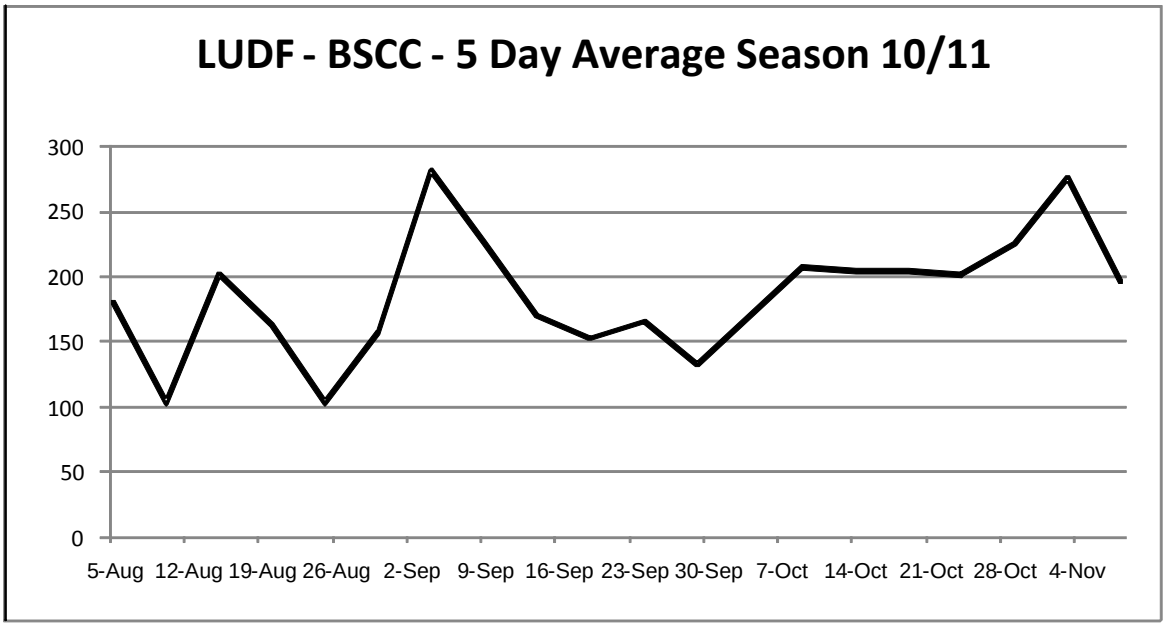

Note the significant spike in SCC following the September 4th Earthquake

Production Losses due to Mastitis (July – January)

	2006/07	2007/08	2008/09	2009/10	2010/11
Cows milking day lost*	1,714	1,242	1,358	805	847
Average MS lost / day	1.5	1.5	1.5	1.5	1.5
Calculated Total MS lost	2,571	1,863	2,037	1,208	1,271

*a cow milking day is every full day that a cow is in the treatment mob and its milk is being withheld from factory supply.

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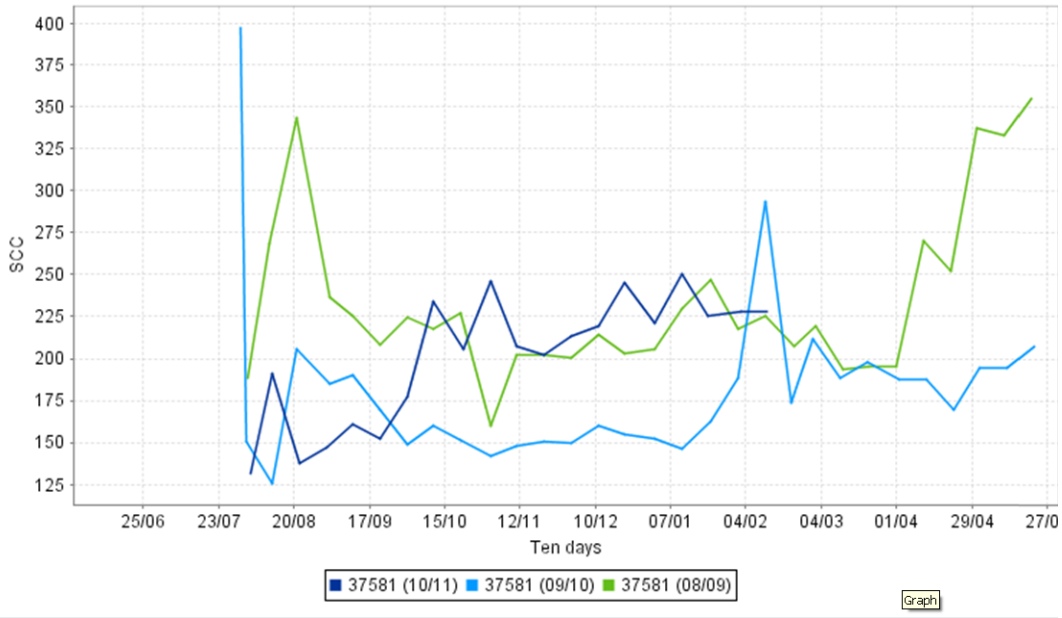
COMMENTS:

This season the herd calved with very low levels of clinical mastitis and bulk milk somatic cell count. The earthquake on September 4th and subsequent interruption to milking saw the somatic cells rise through September and peaking by late October.

Somatic cell count average per 10 days LUDF



These results are very disappointing given the great start to the season. Unhappy with this the team has reviewed all aspects of the milking and mastitis management. A specialist was engaged to review and offer recommendations.

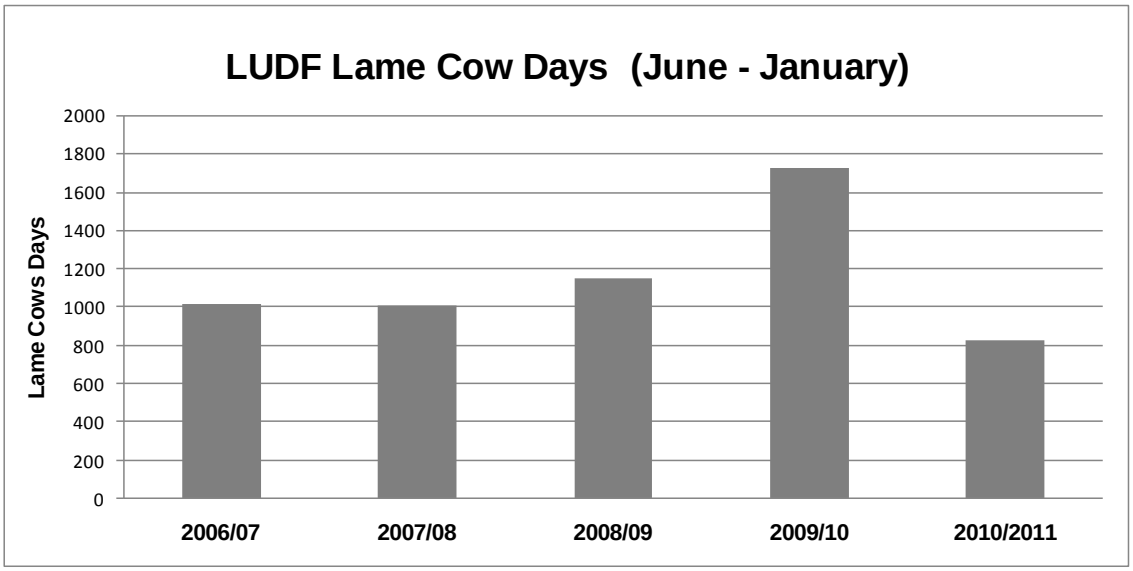
- The machine vacuum was checked. This had increased from 42 psi to 46 psi, caused by some dirt in the transducer on the variable speed milk pump as it was set at 42 psi during the machine test done in January 2010
- Vacuum has since been lowered to 41 psi
- A hand held teat sprayer has been installed, the strength of our teat spray mix has been increased and glycerine was added
- We have also shortened the milk hoses and air hoses
- Pulsation has been changed to 60-40
- All clusters have had replacement rubber seals installed
- The clusters are considered perhaps lighter than ideal, leading to some cup crawl. Replacement of these is likely at some point when Automatic Cluster Removers are added to the plant.

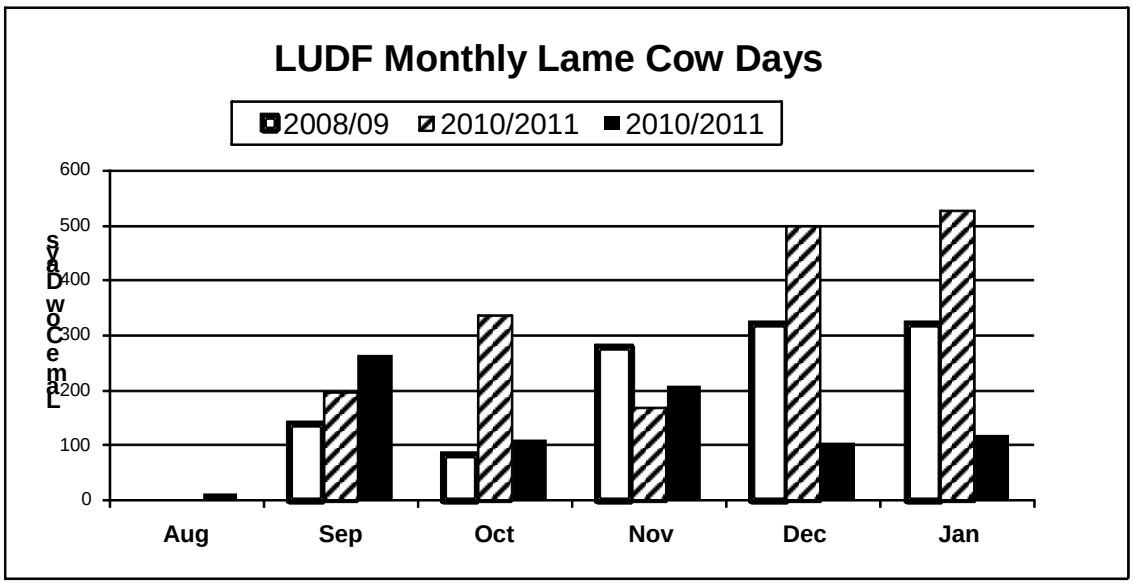
So far little benefit to these changes can be seen.

LAMENESS – Season to Date – Review

Despite the wetter spring weather conditions, the number of lame cows and the number of lame cow days has been reduced significantly this season compared to the previous season. To the end of January 62 cows were identified as lame (including 5 that were lame more than once), the same period last season 98 cows were identified as lame (including 12 cows that were lame more than once).

Comparing the lame cow days for both seasons from June to January, there were 826 for 2010/2011, nearly half of the 1722 recorded 2009/10. There were less lames cows this season, and those cows identified as lame spent less time in the lame mob (12.3 days in 2010/11 (826 days/62 cows) compared to 18 days (1,722 days/98 cows) in the 2009/10 season). The annual lame cow days is the average number of cows in the lame mob every week multiplied by 7. Note this calculation counts cows that have been lame more than once.





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COMPARISON SEASON TO DATE JUNE- JANUARY

June to January	Season 2009/10	Season 2010/2011
• Hoof	Front Left (15%) Front Right (9%) Back Left (45%) Back Right (34%) More than one foot (3%)	Front Left (14%) Front Right (5%) Back Left (31%) Back Right (46%) More than one foot (1%)
• Diagnosis	No. Cows White line 31 Bruising 7 Inter-digital lesion 3 Sole Penetration 29 Footrot 24 Total 94	No. Cows White line 16 Bruising 0 Inter-digital lesion 1 Sole Penetration 21 Footrot 3 Total 41
• Treatment	Cows Trimmed 72 Cows - Excenel 29 Cow - Depocillin 1 Total 102 Cows with shoes fitted 11	Cows Trimmed 41 Cows - Excenel 13 Cows - Depocillin 3 Total 57 Cows with shoes fitted 16

POSSIBLE CAUSES OF LAMENESS IDENTIFIED AT LUDF

- The sharp right hand turn from the underpass to the yard
- Cow flow on underpass
- Dampness of underpass at some times of the year (could explain high incidence of Footrot)
- The state of the South Lane (prior to maintenance work this past spring)
- Cow pressure in the yard
- Cows have taken a long time to recover

MAIN CHANGES THIS SEASON

Changes	Cost	Comment
Recap south lane	$13,240	Has reduced the amount of stones coming on to the concrete and consequently the amount of stones being found in the cow's feet. This has had an impact on reducing lameness.
Changed layout of the underpass to avoid sharp corner in to the yard	$635	To date has helped with the flow of the cows going through the underpass.
Top Gate	$1,321	Slowing down the top gate has probably given the best return. The amount of white line cases which are mostly caused by cow pressure in the yard has been halved.
Earlier identification of lame cows	Staff time and input	Continue to encourage staff to identify lame cows early. This is talked about weekly at staff meetings.
More staff training to prevent, identify and treat lame cows		Ongoing training as required. Half day spent with local vet.
Review treatment policy to reduce time cows take to recover	Staff time and input	Recheck all lame cows every Monday morning to speed up their recovery. Apply shoes to speed up recovery and get back into herd faster.

KEY LESSONS LEARNED

- Biggest contribution to lameness was staff use of the top gate. Slowing this down to approximately 1/20th of its speed has resulted in less lameness. The gate now has a fixed (slow) speed forward and normal speed back.
- Top gate and south lane entrance were only completed at the end of October so the benefit from this has not impacted fully. Would expect to see further reductions in lameness across the rest of the season and also into next season.

REPRODUCTION REVIEW

1. The herd was tail painted on 23 September and pre-mating heats were recorded weekly. 574 pre-mating heats were recorded, initially calculated as 85% of the herd and therefore the target was achieved. Further analysis (as in the following Fertility Focus Report) shows only 73% of cows were recorded as having a pre-mating heat. The difference is most probably recording some cows twice (ie at the beginning and again at the end of the 32 day period in which pre-mating heats were observed).
2. Importantly, when considering the role of intervention with non-cycling cows, there were only 85 cows at the start of mating that had calved more than 42 days and hadn't shown signs of a pre-mating heat. No hormonal intervention was used with non-cycling cows this year.
3. 591 cows inseminated in 3 weeks (28 cows /day). First week 207 cows mated (29.5 cows/day); second week 185 cows inseminated (26.4 cows/day); and the third week 199 cows inseminated (28.4 cows/day). 88.2% 3-weeks submission rate (591 cows) was achieved.
4. To the end of AB 631 cows had been mated. 1000 AI straws were used (including the heifers). AI occurred for the first 5.3 weeks of cow mating followed by natural mating.
5. 72 out of 166 heifers confirmed in-calf to date (43%) to the synchrony/AB programme.
6. The bulls were removed after 9 weeks of mating with the heifers.
7. The bulls were removed on 4 January, 10 weeks after the start of mating.
8. The herd was pregnancy tested on 10 January to identify cows in calf after six weeks of mating. The number judged to be in calf was 482. Against the herd at the start of mating of 669 cows this is 72.0%.
9. Final Pregnancy test confirmed 87% of the herd in calf. (13% empty with 10 weeks mating).

Fertility Focus 2010: Seasonal

Lincoln University
C/O The Manager (University Dairy Fa
PO Box 94
Lincoln University Lincoln 7647

Report date:	16/02/11
PTPT:	BQCY
Herd Code:	6/114
No of cows included:	680
These cows calved between:	17/06/10 and 23/12/10
Mating start & stop date: (estimated from AI or rectal pregnancy test data)	25/10/10 - 04/01/11
Planned start of calving:	03/08/11

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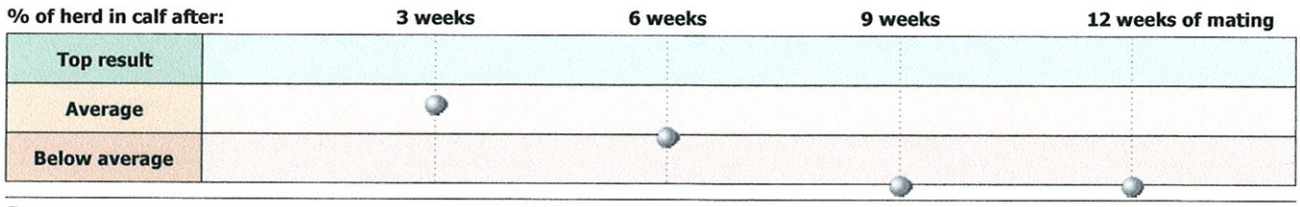
1 Overall herd reproductive performance

6-week in-calf rate
Percentage of cows pregnant in the first 6 weeks of mating

Your herd	67% (67-70%)
Aim above	78%
	☆

Empty rate
Percentage of cows not pregnant after 11 weeks of mating

Your herd	14% (12-15%)
Aim for	6%
	☆



2 Drivers of the 6-week in-calf rate

3-week submission rate
% of cows that were inseminated in the first 3 weeks of mating

Your herd	87%
Aim above	90%
	☆☆☆

Non-return rate
% of inseminations that were not followed by a return to heat

Your herd	
Aim above	

Conception rate
% of inseminations that resulted in a confirmed pregnancy

Your herd	53%
Aim above	60%
	☆☆☆

3 Key indicators to areas for improvement

Calving pattern of first calvers
Well managed heifers get in calf quickly and calve early.

Calved by	Week 3	Week 6
Your herd	81%	93%
Aim above	75%	92%
	☆☆☆☆☆	☆☆☆☆☆

Calving pattern of whole herd
Did late calvers reduce in-calf rates?

Calved by	Week 3	Week 6	Week 9
Your herd	57%	86%	97%
Aim above	60%	87%	98%
	☆☆☆☆☆	☆☆☆☆☆	☆☆☆☆☆

Pre-mating heats
A high % of well managed cows will cycle before the start of mating.

Your herd	73%
Aim above	85%
	☆☆☆

3-week submission rate of first calvers
Well managed heifers cycle early

Your herd	88%
Aim above	90%
	☆☆☆☆☆

Heat detection
A high % of early-calved mature cows should be inseminated in the first 3 weeks of mating.

Your herd	90%
Aim above	95%
	☆☆☆

Non-cycling cows
Treated non-cyclers get in calf earlier.

Treated	By PSM	Wks 1-3	Wks 4-6
Your herd	0%	0%	0%

Rating	What does it tell me?	What should I do?
☆☆☆☆☆	Top result	Ideal - keep up the good work!
☆☆☆	Average	Getting there - focus on getting the details right.
☆	Below average	Plenty of room to improve - seek professional advice.
	No result	Not enough information provided - seek help with records.

Performance after week 6
If you ran bulls after week 6 of mating, empty rate helps assess bull performance.

	Empty rate
Your herd	14%
Expected	8%

Seek advice

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Behind Your Detailed Fertility Focus Report

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Report period: Cows calved between 17/06/10 and 23/12/10.
This was the most recent period with sufficient herd records that enabled an analysis to be completed.

Calving system: Seasonal
Your herd has been classified as seasonally calving because most calvings occurred in a single batch lasting less than 21 weeks.

Level of analysis: Detailed.
Your good record keeping means a detailed analysis was possible for your herd.

Report date:	16/02/11
PTPT:	BQCY
Herd Code:	6/114
Calvings up to this date requested for analysis:	16/02/11
No of cows included:	680
These cows calved between:	17/06/10 and 23/12/10
Mating start & stop date: (estimated from AI or rectal pregnancy test data)	25/10/10 - 04/01/11

Part A) Herd records cross check

Check that the herd records in the table are complete and correct.

2010/11	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
No. of calvings		61	449	144	35								689
No. of AI matings					227	641							868
No. of aged preg tests								496	187				683
No. of non-aged preg tests								2					2
No. of cows culled or died			9	8	2	8	9	11	1				48

Part B) Notes on the calculations

Use the following notes to see how your results were calculated.

1 Overall herd reproductive performance

6-week in-calf rate

Your report has been based on the mating and pregnancy test results you supplied. The ACTUAL 6 week in-calf rate is shown for your herd.

Empty rate

The empty rate reported was based on the results of pregnancy testing. The range provides the lowest and highest likely estimate.

2 Drivers of the 6-week in-calf rate

3-week submission rate

677 cows had calving dates in the required range and 87% of these were submitted during the first 21 days of mating.

Non-return rate (1-24 days)

Non-return rate is not calculated when pregnancy test results provide an accurate estimate of conception rate.

Conception rate

839 eligible inseminations were used in calculating your herd's conception rate.

3 Key indicators to areas for improvement

Calving pattern of first calvers

161 cows with eligible calving dates were recorded as calving at less than 34 months of age. The calving pattern of first calvers was calculated from their records.

Calving pattern of whole herd

689 cows had calving dates that were eligible for this report.

3-week submission rate of first calvers

161 first calvers had calving dates in the required range and 88% of these were submitted during the first 21 days of mating.

Heat detection

242 cows at least 4 years old at calving had calved at least 8 weeks before planned start of mating and 90% of these were submitted during the first 21 days of mating.

Pre-mating heats

677 cows had calving dates in the required range and 492 of these had a pre-mating heat recorded.

Non-cycling cows

No cows were identified as being treated for non-cycling. If you did treat non-cycling cows, please supply records to ensure those cows are identified.

Performance after week 6

Your herd's empty rate and 6-week in-calf rate were used to determine the success of your herd's mating program after the first six weeks. If bulls were used after week 6 of mating, this gives an assessment of how well they got cows in calf.

Induced cows

No cows were identified as having induced calvings. If you did induce cows, please ensure that they are all identified.

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cashmanager RURAL

Variance Report
for
LUDF

Compare Actuals Actual(2011) With Budget - Main (2011)
DateRange: Jun To Jan

GST Exclusive

	Actuals 2011		Budget 2011		Variance		Actuals 2011 as a % of Budget 2011	
	$	Qty	$	Qty	$	Qty	$	Qty
INCOME								
Cattle Sales (Sales)								
Bobby Calves	7,903	(422)	9,000		(1,097)	(422)	88 %	0 %
R2yr Heifers			1,000		(1,000)		0 %	0 %
Mixed Age Cows	6,080	(15)	2,413		3,667	(15)	252 %	0 %
R2yr Bulls	16,611	(20)			16,611	(20)	0 %	0 %
	30,594		12,413		18,181		246 %	
INCOME	30,594		12,413		18,181		246 %	
MILK								
Milk Sales								
Milk Solids	953,340	(174988.9)	869,680	(189064)	83,660	14075.1	110 %	93 %
	953,340		869,680		83,660		110 %	
MILK	953,340		869,680		83,660		110 %	
NET INCOME	983,934		882,093		101,841		112 %	
FARM EXPENSES								
Administration								
Tolls(claimable)	(1,573)		(1,670)		97		94 %	0 %
Hospitality/Sundry	(172)		(600)		428		29 %	0 %
Other Admin Expense			(16)		16		0 %	0 %
Farm Consultant	(9,547)		(9,330)		(217)		102 %	0 %
Internet Charges	(582)		(670)		88		87 %	0 %
	(11,874)		(12,287)		413		97 %	
Animal Health								
Vet Fees	(1,692)		(1,750)		58		97 %	0 %
Drench	(2,893)		(1,850)		(1,043)		156 %	0 %
Trace Minerals	(3,058)		(3,000)		(58)		102 %	0 %
Vaccines herd	(330)				(330)		0 %	0 %
Other Drugs	(1,015)		(660)		(355)		154 %	0 %
Mastitis	(1,973)		(2,112)		139		93 %	0 %
Bloat	(3,794)	(3)	(1,900)		(1,894)	(3)	200 %	0 %
Teatspray	(1,076)	(1)	(2,850)		1,774	(1)	38 %	0 %
Calving Expenses	(3,669)		(2,640)		(1,029)		139 %	0 %
Teat seal R2s	(1,584)		(1,574)		(10)		101 %	0 %
Vacinnes Young Stocl	(81)		(654)		573		12 %	0 %
Debud calves	(1,315)	(200)	(990)		(325)	(200)	133 %	0 %
Milk fever	(651)	(48)	(750)		99	(48)	87 %	0 %
Magnesium Chloride	(4,549)	(11)	(5,618)		1,069	(11)	81 %	0 %
Magnesium Oxide	(3,278)	(5)	(2,500)		(778)	(5)	131 %	0 %
Sray paint	(213)				(213)		0 %	0 %
Milking gloves	(409)				(409)		0 %	0 %
BVD Vaccines	(4,418)		(3,075)		(1,343)		144 %	0 %
Cow Slips	(1,041)				(1,041)		0 %	0 %
Youngstock Minerals	(1,511)				(1,511)		0 %	0 %
Lime flour	(465)	(2)			(465)	(2)	0 %	0 %
Udder cream	(44)				(44)		0 %	0 %
Blood tests	(341)	(10)			(341)	(10)	0 %	0 %
Preg test R2s	(433)				(433)		0 %	0 %
	(39,832)		(31,923)		(7,909)		125 %	
Breeding Expenses								
Admin /Identity Tags	(1,628)		(1,746)		118		93 %	0 %
Herd Test	(1,099)		(2,600)		1,501		42 %	0 %
CIDR's			(2,280)		2,280		0 %	0 %
Artificial Insem.	(15,287)	(826)	(19,008)		3,721	(826)	80 %	0 %

Variance Report
for
LUDF

Compare Actuals Actual(2011) With Budget - Main (2011)
DateRange: Jun To Jan

GST Exclusive

	Actuals 2011		Budget 2011		Variance		Actuals 2011 as a % of Budget 2011	
	$	Qty	$	Qty	$	Qty	$	Qty
Breeding Expenses								
Pregnancy testing	(1,399)	(665)			(1,399)	(665)	0 %	0 %
MINDA	(1,656)		(1,467)		(189)		113 %	0 %
Tail paint	(441)	(38)	(800)		359	(38)	55 %	0 %
Pro track	(1,000)		(1,733)		733		58 %	0 %
Non Cyclers			(800)		800		0 %	0 %
Bulls	(5,491)	(32)			(5,491)	(32)	0 %	0 %
Heifer syncro	(5,563)	(166)			(5,563)	(166)	0 %	0 %
Heifer Ai	(3,731)	(166)			(3,731)	(166)	0 %	0 %
Metro check	(500)	(670)			(500)	(670)	0 %	0 %
	(37,793)		(30,434)		(7,359)		124 %	
Electricity								
North Irrig Power	(16,915)		(19,781)		2,866		86 %	0 %
Dairy Shed	(13,926)		(11,922)		(2,004)		117 %	0 %
South irri Power	(12,163)		(14,509)		2,346		84 %	0 %
	(43,004)		(46,212)		3,208		93 %	
Feed								
Winter Grazing	(119,356)		(120,000)		644		99 %	0 %
Silage Purchased	(47,053)	(171340)	(65,340)		18,287	(171340)	72 %	0 %
Calf feed	(7,354)	(12.15)	(7,924)		570	(12.15)	93 %	0 %
Grazing R1	(30,141)		(28,451)		(1,690)		106 %	0 %
Grazing R2	(44,756)	(166)	(35,947)		(8,809)	(166)	125 %	0 %
Silage Making	(12,014)	(114100)	(17,183)		5,169	(114100)	70 %	0 %
	(260,674)		(274,845)		14,171		95 %	
Fertiliser								
Superphosphate	(28,703)	(75240)	(21,070)		(7,633)	(75240)	136 %	0 %
Nitrogen (Urea)	(36,996)	(60420)	(29,700)		(7,296)	(60420)	125 %	0 %
Eco-n	(12,752)	(160)	(12,720)		(32)	(160)	100 %	0 %
Spread Urea	(9,030)	(864.3)	(10,085)		1,055	(864.3)	90 %	0 %
Spread Super	(3,559)	(169.3)			(3,559)	(169.3)	0 %	0 %
	(91,040)		(73,575)		(17,465)		124 %	
Regrassing								
Cultivation	(6,552)	(15.53)	(6,143)		(409)	(15.53)	107 %	0 %
Drilling	(5,063)	(46.28)	(1,597)		(3,466)	(46.28)	317 %	0 %
Spraying	(179)	(8.6)	(2,172)		1,993	(8.6)	8 %	0 %
Seed Purchase	(8,399)	(585)	(4,898)		(3,501)	(585)	171 %	0 %
	(20,194)		(14,810)		(5,384)		136 %	
Repairs & Maint								
Farm Buildings	(394)		(1,330)		936		30 %	0 %
Water Supply	(1,874)		(670)		(1,204)		280 %	0 %
Irrigation	(5,327)		(8,522)		3,195		63 %	0 %
Fences & Yards	(268)		(670)		402		40 %	0 %
Shelter Trees	(3,949)		(1,000)		(2,949)		395 %	0 %
Drainage	(3,570)		(2,000)		(1,570)		179 %	0 %
Tracks	(17,213)		(20,000)		2,787		86 %	0 %
Tools	(688)		(670)		(18)		103 %	0 %
Plant & Equipment	(1,759)		(2,330)		571		76 %	0 %
Dairy Shed Plant	(15,301)		(5,330)		(9,971)		287 %	0 %
Effluent	(1,701)		(2,400)		699		71 %	0 %
Minor Cap. purchases	(700)		(3,330)		2,630		21 %	0 %
Pivot ruts	(8,214)		(4,000)		(4,214)		205 %	0 %
	(60,958)		(52,252)		(8,706)		117 %	
Shed Expenses								

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Variance Report
for
LUDF

Compare Actuals Actual(2011) With Budget - Main (2011)
DateRange: Jun To Jan

GST Exclusive

	Actuals 2011		Budget 2011		Variance		Actuals 2011 as a % of Budget 2011	
	$	Qty	$	Qty	$	Qty	$	Qty
Shed Expenses								
Detergents	(1,860)		(2,910)		1,050		64 %	0 %
Cleaners			(333)		333		0 %	0 %
Rubberware	(1,564)		(1,700)		136		92 %	0 %
Filters	(361)	(6)	(300)		(61)	(6)	120 %	0 %
Brooms and Brushes	(586)		(1,016)		430		58 %	0 %
	(4,371)		(6,259)		1,888		70 %	
Vehicle Expenses								
Petrol	(2,224)	(1387.12)	(2,423)		199	(1387.12)	92 %	0 %
Diesel	(5,470)	(5194)	(2,300)		(3,170)	(5194)	238 %	0 %
Oil & grease	(51)		(300)		249		17 %	0 %
Ute	(1,879)		(3,000)		1,121		63 %	0 %
Tractor	(2,458)		(1,800)		(658)		137 %	0 %
Motorbike	(2,648)		(3,634)		986		73 %	0 %
WOF & rego			(600)		600		0 %	0 %
	(14,730)		(14,057)		(673)		105 %	
Wages & Employment								
Perm Staff/Bonus			(1,800)		1,800		0 %	0 %
Casual	(2,280)	(138.5)	(7,000)		4,720	(138.5)	33 %	0 %
Accrued Leave	(722)				(722)		0 %	0 %
Accommodation Allce	(13,336)		(13,333)		(3)		100 %	0 %
ACC	(5,496)		(5,496)				100 %	0 %
Protective clothing	(1,384)		(1,387)		3		100 %	0 %
Staff Development			(3,167)		3,167		0 %	0 %
Assistant 2	(112,341)		(115,669)		3,328		97 %	0 %
Stores/Tea Supplies			(700)		700		0 %	0 %
Stat Days	(2,762)		(1,300)		(1,462)		212 %	0 %
	(138,322)		(149,852)		11,530		92 %	
Weed & Pest								
Herbicides	(1,035)		(300)		(735)		345 %	0 %
	(1,035)		(300)		(735)		345 %	
FREIGHT								
Freight Cows	(3,223)	(289)	(3,840)		617	(289)	84 %	0 %
Freight R1s	(25)		(1,140)		1,115		2 %	0 %
Freight General	(24)		(400)		376		6 %	0 %
Freight R2s	(1,290)	(129)			(1,290)	(129)	0 %	0 %
	(4,561)		(5,380)		819		85 %	
FARM EXPENSES	(728,389)		(712,185)		(16,202)		102 %	
CATTLE PURCHASES								
Cattle Purchases								
R Yr 2 Bulls	(25,400)	(20)			(25,400)	(20)	0 %	0 %
Bulls			(20,320)		20,320		0 %	0 %
	(25,400)		(20,320)		(5,080)		125 %	
CATTLE PURCHASES	(25,400)		(20,320)		(5,080)		125 %	
TRADING SURPLUS	230,145		149,588		80,557		154 %	
FIN YEAR SURPLUS	230,145		149,588		80,557		154 %	
GST								
GST								
GST Component	(27)		(3,379)		3,352		1 %	0 %
General			2,200		(2,200)		0 %	0 %
	(27)		(1,179)		1,152		2 %	
GST	(27)		(1,179)		1,152		2 %	

cashmanager RURAL

Variance Report
for
LUDF

Compare Actuals Actual(2011) With Budget - Main (2011)
DateRange: Jun To Jan

GST Exclusive

	Actuals 2011		Budget 2011		Variance		Actuals 2011 as a % of Budget 2011	
	$	Qty	$	Qty	$	Qty	$	Qty
INCOME (EXPENSE)	$ 230,118		$ 148,409		+81,709		155 %	

Where has the Clover Gone?

LUDF has normally observed good levels of clover in the pastures – anecdotally in the vicinity of 25-35% of the sward through the summer. This clover has contributed both high quality feed and (as in the Nutrient Budget that follows) provides additional nitrogen via fixation.

The clover content in the pastures at LUDF this season has been almost non-existent, although some clover is now reappearing in 'ungrazed' areas such as the area surrounding the soil pit (grazed until March 2009 then fenced and mown). Monitoring of Clover Root Weevil adults showed low levels in the 2009/10 summer, followed by rapidly increasing numbers this spring.

The following material is a combination of input from Dr Dave Chapman, DairyNZ, Dr Ants Roberts, Ravensdown, Mark McNeil, AgResearch, Graham Kerr, Agriseeds and the LUDF management team.

Clover Root Weevil - North Island experience

What is the clover root weevil?

The adult is a speckled brown weevil, up to 6 mm long, that lives for two months or more. It is a nocturnal feeder that hides at the base of the pasture during the day. Adults and larvae are present in the pasture all year round.

In spring adults emerge from mid-October through to mid-December, and in autumn they emerge from February until April.

A single female may lay up to 3000 eggs in good soil moisture conditions, but in dry conditions far fewer eggs are laid and there is a very small larval summer/autumn generation.

Adults feed only on clovers, particularly white clover. They prefer seedlings and so disrupt natural regeneration of clover. Adult feeding leaves distinctive U-shaped notches on clover leaflets. The larvae severely damage clover nodules, roots and stolons, and so reduce N fixation and plant reserves, and induce root diseases. Thus, the poor old clover gets a double whammy above and below ground. Severe damage causes loss of clover from pastures, but more commonly clover persists with less vigour and fewer nodules.

In the North Island, the initial CRW attack resulted in almost a complete loss of white clover in pastures. This lasted 2-3 seasons, before clover returned.

White clover levels in the Waikato where CRW have been for over 10 years now appear more consistent, but at lower levels than before CRW. This situation is helped by the release of the parasitoid wasp.

The affects of CRW in Canterbury will likely be different - with irrigation and hence much more reliable clover growth year to year.

Managing clover-based pastures in CRW-affected areas reduce stress on clover:

Strong white clover can better tolerate, and recover from, CRW attack, so good grazing management is important. CRW attack makes the clover more fragile, so avoid trampling, pugging and overgrazing to assist clover survival.

White clover doesn't like shading and is sensitive to direct UVradiation on its stolons, so recommended grazing strategies include:

Consistent grazing during spring and summer:

- Aim for good post-grazing residuals (1480 kg DM/ha or 7 RPM units); and
- Identify surplus cover early and cut for silage to prevent clover being swamped by grasses.

N fertiliser use:
If white clover is lost from a pasture, extra N fertiliser will be required to compensate for the loss of fixed N from white clover. As a minimum, applying N fertiliser at rates of 20-30 kg N/ha in spring may improve the vigour of both clover and grass, increase clover persistence in summer and enable an autumn recovery of clover if the summer generation of larvae is small.

Pasture renovation:
The following are options for establishing highly productive pastures in CRW areas:

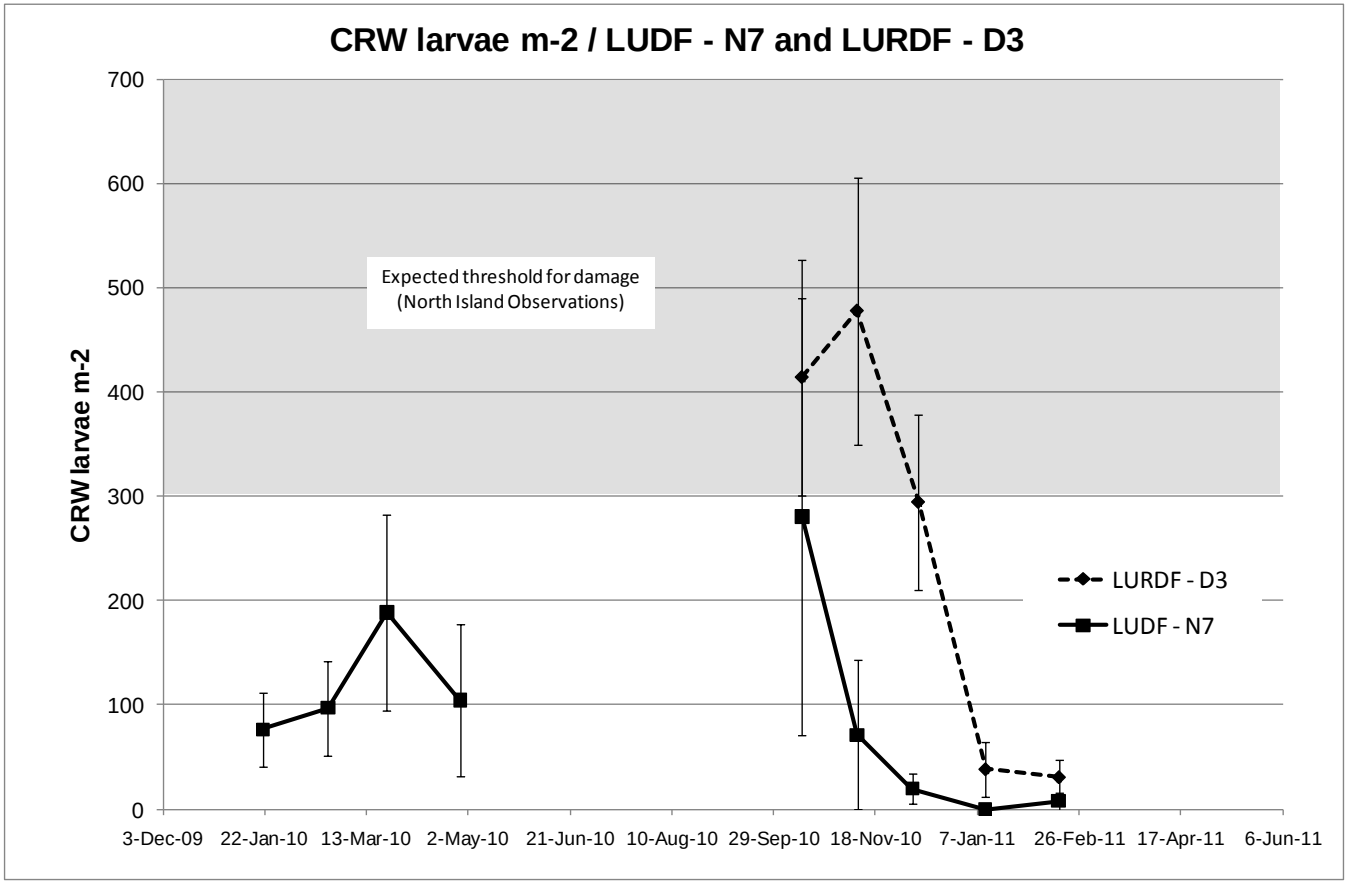
1. Cultivation following herbicide spraying – This will reduce adult numbers in the paddock but only reduces larvae numbers by about 60 per cent, so that while clover will establish well, seedling roots and nodules will soon be attacked.
2. Selective removal of clover from pastures – Three months before sowing apply Dicamba or Versatill. This will reduce larval numbers by 95 per cent, and after three months new pastures can be sown after cultivation or by direct drilling after herbicide.
3. Reduce adult numbers with insecticide – Lorsban 750 WG is registered for use against CRW and works well against high adult populations but does not kill existing larvae.
4. Three month fallow – A fallow period between herbicide spraying and sowing new pasture prevents damage as both adults and larvae are gone.
5. Summer crop – Rotate the worst affected areas through a summer crop such as a forage maize or brassica. This will remove many damaging pasture pests, including clover root weevil, nematodes and plant diseases, from the soil and enables the establishment of vigorous healthy pastures.
6. Use highly stoloniferous medium, or medium-large leaved clovers in your seed mix [rather than large leaved types]. They are more tolerant of CRW feeding.

   Barrier strips created by spraying with insecticide along fence lines will not prevent re-infestation as adult weevils can fly in during the following spring.

Clover Root Weevil – LUDF

- Clover root weevil (CRW), *Sitona lepidus*, was first detected on the Lincoln University Dairy Farm in late 2008, and regular monitoring commenced in May 2009.
- CRW adults are present all year round. New generation CRW adults emerge from November onwards, peak in late February, then decline over winter as age-related mortality occurs.
- The damaging CRW larvae appear to peak in late winter-spring and again in autumn (see graph below). This suggests there are two CRW generations per year, as in the North Island. Over winter, adults continue to lay eggs whenever it's warm enough, so larval numbers build-up, only moving through to the pupal stage when soil temperatures are warm enough. They then emerge as adults in late spring.
- North Island data have shown that typical winter larval population levels of 300 larvae m^{-2} can reduce Waikato white clover yields by 35% (1000kg DM/ha) annually, with greatest losses occurring in spring.
- CRW flights can occur from mid-December through to April. This means it is difficult to control the adult stage with insecticides, as chemicals only provide short term control before reinvasion of pasture occurs.
- CRW larval populations at LUDF had only reached moderate levels by winter 2010, though they have since built up quickly.

- In relation to the rapid decline in white clover observed at LUDF, larval feeding damage would have compounded other problems, such as giving entry to root diseases during a wet winter. When combined with the pressure of animal grazing, larval feeding could have contributed to the clover loss.
- CRW adult populations on the farm have increased since monitoring commenced, but are still small compared to peaks of over 100 adults m^{-2} observed in Waikato prior to biocontrol.
- The CRW biocontrol agent *Microctonus aethiopoides* has been released in Canterbury, both at Rotherham and Rakaia Island, where the detected CRW populations were big enough to support early releases. Establishment has been confirmed at Rotherham, but not yet at Rakaia Island.
- AgResearch will make an additional biocontrol release in the vicinity of Lincoln in early 2011, unless sampling shows its arrival through natural dispersal from Rakaia Island is imminent.
- Monitoring on the farm will be conducted throughout 2011 with larvae and adults sampled at regular intervals. This will provide important information on biology and management of CRW in Canterbury.



CRW larval densities measured in paddock N7 – LUDF and D3 - LURDF (Research Dairy Farm). Larval numbers build-up over winter to peak in spring. Error bars represent the 95% confidence interval.

Where has the clover gone at LUDF? Ryegrass, competition, grazing and nitrogen

David Chapman, Principal Scientist, DairyNZ, Lincoln

Background:

Why is it so hard to keep a high proportion of white clover in our dairy pastures? The benefits of white clover are well known: it offers excellent quality feed for milking cows, grows better in summer when ryegrass often struggles even when there is plenty of water, and (because it is a legume) it can fix some 'free' nitrogen from the air.

For these reasons, we've traditionally considered that having 30% of thereabouts of total annual pasture production coming from clover to be a good thing. However, it is now difficult to find pastures on NZ dairy farms, including LUDF, with that amount of clover. Why?

To address this, we should draw some comparisons between clover and perennial ryegrass, because these two species are almost always sown together in new pasture. While the ryegrass/white clover pasture is our 'ideal' mixture, the reality is that the ryegrass and clover plants are in constant competition with each other for the things that all plant species need in order to grow: light, water and nutrients. The winner of this competition will eventually dominate the pasture. The way cows graze the pastures, and the way we manage the pastures, influences the competitive advantage of the respective species, and therefore the pasture composition.

When we review what is known about the **competitive ability** of ryegrass and white clover, the score card looks something like this:

Competition for light:	Winner = ryegrass, loser = clover
Competition for water:	About even (perhaps a slight edge to ryegrass)
Competition for nitrogen:	Winner = clover (it fixes its own N) ***but N fertiliser negates this***
Competition for P and K:	Winner = ryegrass, loser = clover

Therefore, 'home-ground' advantage for white clover is on soils that are low in N but high in phosphorus (P) and potassium (K), where pastures are kept short all the time so the grass does not 'shade out' the clover, and no N fertiliser is used. How often do we come across these situations?

The **grazing behaviour** of cows on clover and grass also tells us a lot about the way the battle between the species plays out. If given a free choice between eating as much clover as they would like or as much ryegrass as they would like, cows almost always take about 70% of their daily intake from the clover, and 30% from the grass. That is, they ***prefer*** clover, but will not eat ***only*** clover. They always eat some grass too, even though they cannot eat as much grass as clover in a day, and the grass is (to our way of thinking anyway) of lower quality than the clover.

This tells us that cows **do not** graze in ways that would maximise their daily energy intake: if this was their motivation, they wouldn't eat any grass at all, only clover. The grass obviously adds something of value to the diet from the cows perspective – possibly fibre, which (among other things) helps temper the amount of ammonia building up in the rumen when the high protein content of the clover is digested. Ammonia has to be removed as urea in the urine, which uses up energy and concentrates the N in the urine hence potentially increasing nitrate leaching from soils.

If there is a high proportion of clover in the pasture, this will more closely match the natural grazing preference of cows, increase their intake (particularly their energy intake), and increase milk solids. Grass dominant pastures may require cows to graze for longer to obtain their daily energy requirement, and could compromise our ability to maintain intakes and desired round length if grass quality is particularly poor.

Implications for LUDF?

What might this all mean for a farm like LUDF where the low clover content in pastures (estimated to be less than 10% of dry matter this year) is causing concern?

There is no doubt that the soils and climate of LUDF can support good clover growth. The graph in Figure 1 contains results from 2002-03, and shows clover content peaking at 60% of pasture dry matter in summer in the control treatment (no N fertiliser applied). Interestingly, the effects of N fertiliser were already apparent, in the grasses ability to suppress some clover growth where additional N fertiliser was available.

Trials conducted at Ruakura by Sharon Harris and Dave Clark in the mid 1990's showed that the optimal amount of clover in the diet of cows for high milk solids production is around 50% of DM. This would only be achievable with zero N fertiliser, which would reduce total pasture growth. Clark and Harris looked at this trade-off between clover content, total pasture yield and pasture quality using a farm system model. They estimated the operating profit for a farm consuming 16 t DM/ha per year with 20% white clover as a baseline, then worked out how much more, or less, the total pasture yield would need to be to give the same operating profit if clover content fell below, or rose above, 20%. The results are in Figure 2. If clover content fell to 10%, then total pasture yield needed to increase by 15% to compensate for the loss of pasture quality and hold the same operating profit: that is, another 1.8 t DM/ha consumed was required. Assuming an extra 10 kg of pasture DM is consumed for every kg of N fertiliser applied, this is the equivalent of 180 kg N fertiliser per hectare. Figure 1 shows that this would cause the clover content to fall further.

LUDF has used about 200 kg N/ha in recent years and this theoretically is one factor holding clover content back to 10% or less of annual dry matter. Visual observations however (at least until this time last year) indicated late spring / summer clover content was probably in the region of 20-40%. LUDF's use of N will, however, produce more total dry matter and give more control over seasonal pasture growth compared to a system with less N and more clover. But it may not produce more total milk solids.

What can be done about this?

The information above provides good reasons for having a strong clover presence in the pasture, but can we have our cake (clover) and eat it too? Not easily, if we grow ryegrass and clover together, use a lot of N fertiliser, and place a high premium on late winter – early spring feed (this is when clover growth rates are quite sluggish). Sowing a mix of both medium- and large-leaf clover cultivars known for their high plant density should give the clover plants a better foothold in the pasture. Keep P levels in the soil up, and watch pH levels (low pH is more harmful to clover than ryegrass). Don't take silage from a 'good clover' paddock. Don't expect too much!

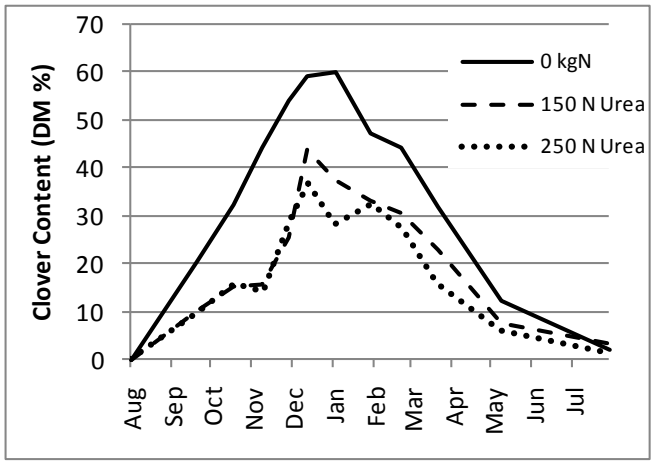


Figure 1: Percent clover in pastures at LUDF in 2002-03, with different N fertiliser treatments

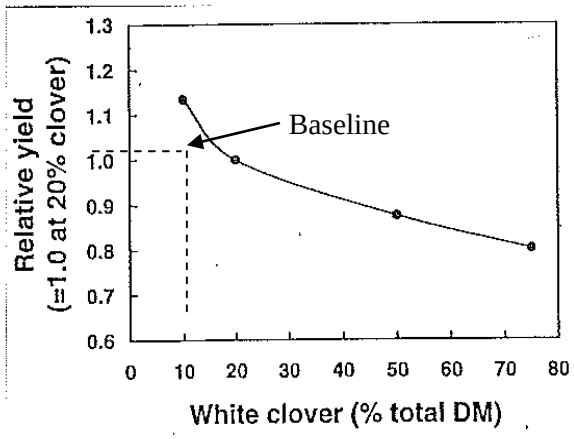


Figure 2: Change in total pasture yield needed (on left-hand axis) to maintain operating profit when clover comprises between 10 and 70% of pasture dry matter

Summary score card: Ryegrass and Clover

	Ryegrass	Clover	Comments
Advantage to clover			
How quickly can cows eat each species?	100	~160	This is the relative short-term intake rate, if eating either pure ryegrass or pure clover, i.e. cows can consume clover 60% faster than ryegrass during meal bouts.
How much dry matter will cows eat per day?	100	~ 120	This is the relative ***daily intake***, if eating a diet of pure ryegrass or pure white clover i.e. cows eating clover eat about 20% more dry matter per day.
How does the quality compare?	100	~ 110	This is the relative ***digestibility*** of the two species – i.e. clover is on average about 10% better than ryegrass, ***but*** ryegrass fluctuates a lot more during the year than clover.
How much milk will they produce?	100	~ 130	This is the relative ***milk solids*** per day, if eating a diet of pure ryegrass or pure white clover, i.e. cows eating clover produce about 30% more milk solids per day.
Deuce			
Which do cows prefer?	30%	70%	This is the % of their daily intake ***if*** offered a free choice between them. Good for clover because it reflects the cows view of 'quality' (they have a clear partial preference for clover); bad for clover because ***cows will graze it harder than ryegrass, if they have a choice.***
Advantage to ryegrass			
How much leaf is lost when cows graze?	Most – but some remains	Virtually all	Depends on grazing residual, but ***ryegrass generally has a head start in regrowth***. Even more so if cows actively select for the clover.
How do they respond to N fertiliser?	***Strongly***	***Not at all***	Head start + N = trouble for clover.
How well do they compete for light?	Strongly	Moderately	Head start + N + tall pastures = extra trouble for clover.

Simplified Nutrient Budget

	2010/11 Plan	2009/10 Plan	2009/10 – Actual	2008/09 Actual	2007/08 Actual
Inputs					
Fertiliser	249	175	185	175	163
Atmospheric / Clover N	76	108	121	131	139
Irrigation	13	13	13	13	13
Supplements	48	42	18	18	44
Outputs					
Product	126	122	120	120	125
Atmospheric	94	69	101	74	80
Leaching /Runoff	22	17	38	18	26
Immobilisation	144	130	78	128	128

Lincoln University Dairy Farm - Farm Walk notes

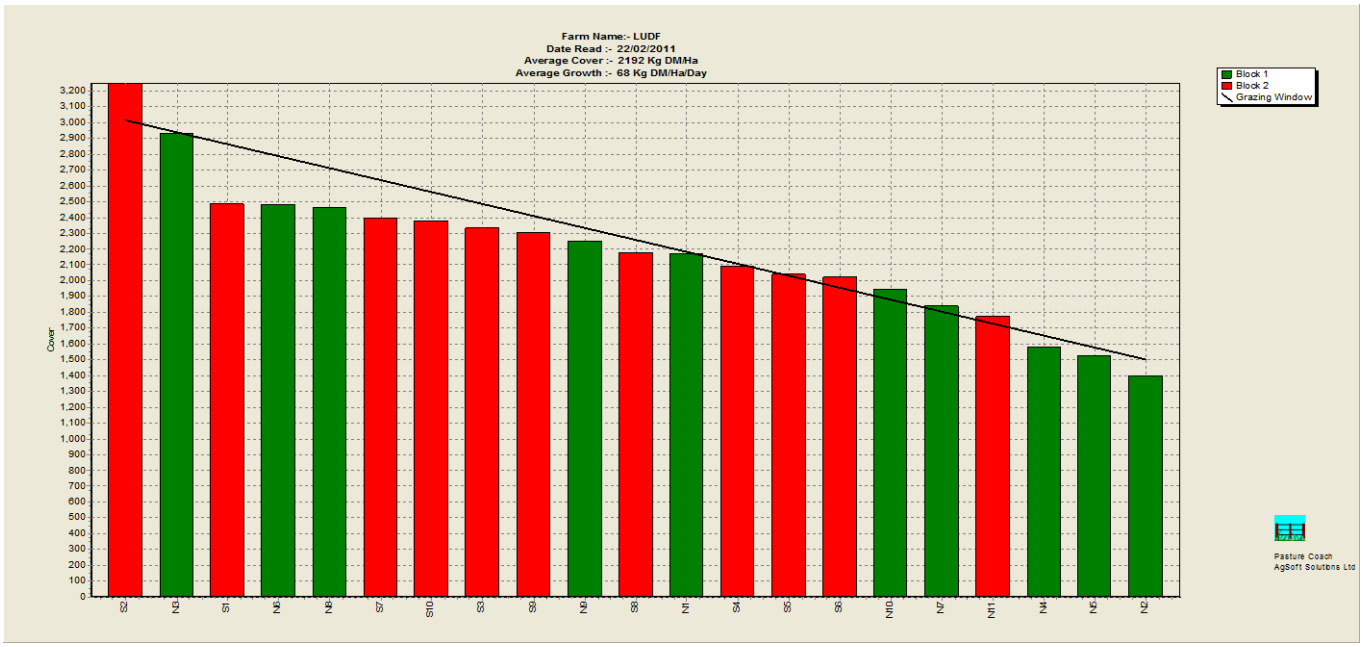
Tuesday, 22nd February 2011

CRITICAL ISSUES FOR THE SHORT TERM

1. **Maintain pasture quality by regular monitoring and making necessary changes**
2. **Keep grazing residuals to the desired 7 - 8 clicks**
3. **Continue Mg supplementation**
4. **Closely observe milking cows for mastitis**
5. **Maintain round length between 21-23 days**

SUMMARY OF KEY FACTORS AFFECTING GRAZING MANAGEMENT & ANIMAL PERFORMANCE

6. Soil temperature this week was 17.3oC (last week 16.9oC).
7. There has been no rain over the last week. 3 days of irrigation required on the North and 2 days on the South Block this week.
8. PASTURE GROWTH was 68 kg DM/ha/day, the same as the 69 kg DM/ha/day last week.
9. Average PASTURE COVER was measured at 2,192 kg DM/ha, down from last week at 2,304 kg DM/ha.
10. In the same week last year growth rate was 77kg DM/ha/day and average pasture cover was 2,299kg DM/ha with slightly lower soil temperature.
11. This morning 659 cows were milked into the vat, 5 of these were lame cows.
12. Including all groups of cows, 53.6 ha was grazed for the week, an average of 7.6 ha/day or 20 day round.
13. No silage fed during the week. Season to date 101.4t DM (151.7 kg DM/cow).
14. Paddock N2 was sprayed out on 8 January. It was cultivated and drilled with Trojan Ryegrass on 20 January. It has had a small nip off with calves and is probably about 14 – 18 days from grazing by the herd. It will be weed sprayed after that grazing.
15. Today's feed Wedge:



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SIDE

The target line in the wedge reflects the pre-grazing target of 3,010 kg DM/ha and a post grazing of 1,500 kg DM/ha, which is the pre-grazing needed to feed the cows considering the stocking rate of 4.29 cows/ha (656 cows/152.7 ha)), cows eating 16 kg DM/cow/day and a rotation length of 22 days.

16. There is a deficit of 12t DM on this Feed Wedge, that will need to be filled with silage during the week.
17. The growth rate was not high enough to enable the round to recover to our targeted 21 – 23 days. This is a little surprising given soil temperature and very adequate soil moisture. Many pastures however are showing considerable nitrogen deficit symptoms.
18. The fifth round of Urea is underway. This week 38 ha received 25 kg N. Season to date 189kg N/ha has been applied across the whole of the milking platform (160 ha).
19. Two new lame cows this week. There have been 59 lame cows since calving started on the 20 July.
20. No new cases of clinical Mastitis, season to date 65 cows treated for Mastitis.
21. SCC has ranged from 199 – 250,000. All cows are currently having one quarter stripped each morning milking to check for mastitis.
22. Production this week was 1.38 kg MS/cow/day (1.42kg MS/cow last week) and 5.71kg MS/ha/day (5.87 kg MS/ha last week).
23. The herd was pregnancy tested 35 days after six weeks of mating. The number judged to be in calf was 482. Against the herd at the start of mating of 669 cows this is 72.0%.
24. Last week we rechecked our empties The number judged to be in calf is now 586 against the herd at the start of mating of 669 cows this is 87.6.0%.

25. R2 heifers were preg. tested Thursday, 10 February and we had 152 out of 166 deemed to be in calf 91.5%.

Next farm walk will be on **Tuesday, 1st March 2011, at 9.00 am.**
Farmers or their managers and staff are always welcome to walk with us. Please call to notify us of your intention and bring your plate meter. Phone SIDDC – 03 325 3629

Management Group
Peter Hancox (Farm Manager), George Reveley (for SIDDC), Virginia Serra (DairyNZ).

SIDDC South Island Dairying Development Centre
Partners Networking To Advance South Island Dairying
Lincoln University Te Whare Wānaka o Aoraki CHRISTCHURCH-NEW ZEALAND · DairyNZ · Ravensdown · LIC · Plant & Food RESEARCH RANGAHAU AHUMĀRA KAI · agresearch · SIDE

LUDF Weekly Data Sheet

Date (Totals at end of period)	25-Jan-11	1-Feb-11	8-Feb-11	15-Feb-11	22-Feb-11
Total Cows Wintered (July 1st Total)	694	694	694	694	694
Farm grazing ha (available to milkers)	160	160	160	160	160
Dry Cows on farm / East block / other	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
Culls (Includes culls put down & empties)	0	3	0	1	0
Culls total to date	14	17	17	18	18
Deaths (Includes cows put down)	0	0	0	1	1
Deaths total to date	13	13	13	14	15
Calved Cows available (Peak Number 680…)	664	661	661	660	659
Treatment / Sick mob total	2	2	0	0	0
lame, mastitis, other, colostrums	4/2/0/0	1/2/0/0	3/0/1/0	2/0/0/0	2/0/0/0
Milking twice a day into vat	659	658	658	658	657
Milking once a day into vat	4	1	3	2	2
Total Cows Milked into vat	663	659	661	660	659
Days in Milk actual cow days/Peak Cows	157	164	171	178	185
MS/cow/day (Actual kg / Cows into vat only)	1.41	1.5	1.5	1.37	1.36
MS/cow to date (total kgs / Peak Cows 680)	258	268	278	288	297
MS/ha/day (total kgs / Total ha used - eg 161.5ha)	5.86	6.2	6.1	5.6	5.62
MS/ha to date (total kg / Total ha used)	1071	1114	1157	1196	1236
Herd Average Condition Score		4			4
Whole Herd LW (kgs)	461	470	467	467	469
Soil Temp Tues 10.00am 10cm	15.9	16.5	17.4	16.9	17.3
Growth Rate (kgDM/ha/day)	78	74	78	69	68
Plate meter height - ave half-cms	13.8	13.0	13.2	12.8	12.0
Ave Pasture Cover (x140 + 500)	2434	2320	2348	2304	2192
Pre Grazing cover (ave for week)	3160	3174	3002	3019	3053
Post Grazing cover (ave for week)	1550	1550	1550	1550	1550
Highest pre-grazing cover	3200	3314	3230	3300	3258
Area grazed / day (ave for week)	6.28	7.80	7.90	7.60	7.60
Grazing Interval	25	21	20	21	21
Pasture ME (pre grazing sample)	12.3			12.1	
Pasture % Protein	21.1			23.0	
Pasture % DM	15.9			15.5	
Pasture % NDF	36.2			34.5	
Supplements Type	0	0	0	Grass Silage	0
Supplements fed kg DM/cow/day in paddock	0.0	0.0	0.0	1.4	0.0
Supplements fed to date kg per cow (680 peak)	146.9	146.9	146.9	156.7	156.7
Supplements Made Kg DM / ha cumulative	593.8	670	670	670	670
Units N applied/ha and % of farm	30units27%	30units20%	0	30units24%	30units23%
Kgs/ha N to Date (on the NON-effluent area 133ha)	215	222	222	229	237
Rainfall (mm)	28	0	21	8	0
ET Weekly Soil & Science readings (mm)					
Days irrigated each week	1	6	6	2	3
Irrigation mm applied per week	5.8	34.8	34.8	11.6	17.4
Stock Water Consumed litres / cow / day	20	46	26	40	36

SIDDC ONLINE

Check out the SIDDC website to find out how your farm compares to best practice, see the latest farm walk notes as well as:

- Research
- Maps
- News and events
- Focus days
- Demo farm information
- and much more

VISIT THE SIDDC WEBSITE AT WWW.SIDDC.ORG.NZ

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