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

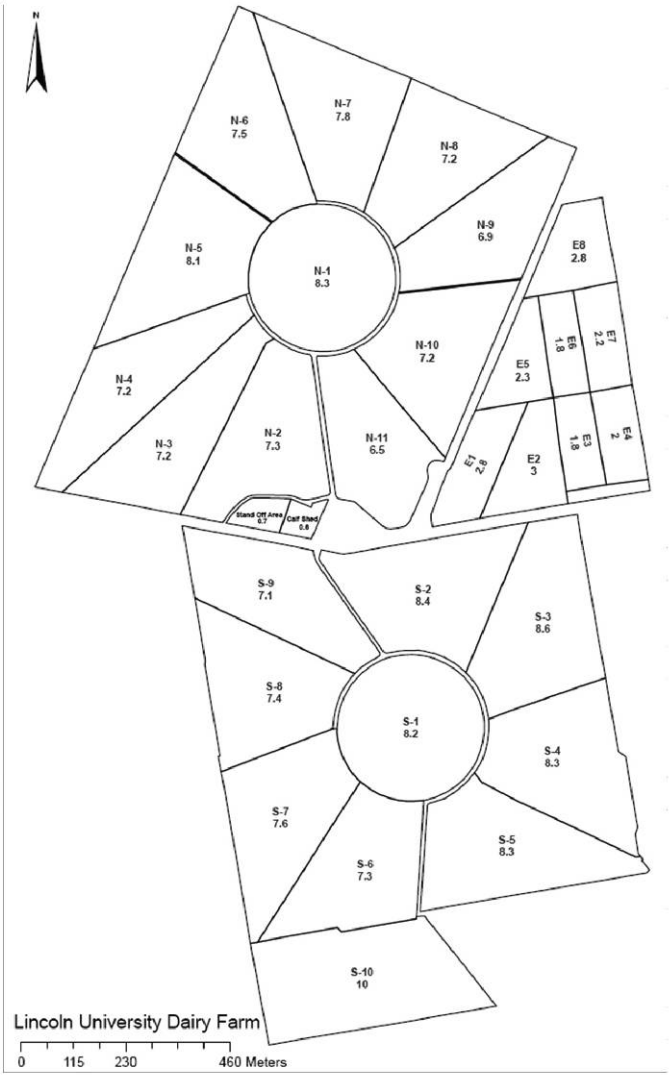
Plant & Food RESEARCH
RANGAHAU AHUMĀRA KAI

agresearch

SIDE

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 – 14 October 2010



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 159 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 milksolids 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	159 ha
Runoff [East Block]	14 ha

Soil

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
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	-	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, & seven [7] [33% of area] have been renovated to maintain pasture performance.
  - 2 paddocks of Arrow plus Alto perennial ryegrasses (all with Kotare/Sustain white clovers & Timothy)
  - 3 paddocks of Bealey, and
  - 2 paddocks of Alto perennial ryegrasses (all with Kotare/Sustain white clovers & Timothy)
- Pasture consumption for 04/05 season calculated at 15.9t DM/ha, & for 05/06 at 16.1t DM/ha & for 06/07 at 16.4t DM/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

- Dairy shed effluent is held in 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 @ August 2010

Breeding Worth (rel%) / Production Worth (rel%)	119/46 137/55
Average weight / cow (dec) – Herd monitored walk over weighing	470 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%]

	03/04 Season	04/05 Season	05/06 Season	06/07 Season	07/08 Season	08/09 Season	09/10 Season
Milkers - max/wintered	644/660	651/675	651/672	680/706	680/704	680/704	660/683
Days in milk					263	254	266
Total kg/MS supplied	271,971	276,132	286,115	274,599	278,560	261,423	273,605
Total kg/MS/cow	422	427	440	410	409	384	415
Total kg/MS/ha	1684	1719	1772	1703	1744	1634	1710
Farm Working Expenses/kgMS	$2.64	$2.64	$2.63	$2.80	$3.37	$3.88	$3.38
Dairy Operating Profit/ha	$2008	$2768	$2357	$3002	$8284	$2004	$4696
Payout [excl. levy] $/kg	$4.22	$4.56	$4.07	$4.47	$7.87	$5.25	$6.37
Return on Assets	5.6%	6.9%	5.5%	6.7%	14.6	4.8%	7%

Stock numbers

		2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
1 July cow numbers		631	660	675	664	702	704	704	685	694
Max. cows milked		604	644	651	651	670	680	683	660	
No. Yearlings grazed	On/Off	0/118	0/139	0/140	0/175	0/172	0/171	0/200	0/160	
No. Calves grazed	On/Off	0/141	0/143	0/162	0/170	0/175	0/200	0/170	0/160	
Cows wintered off	No. cows	500	520	500	500	540	546	547	570	691
	Weeks off	8	7	8	8	8	9	7	9	8.4
Stocking rate	Cow equiv. / ha	3.75	4.0	4.0	4.0	4.2	4.2	4.3	4.13	4.22
	Kg liveweight / ha	1,838	1,960	1,960	1,960	1,974	2,058	2,107	1,941	
Supplement - fed - Purchased	[kg/cow]	550	385	300	315	266	415	342	259	
Made on dairy/platform	[kg/cow]	0	98	220	365	93	95	64	144	
Applied N/160 eff. ha							186	190	185	

Staffing & management

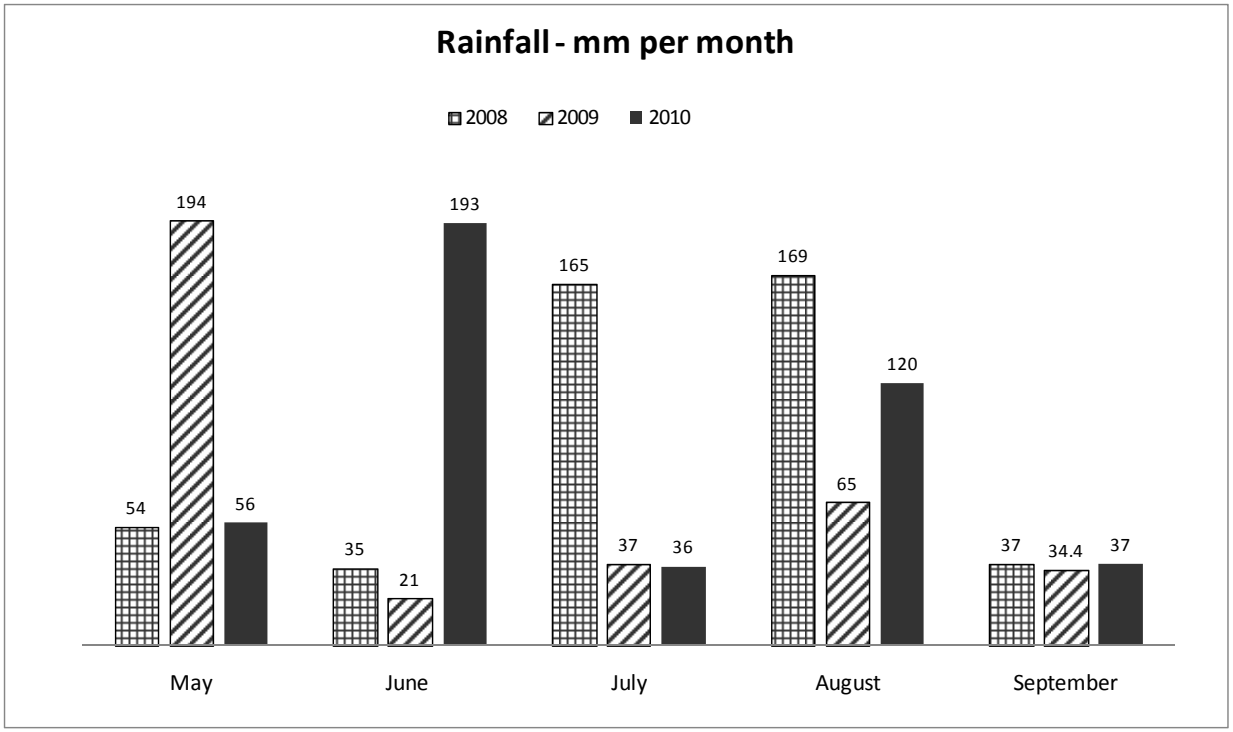
Roster System – 8 days on 2 off 8 days on 3 off

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

Contents

SEASONAL UPDATE – October 2010

Rainfall May – September last 4 Seasons



Rainfall from May to August last 3 seasons

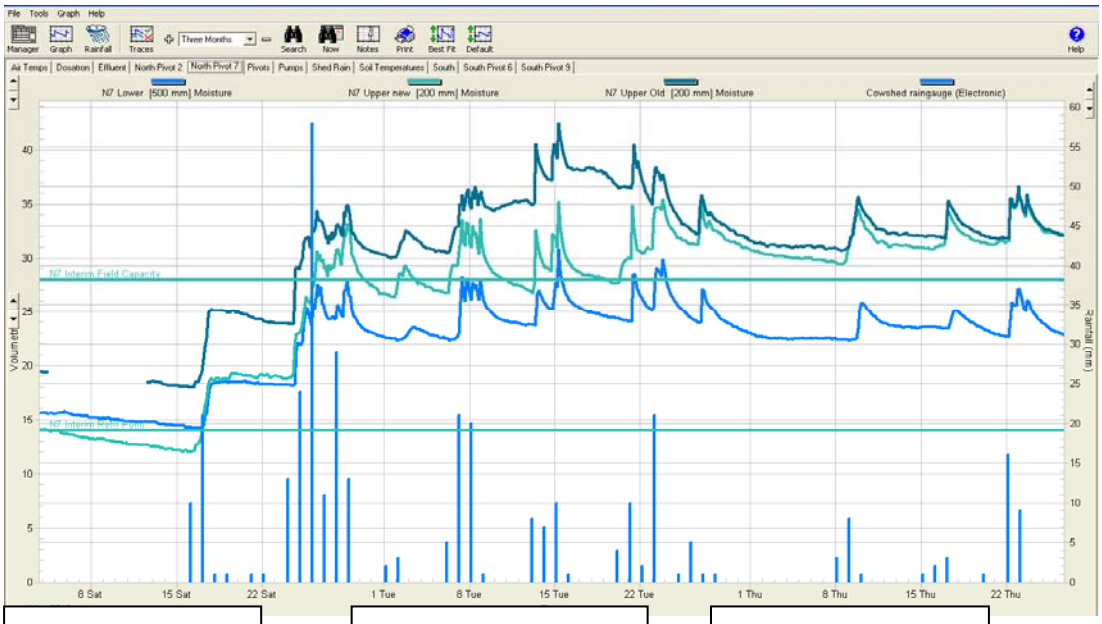
Rainfall (mm)	2008	2009	2010
May – August	423	317	405

As can be seen in the table above the rainfall from May to August is significant most years, and as shown in the graph above there is at least one of these months with rainfalls between 165 – 194 mm.

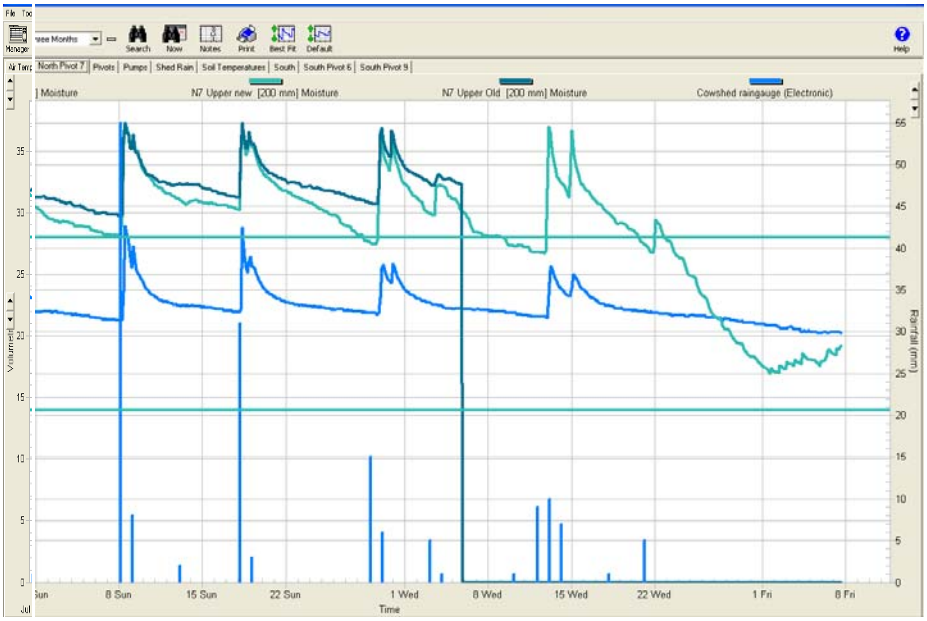
Keeping cows in the milking platform proves challenging most seasons so other options, such as finishing at the end of May with a lower pasture cover on the milking platform e.g. 1900 kg DM/ha then take all cows off the milking platform and home again when calving starts, are being considered. A decision will be made when the options have been evaluated.

In terms of cow condition we are quite pleased with the condition of most mobs and most cows have calved at the targets condition.

Water levels in Soils

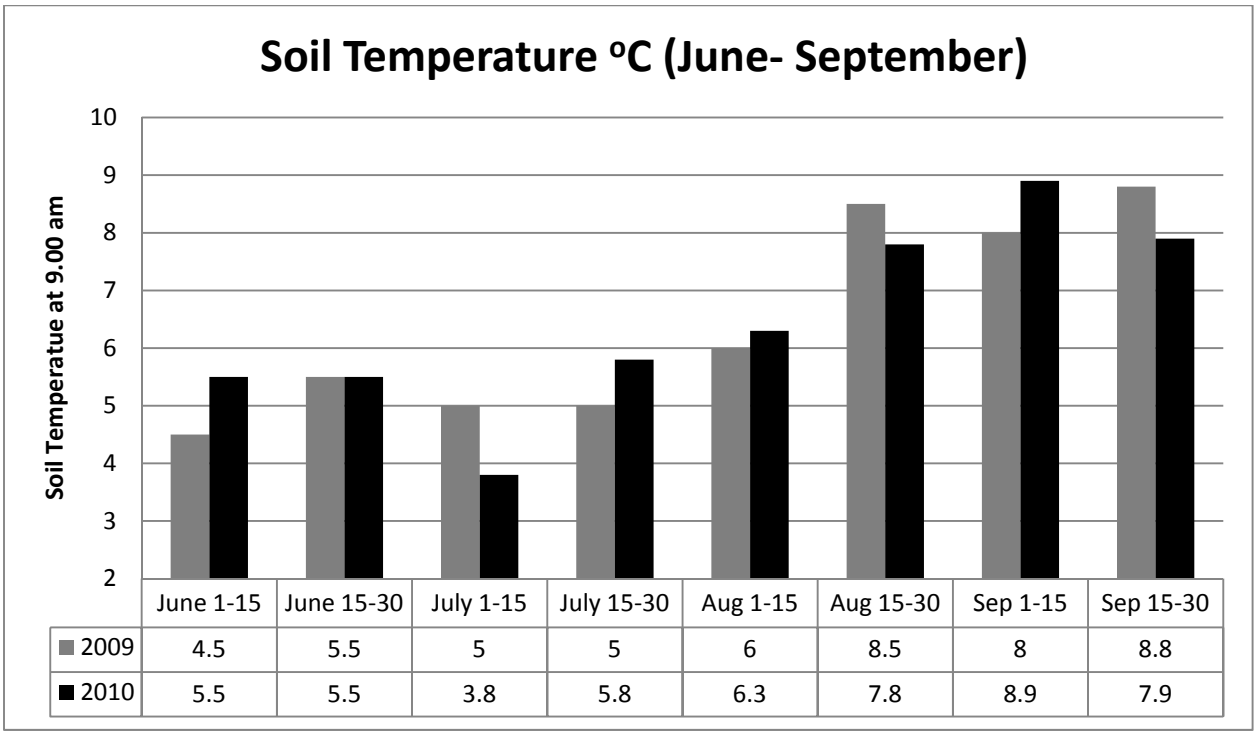


May 2010 | June 2010 | July 2010



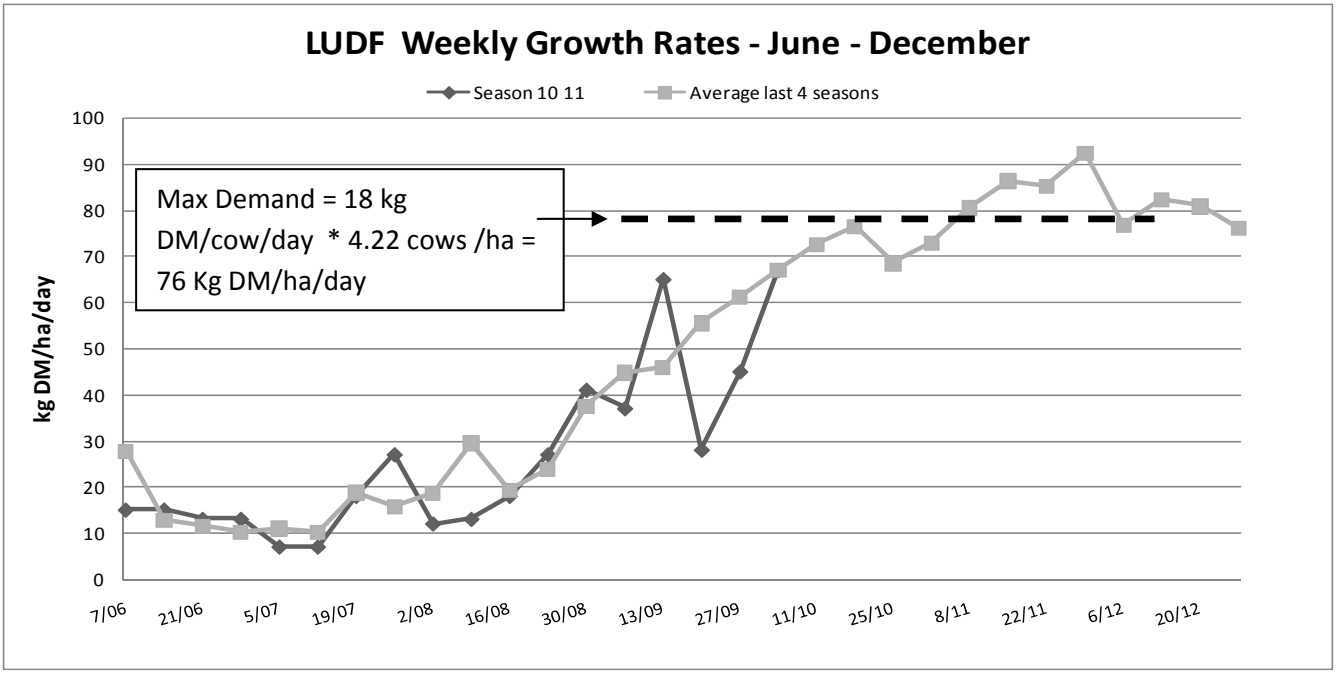
August 2010 | September 2010

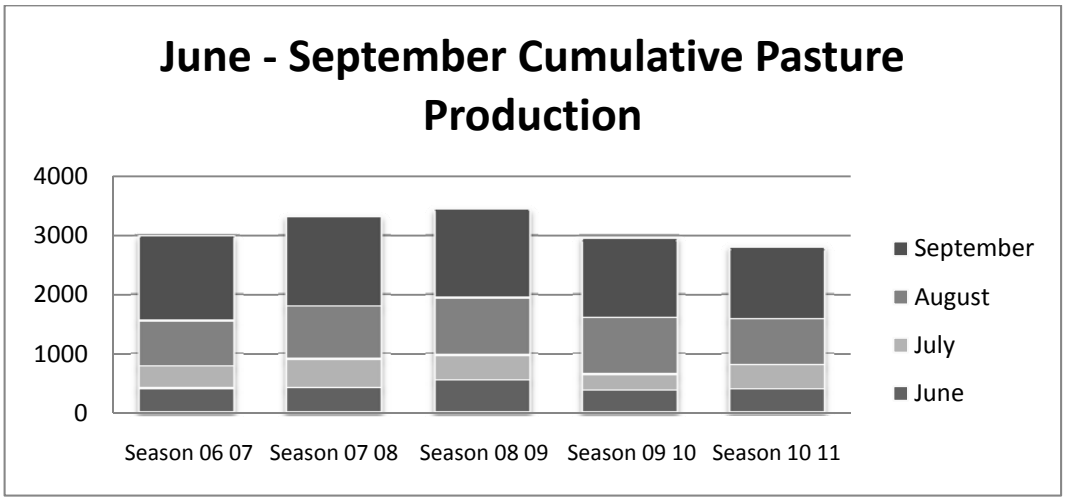
Soil Temperatures



	June 1-15	June 15-30	July 1-15	July 15-30	Aug 1-15	Aug 15-30	Sep 1-15	Sep 15-30
2009	4.5	5.5	5	5	6	8.5	8	8.8
2010	5.5	5.5	3.8	5.8	6.3	7.8	8.9	7.9

Pasture Growth Rates





Comments on growing conditions from June to October

Growth Rates over June, July and August have been similar to last year but more variable during September. Soil temperatures have been below last season in the first fortnight of July and second fortnight of August and September. The main challenge this season has been the wet weather conditions that started in the last week of May. As can be seen in the water profile of the soil from the Aquaflex reports, soils have been saturated for most of the winter until 15th September when soil water levels started to drop below water field capacity. Growth rates have not been the problem during June- August, pasture utilization and avoiding pasture damage have been the main challenges.

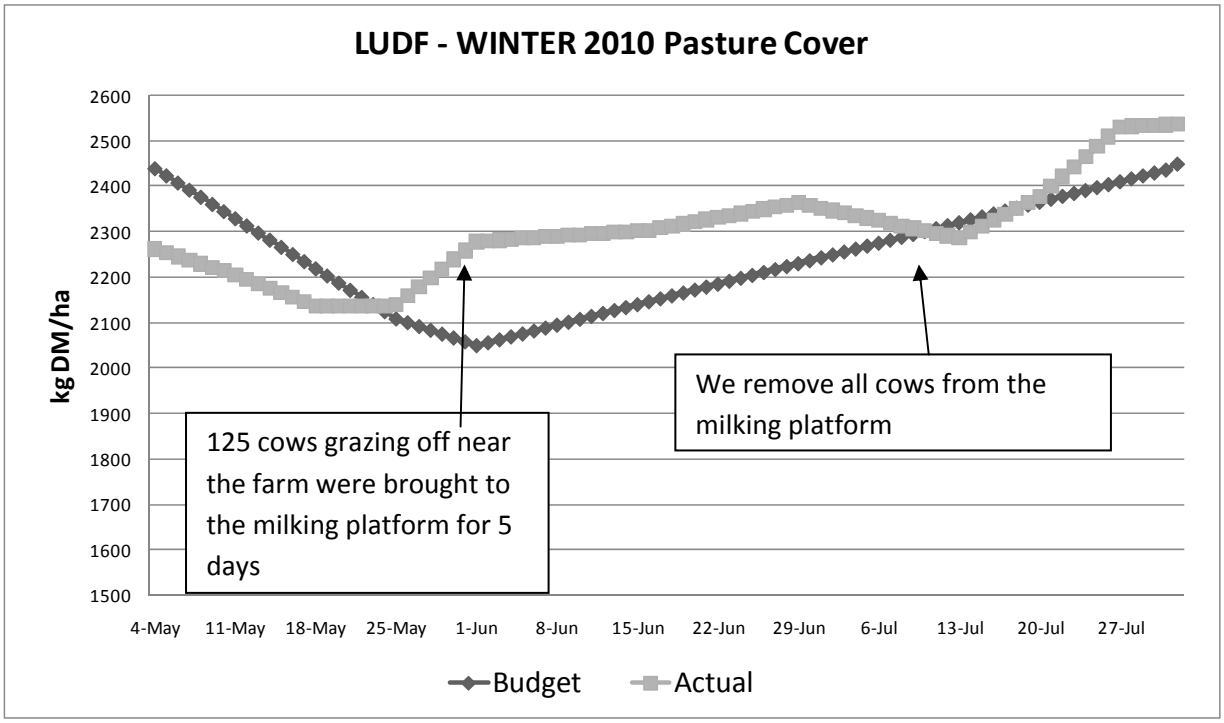
Winter Management – Review

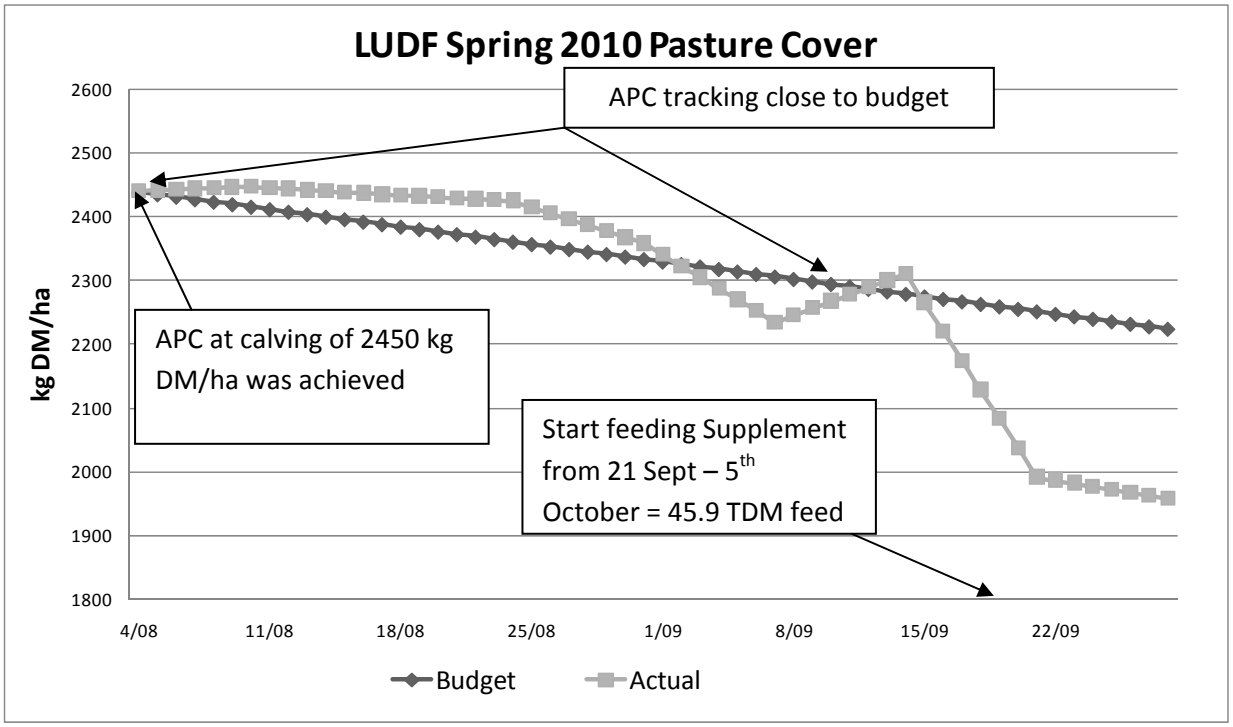
Winter Grazing Days per Month

Month	Cows on Milking Platform	Cows off the milking platform	Total Cows
June	100x 27 days 125 x 5 days	591 cows x 25 days = 14775 466 cows x 5 days = 2330 100 cows x 3 days = 300 Total = 17405	691
July	111 cows x 14 days 12 cows x 13 days 502 cows x 4 days	580 cows x 14 days = 8120 679 cows x 13 days = 8827 189 cows x 4 days = 756 Total = 17703	691
August	210 x 10 days 343 x 7 days 436 x 7 days 507 x 7 days	189 cows x 3 days = 567 189 cows x 21 days = 3969 87 cows x 7 days = 607 Total = 5143	687
September	601 x 7 days 685 x 23 days	84 cows x 7 days = 588	685
		TOTAL = 40839 Or 59 days per cow (for 691 cows wintered)	

Compared with last winter, this season we used 9 days per cow less off-farm winter grazing. (Last year an average of 67 days per cow with 683 cows wintered compared to an average of 59 days/cow this year). The plan was to keep about 100-110 light early calving cows in the milking platform but the wet weather conditions and preventing pasture damage were a challenge. This is the number of cows needed in the milking platform to ensure a good feed wedge is maintained for when calving starts. This proved quite challenging in the wet conditions in the heavier soils of the farm.

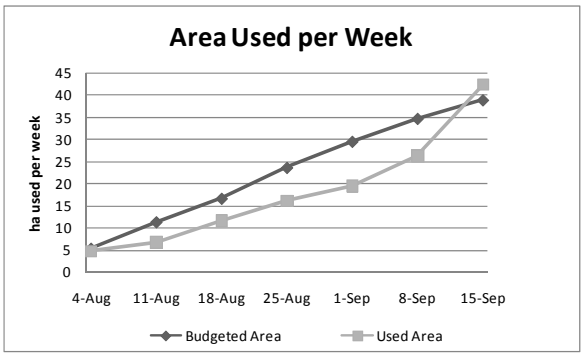
Spring Plan – Review


LUDF - WINTER 2010 Pasture Cover
kg DM/ha
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
4-May
11-May
18-May
25-May
1-Jun
8-Jun
15-Jun
22-Jun
29-Jun
6-Jul
13-Jul
20-Jul
27-Jul
125 cows grazing off near the farm were brought to the milking platform for 5 days
We remove all cows from the milking platform
Budget
Actual

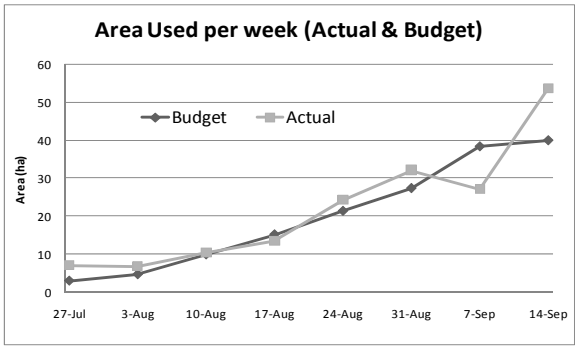

LUDF Spring 2010 Pasture Cover
kg DM/ha
2600
2500
2400
2300
2200
2100
2000
1900
1800
4/08
11/08
18/08
25/08
1/09
8/09
15/09
22/09
APC tracking close to budget
APC at calving of 2450 kg DM/ha was achieved
Start feeding Supplement from 21 Sept – 5th October = 45.9 TDM feed
Budget
Actual

Spring Rotation Plan

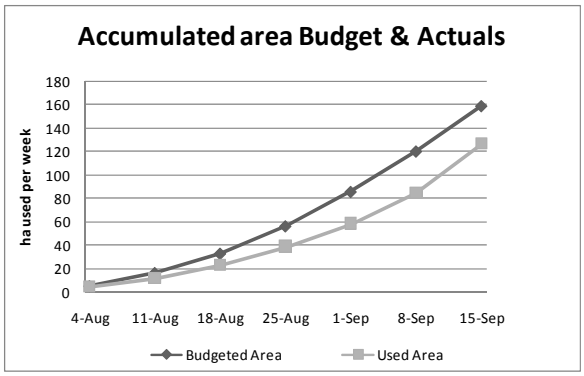
Spring 2009



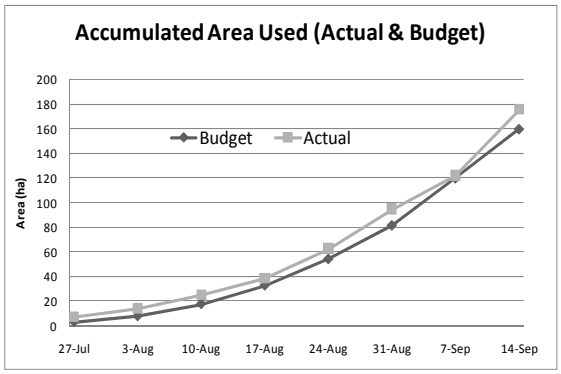
Spring 2010



Spring 2009



Spring 2010



Supplement feed / made (Season to date)

	Supplement Fed		Supplement Made
	Season 2010/11	**Season 2009/10**	**(Season 09/10)**
September	25.3 TDM	None	35.2 TDM
October	20.6 TDM	9.8 TDM	None (to date)
Total to 14th October	45.9 TDM	9.8 t DM	35.2 TDM

(No Supplement made to date this spring (10/11)

Summary Spring Pasture & Feed Management to date

- During winter cow numbers in the milking platform were manipulated to manage the Average Pasture Cover and also the wet conditions on the farm.
- Cows in the milking platform were stood- off in the yard and races when necessary to avoid pasture damage.
- The Average Pasture Cover target was achieved at calving.
- Back fences were used at all times to reduce damage to paddocks.
- The Spring plan was followed as much as possible but the first round finished 3 days earlier than planned
- Round length dropped to 21 days when cows were used to clean up paddocks with quality issues in the first round. We chose to do this and not feed silage so we could restore the quality in all paddocks of the farm.
- Silage was fed for 2 weeks to recover APC on the farm. Total supplement fed to date 45.9 t DM (from the 100TDM budgeted for the spring).

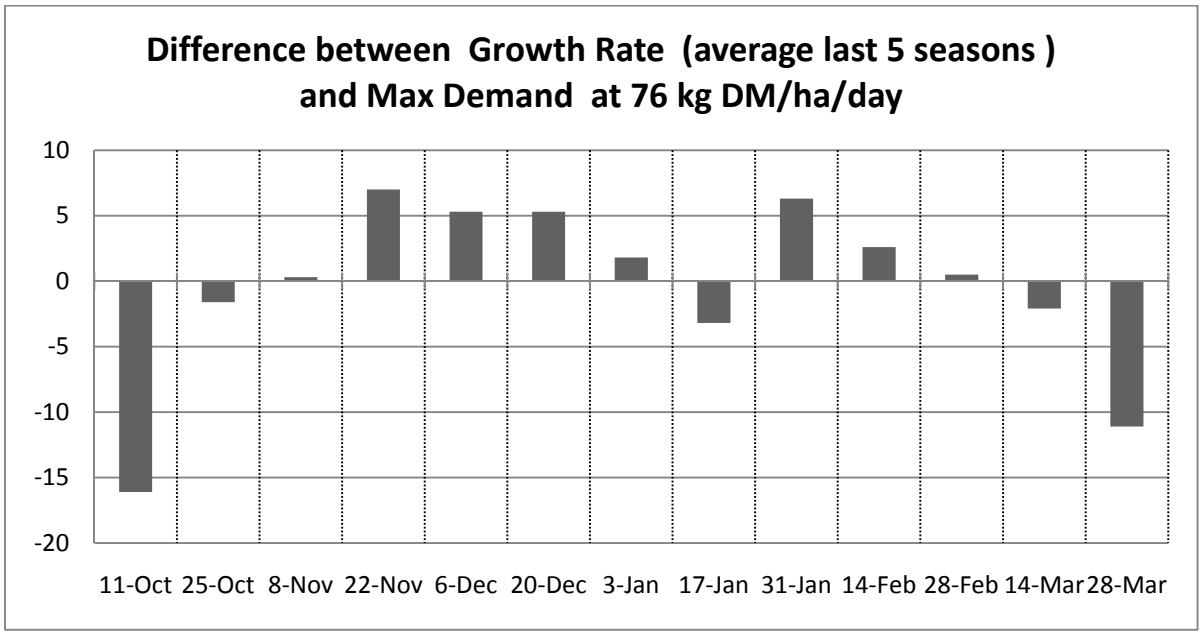
- We have taken more risks by speeding up the round length and being conservative with silage feeding to avoid losing quality and facing a surplus too early in the season (as has happened in the past). We can feed the supplement again if needed at any time.
- We are managing a fine balance between avoiding a surplus and maintaining a healthy Average Pasture Cover on the farm.
- A second application of eco-n was applied in the week from 13-20 July to all except paddock N1, this was then applied after cows finished grazing it on 12th August. Eco-n can be applied if we expect 10 mm of rain and if cover is below 3000 kg DM/ha.
- First application of Nitrogen for the season started on 6th August when 60 ha received 112 kg /ha of Ammo 36 (40 kg N/ha and 11 kg /ha). To date Ammo 36 has been applied 124 ha and the second round of Nitrogen application (as Urea) started on 21st September. In this round we are applying 40 kg N/ha.
- Pasture Damage: Most paddocks have been heavy rolled when dry enough to do so. Seed was broadcasted on 26 ha the week finishing 21st September, and another 15 ha drilled 3 weeks later.

Pasture – Supply & Demand

The graph and table below shows for the last 5 seasons the period in which above maximum demand was grown (as a monthly average).

- In most seasons maximum demand was grown by the end of October, it has been in early November as well.
- In most years maximum demand is grown at least until the end of February. (After that time maximum demand is likely to drop since intake per cow starts to drop, and as do cow numbers).
- There are times during that period when growth rates dropped below maximum demand e.g. January.
- Not surprisingly November – December are the months when we are more likely to grow well above demand.

Difference between Growth Rates and maximum Demand



Strategies to minimise damage to pasture and soil in August and September

The LUDF has a wide range of soil types from shallow Eyre Paparua sandy loams to very deep and heavy Temuka silt loam with impervious clay subsoils. None of the soils have significant stone in them but the lighter soils usually dry out sufficiently to allow grazing 3 – 4 days after significant rain. Farm Strategies are based around avoiding damage during rain and the immediate days following. The heavy soils (about 40% of the farm) are grazed as much as possible when they are adequately dry for grazing.

This spring, as reported elsewhere, soil moisture remained close to or above Field Capacity for most of the calving period. However, in most weeks there were 2 – 3 days when the heavier soils were dry enough to be grazed and the team used these opportunities. This included bringing later calvers onto the platform in early August for a few days to clean up some long pasture that was very frost damaged and not suitable for freshly calved cows.

Use of the 13ha East Block

The east Block is not part of the platform as it has access only across Shands road. The East Block is used strategically for cows that have not yet calved. As many cows as possible were taken off the platform when the soils were very wet. In the early part of August this was relatively easy but as more cows calved it became much more difficult to get enough cows off to make a difference.

Damage to East Block?

The East Block has lighter soil types and cows are back-fenced onto daily breaks. It was damaged to a greater extent than the platform but less than a quarter of it has had to be redrilled.

Holding September calvers further away

The strategy to keep September Calvers away from the platform and East Block until late in August is both a cheaper way to feed them and saves the precious East Block feed for springers. Two years ago a 10ha block about 1km from the Platform was leased with the primary purpose of producing feed for late July and August. Some cows calved on this block but as much as could be managed they calved on the platform. The last cows came back to the platform on the 9th September.

Standing off

Standing off on the cow yard was used as required throughout the period. The majority of use was after the morning milking. Cows were typically held up for 3 hours and then allowed away to their paddock. The yard area, especially the new concrete on the back lane, is well sheltered and cows remain settled when waiting there. The herd was held off pasture for a total of 4 nights only but many shorter sessions.

The feed supply through the period was such that cows were able to be fully fed on pasture, our problem was to make it available in a way that assisted cows to avoid making pasture dirty and avoid serious pugging damage. No supplementary feed was used on the platform pastures or the standing off area. Moderate quality grass silage was used to supplement pasture on the East Block and the 10ha lease block.

The alternative to standing off

It is our experience that the cows would finish the allocated feed and stand in a group or wander around making mud and ruining feed that would otherwise be available at the next grazing.

Key difference from spring 2008 and this one

The very wet spring of 2008 saw the platform significantly damaged, more than this spring. After that spring the Management Team determined that adequate levels of close-by off-farm feed must be available to reduce the August stocking rate. This winter additional yard area was also added to make it much easier and more comfortable for cows to be stood off.

Summary of feed and soil management strategies for the calving period

- Pasture cover 2350 – 2450kgDM/ha at July 31st
- Adequate off farm feed arranged to allow no silage being needed for cows on the platform until the middle of September.
- Cows back fenced every break, every day.
- Platform feed managed to keep to both the first round planner for area allocation and average pasture cover targets.
- Feed used urgently on the heavy soils **whenever** soil moisture allowed.
- Standing-off used whenever necessary.
- Springers returned to the East Block in very wet conditions.

Irrigation Decisions: when and why start & stop irrigation

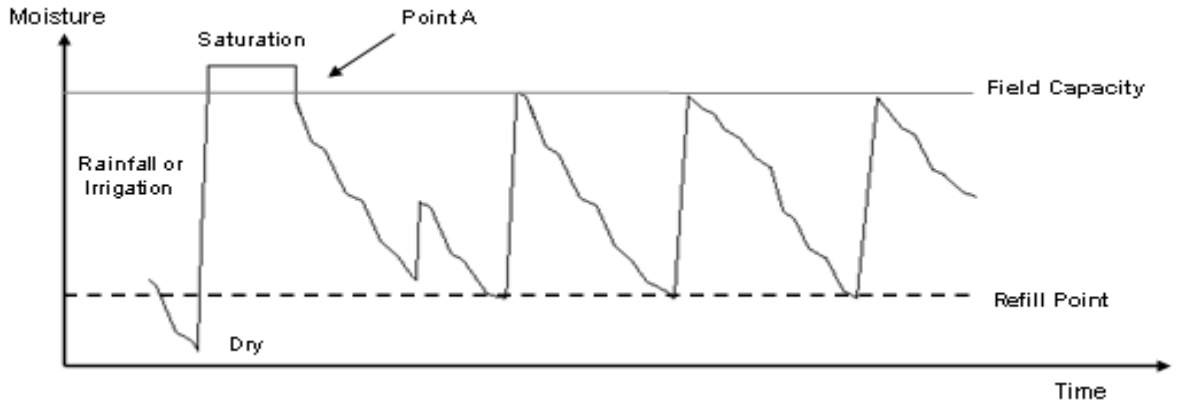
Field Capacity

After saturation the trace normally falls relatively quickly. Soil is said to be at Field Capacity when all of its free water has been drained by gravity, and is defined as the level where the fall of the trace begins to slow down (refer to the Point A in the graph). At this level, the soil holds its maximum amount of moisture.

Refill Point

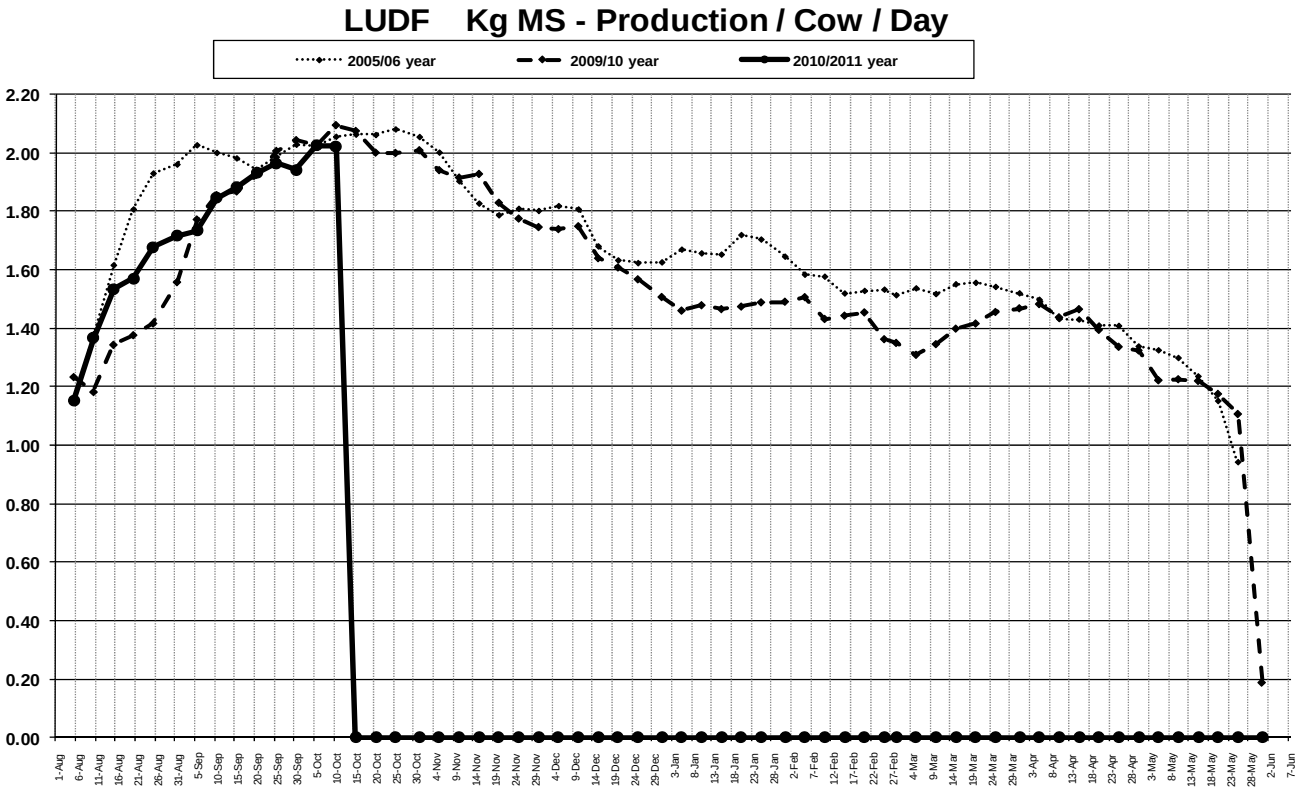
The Refill Point is the minimum level of soil moisture for effective plant growth, and at which point the user must apply water to bring the soil back to its Field Capacity. Typically, the Refill Point is somewhere halfway between the Field Capacity and the Permanent Wilting Point.

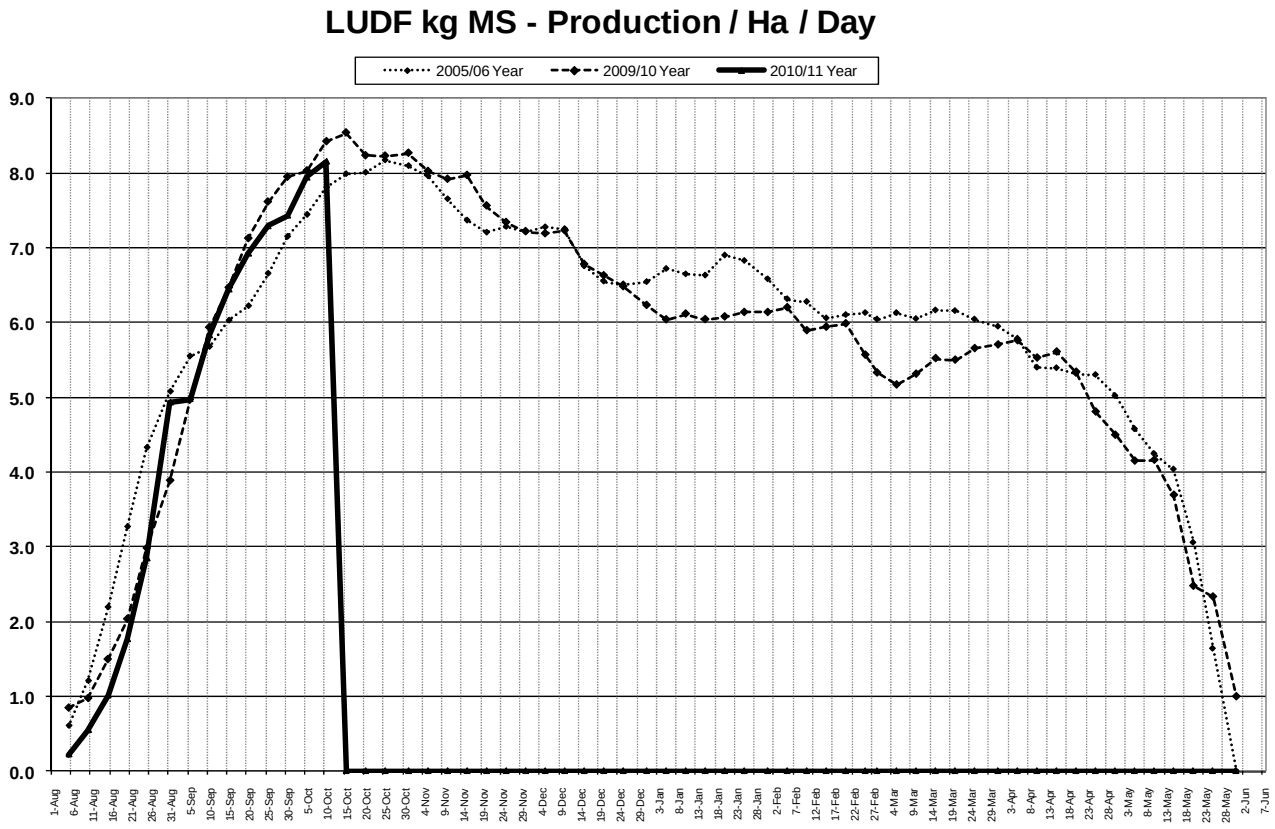
Permanent Wilting Point describes the storage level where the plant will fail to recover after re-wetting.



Reference: http://www.streatsahead.com/Pages/Aquaflex%20level2/Tech%20Notes/Betweenthelines.html

Note: Colour graphs are available on the SIDDC website.





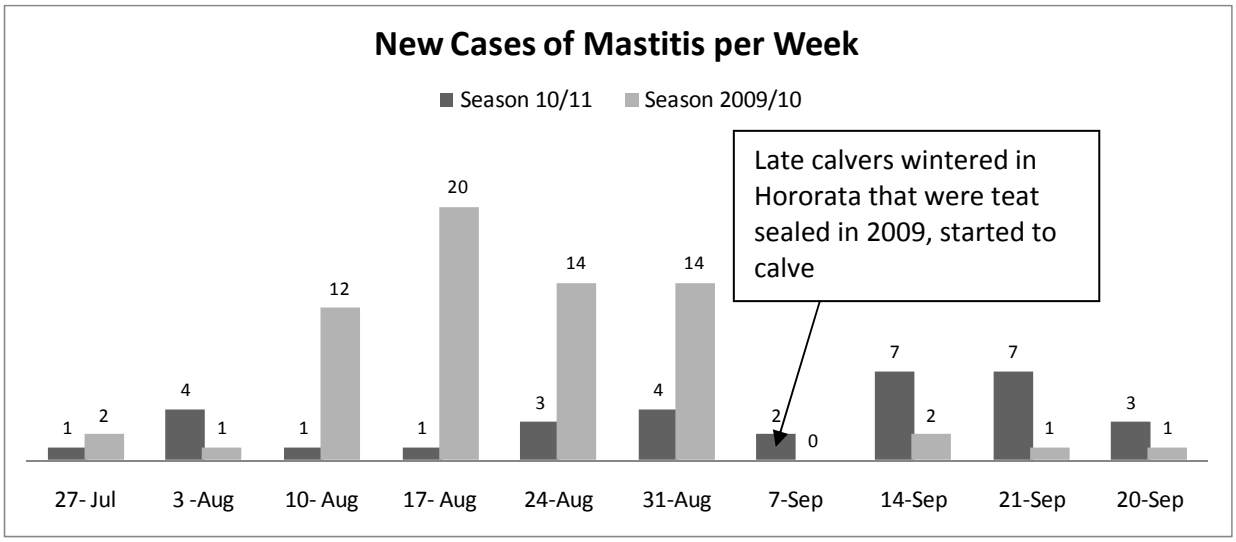
Cows Deaths

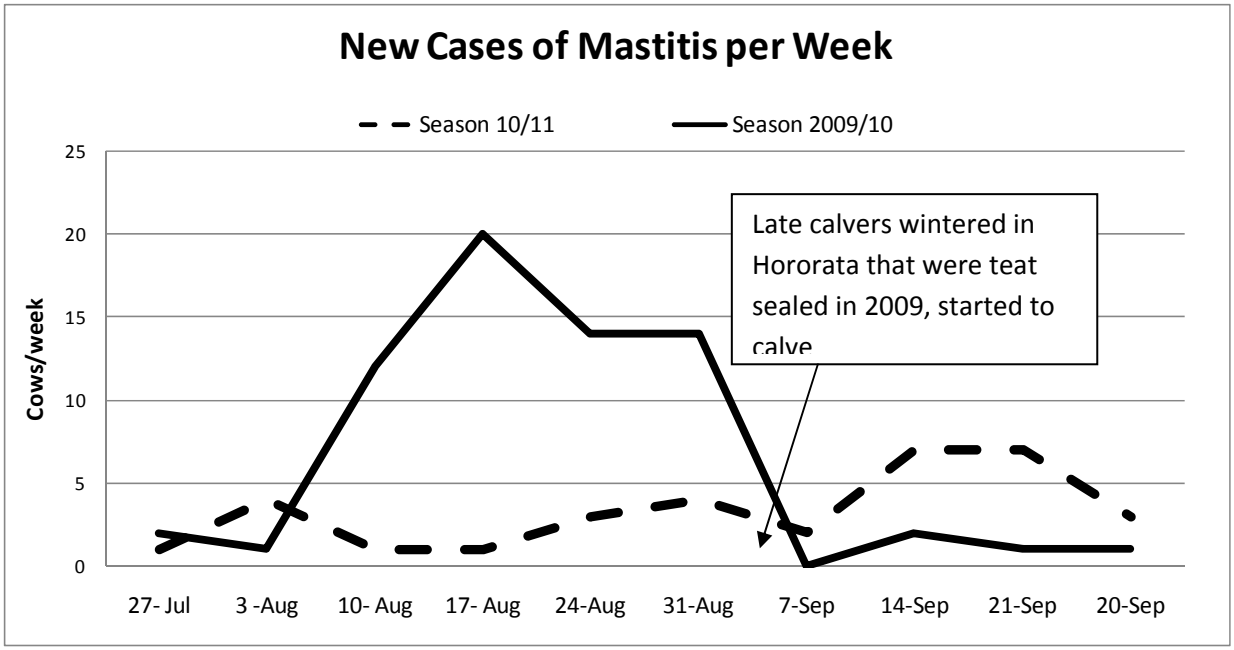
Month		Season 06/07	Season 07/08	Season 08/09	Season 09/10	Season 10/11
June	Heart Fail.	0	1	0	4 (kale) 1(?_)	0 0
July	Accidental Milk Fever	2 2	0 0	0 0	0 0	0 0
August	Accidental Bloat Other Milk Fever Black M	3 1 1 0	0 0 2 1	1 0 1 2	0 0 1 (twins) 0 3	1 0 1 3 0
September	Liver Problems Bloat Milk Fever Black M Put down	2 3 0 0	0 0 1 0	0 0 0 2	0 0 0 0	0 0 2 2 2
Total to end of September		15	7	6	9	11

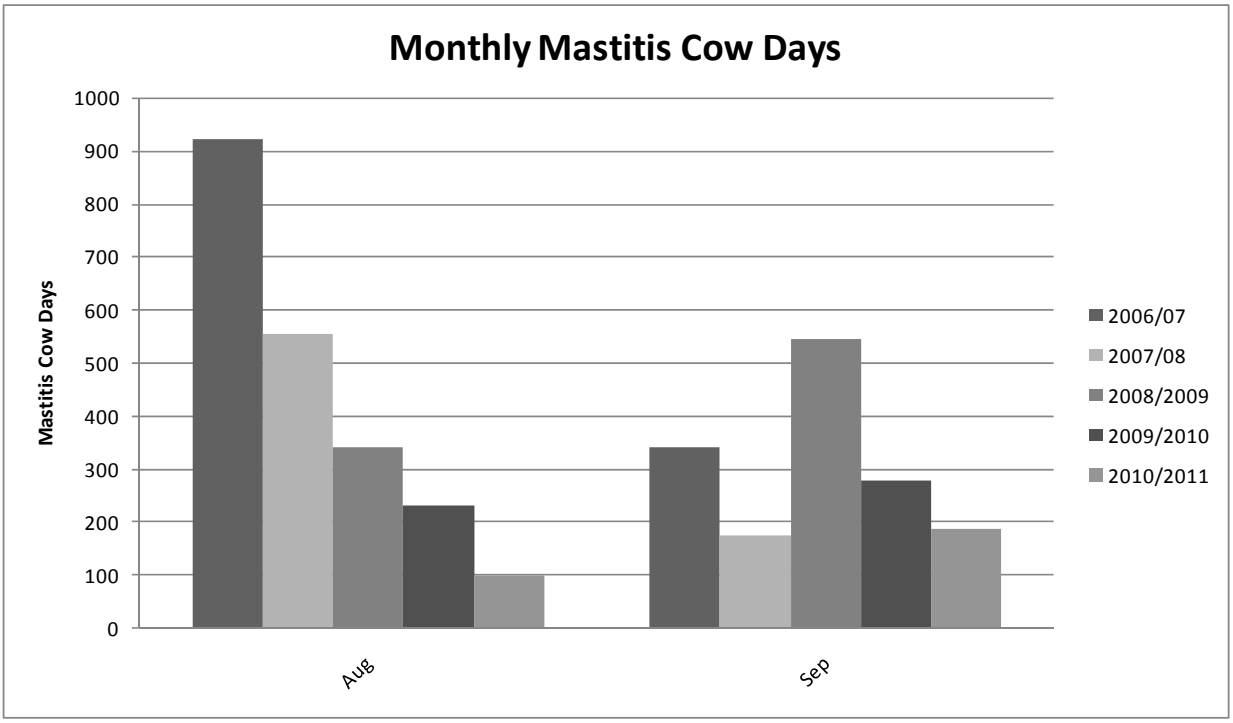
Cows wintered	691
Deaths	11
Culls / Wastage	7
Cows to be peak milked	673
% cows milked/cows wintered	97%

MASTITIS

To date we had 33 cows with mastitis and only 3 are heifers. At the same time last year we had 67 new infections on new calved cows.







*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.

Drying off Strategy Last Season

- R2 Heifers were teat sealed before calving .
- All mixed age cows received Blank Dry Cow Therapy. Cows that didn't exceed SCC of 150.000 at any herd test were treated with a short acting antibiotic (DrycloxDC). Cows that exceeded this level at any herd test were treated with a long acting antibiotic (Dryclox xtra). For heifers the threshold was SCC of 120.000. (This policy follows the SAMM plan).
- All mixed age cows were also teat sealed.

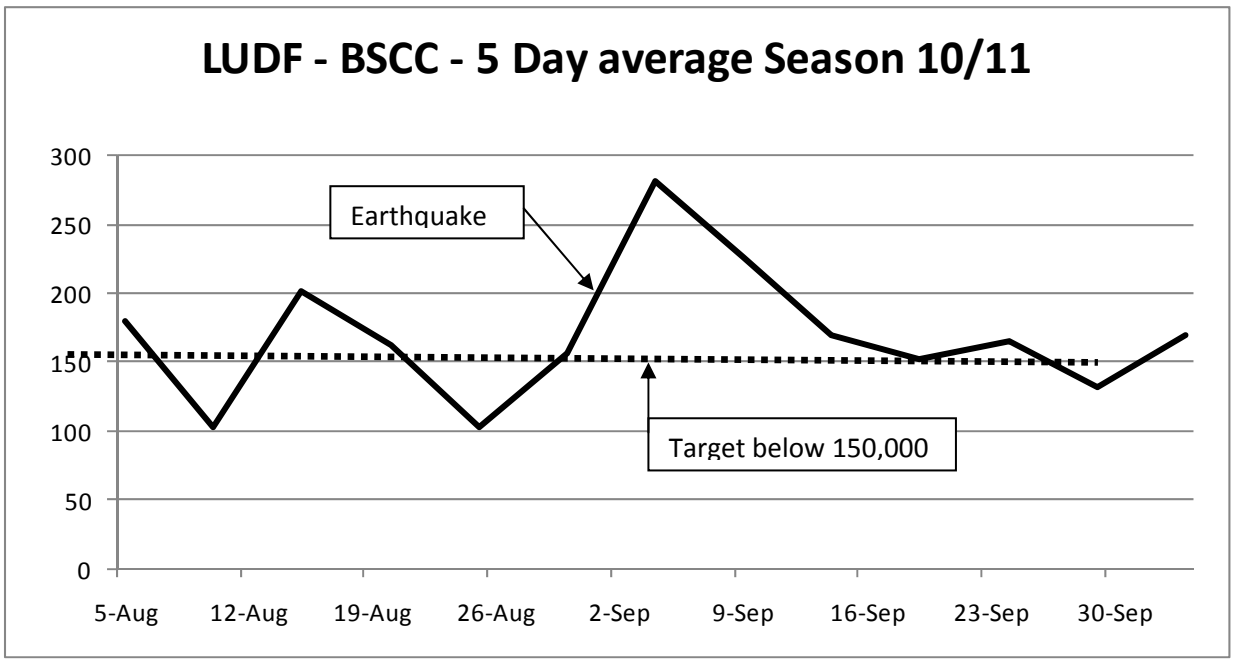
Cost of the Strategy

Treatment	Cost (excluding GST)
Teat seal	165 Heifers x 9.6 $/heifer=$ 1,584 522 cows x 9.6 $/cow = $ 5,011
Short Acting AB	243 cows X 6.4 $/cow = $ 1,555
Long Acting AB	217 cows x 9.8 $/cow = $2,126
TOTAL COST	$10,277 = 15 $/cow

Results so far:

Total number of cows with mastitis after calving for this season was 33 compared to 67 the season before when only heifers and cows wintered in Hororata were teat sealed. This is surprising considering how much wetter this winter and spring has been compared to last year.

Assuming that the direct cost of mastitis for a cow is $116 per cow (lost production = 1.8 kg MS/cow/day* 8 days*$6/kgM = $86 + Antibiotics treatment = $30 = Total cost $116 per infection). This will be the minimum cost since there are other losses such as direct milk loss during current lactation, subsequent infections causing loss of quarter, early culling among others. With this number in mind a reduction in 43 infections for the season will break even with the cost of the teatseal of the mixed age cows.



Lame cows

Month	Cows lame /month
June	6
July	0
August	2
September	17
Total to end of September	25

LUDF REPRODUCTIVE PERFORMANCE AND FUTURE STRATEGY

The reproductive performance of the LUDF has improved significantly from 20% to 13% empty rate with a 10 weeks mating period and without ever using inductions. There has also been a significant improvement in calving spread, achieving last season a 6-weeks in calf rate of 74%.

However, there are still improvements to be made to achieve an empty rate of 6-7% in 10 weeks of mating, without inductions and minimal (or none) hormonal intervention of non-cyclers.

LUDF - Progress to Date in Reproductive Performance

SEASON	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11
Planned Start Calving MA cows						3rd Aug	8th Aug	8th Aug
PSC Heifers							21st July	22nd July
Days from PSC to mid Point	22	23	14	12	16	15	9**	13**
% Cows still to calve 1 month PSM	17 %	12%	12.6%	9%	7%	6.3%	3.6%	8.5%
% Cows treated as Anoestrus	36.7%	24.3%	14.5%	17%	8%	23%	0	?
% Inductions	0	0	0	0	0	0	0	0
Mating Period (weeks) Cows			15	16	15	10	10	10
B Period (weeks) cows			10	8	6	10	6	6
Mating Period (weeks) Heifer			8.5	10	8	8	8	8
AB Period (days) Heifers			3 d	3 d	3 d	3 d	0	1 d
Heifer synchrony	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
6-Weeks In calf rate (%)			65 %	67 %	66 %	67 %	74%	?
% EMPTY Cows	17%	20.5%	16%	14%	14%	20%	13%	?
% EMPTY R2				6%	2%	5%	14%	?

As described in the In-calf programme, herd fertility in New Zealand has 8 main ingredients. These 8 ingredients are the main management areas to get right to achieve good results. In no particular order, these main areas are:

1. Calving Pattern
2. Heifer Management
3. Body Condition and Nutrition
4. Heat Detection
5. Dealing with non-cyclers
6. Genetics and AB practices
7. Bull Management
8. Cow Health

We will look into these 8 management areas to assess reproductive performance and mating strategy for this season.

1. Calving Pattern

Calving Pattern of the whole herd (PSC 8th August – On 673 peak cows)

	3 weeks (8-28 Aug)	6 weeks (29 Aug-11 Sep)	9 weeks (12 Sep–3 Oct)
Cows and Heifers calved	445 (66%)	608 (90%)	668 (99%)
R2 Heifers calved * (162)	128(79%)	150 (92%)	161
Target (%)	60%	85%	98%

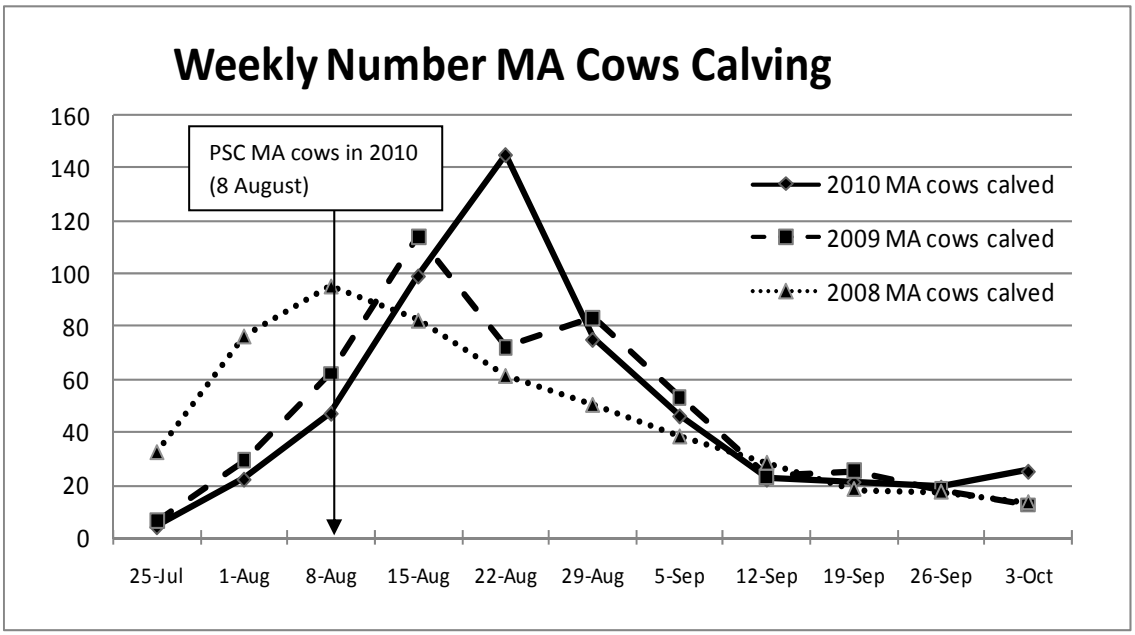
* By the Planned Start of Mating (8th of August) 67 heifers have already calved.

Calving Pattern of First Calvers:

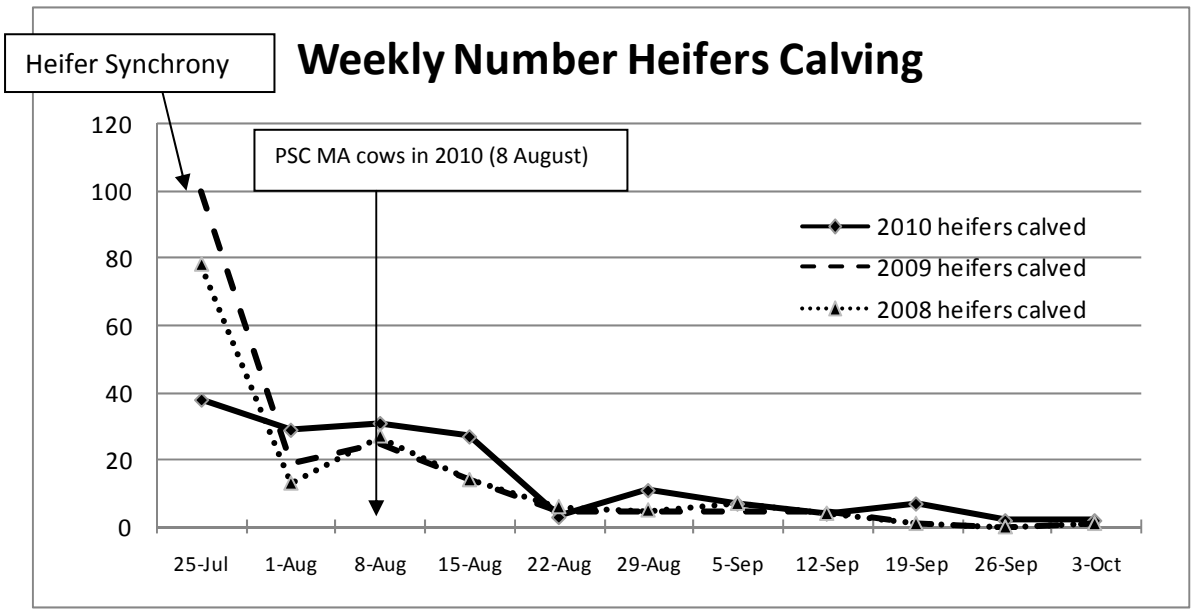
	3 weeks (8-28 Aug)	6 weeks (29 Aug-11 Sept)
LUDF R2 Heifers calved (162 total)	128(79%)	150 (92%)
Target achieved by top farmers (%)	87%	98%

**Targets extracted from page 45 of the In Calf Book*

As can be seen in the table above, heifer calving pattern is slower than the performance achieved by top farms. This slower than ideal calving pattern could affect the performance of these first calvers during mating. This group includes 34 R2 high BW heifers bought which calved a bit later than our heifers. We still have 2 of these heifers to calve.



Note: Data above refers to calendar years calving pattern of MA cows. i.e. calving pattern of MA cows in spring 2008 compared with spring 2009 or spring 2010.



Cows need at least 6 weeks (42 days) post Calving to resume cycling, and heifers at least 2 weeks more (56 days).

Planned Start of Mating is 25th October

- (42 days before PSM), 27 September, 500 cows out of 511 MA cows calved .
- (56 days before PSM), 13 September, 150 out of 162 heifers to calve.
- Therefore, only 11 cows and 12 heifers (total 23) with not enough time to cycle before the PSM.
- At 8th October 14 cows still to calve.

2. Heifer Management

The reproductive performance of replacement heifers is directly related to liveweight at mating and calving. In the Spring of 2008 the R2 heifers calved at LUDF were below desirable targets for liveweight and size and a special effort was made to address this problem. The heifers calving in 2009 and 2010 were much better.

To determine the target liveweight of heifers we need to know the liveweight of the mature cows (6-8 years old). In the case of LUDF this group of cows includes a few big Friesian type of cow which is much heavier than the crossbred cow we are currently breeding. We estimate the mature liveweight of the herd at 480 kg LW/cow the table below presents the target liveweight of heifers at different ages.

Target liveweight of heifers born in Spring 2009

	At 6 months January 10	At 15 months Nov 2010	At 22 months May 2011
% of Mature cow liveweight	30%	60%	90%
Target - Kg LW for heifers at LUDF	144	288	432
Kg LW of 2009 born heifers	116 (21st Nov)	223 (23rd Sept) [Need to grow at 1kg/lwg/day]	

Actual liveweight of Heifers at LUDF:

Date	Actual kg LW/heifer
21st Nov 2009	116
14th Jan 2010	141
10th May 2010	181
20th July 2010	208
16th Sep 2010	223

To achieve the target of 288 kg LW the heifers need to put on 1 kg/day by November 2010.

Calf rearing has never been a problem since the heifers are weaned at good weight and healthy. The main issue is the feeding conditions and management of heifers at graziers. The performance has been variable over the years and we do not have control over it.

Record of heifers calved compared to the planned start of calving

				MA cows calving start		
Calving	**Weeks**	**-2**	**-1**	**Week 1**	**Week 2**	**Week 3**
2008 R2's Start calving 10 days before the herd	% of total	13	36	8	17	9
	Accumulated %		**49**	**57**	**74**	**83%**
2009 R2's Calving start date 15 days before the herd	% of total	26	32	14	8	8
	Accumulated %		**58**	**72**	**80**	**88%**
Proposed - Natural mate 2 weeks prior to MA cows (Source InCalf)	% of total	25	25	25	6	6
	Accumulated %		**50**	**75**	**81**	**87%**
2010 calving following natural mating	% of total	24	**18**	**19**	**17**	**2**
	Accumulated %		**42**	**61**	**80**	**83%**

The heifers calved this August were naturally mated last October. The reasons for this choice were that DNA proven semen was not available for a synchrony programme and daughter proven calves would have as high BW as the MA cows mated to DNA proven. Combined with that milk price was predicted to be very low and some running costs could be avoided.

The natural mating was $7,000 less than using synchrony and AB. Typically 35 – 38 calves are reared from the synchronised matings. Net cost of $183 per heifer replacement for the additional mating costs.

The natural mating was successful in that the calving numbers achieved at 3 weeks was very close to that achieved in 2009 with synchrony and 14 days early. And better than 2008 which had synchrony and 10 days earlier start. The natural mating failed in that 20 heifers from 160 were not in calf at the end of the mating period. The reasons for this could not be determined with any certainty but it has led us to fertility evaluate bulls and do what we can to ensure they are well prepared for mating.

The herd mating was also successful in that the targeted 200 replacement heifers from DNA proven matings in the MA cows have been reared.

This season LUDF is using a synchrony programme that includes a CIDR described in details below. The DNA proven semen is available for synchrony this year and we are hopeful that the CIDR programme will increase the number of heifers calving early.

Mating Plan – Heifers

- Heifers will be mated 12 days before the main herd starting on the 13th October.
- Heifers will be mated for 8 weeks in total.
- Heifers will be synchronised.

Heifer Synchrony Programme (CoSynch)

This year we are using a synchrony programme that uses a Progesterone releasing device, Cuemate, with an injection of gonadorelin at day -9 (4 October), an injection of clopostenol (PGF2a) at day-2 (11 October), and an injection of gonadorelin at day 0 (13 October) with a set time AI.

Based on a trial using 1137 heifers and three Synchrony programme treatments, the 21 day pregnancy rate from this treatment was 13% higher than the double PG programme use by LUDF in previous years (76% compared to 63%) (see information on page XX of handout).

The fixed time AI has also the advantage of less travel and much less judgement being required for picking up heats. (Two trips to Winchmore and Hororata in the week before the October Focus day are also avoided).

Cost Benefit Analysis (Double PG & Cosynch programmes)

Extra Costs			Extra Benefit		
			extra 18-20 heifers in calf to AB 20 heifers x 15 days in milk = 300 days in milk		
166 heifers x 9.75 $/heifer	=	$ 1618			
30-40 more AB straws	=	$ 760	300 days x 1.4 x 6 $/kg MS	=	$ 2520
			8 heifer calves x $ 300	=	$ 2400
Total extra cost	=	$ 2378			
			Total extra benefit	=	$ 4920
Benefits – Costs = $2542					

3. Cow Condition and Nutrition

Managing cow condition and nutrition over the season has a big impact on reproductive performance. All lactating cows will lose condition after calving. The main objective is to minimise the loss to 1 or less than 1 CS and ensure at least 85% of cows are above CS 4 at PSM.

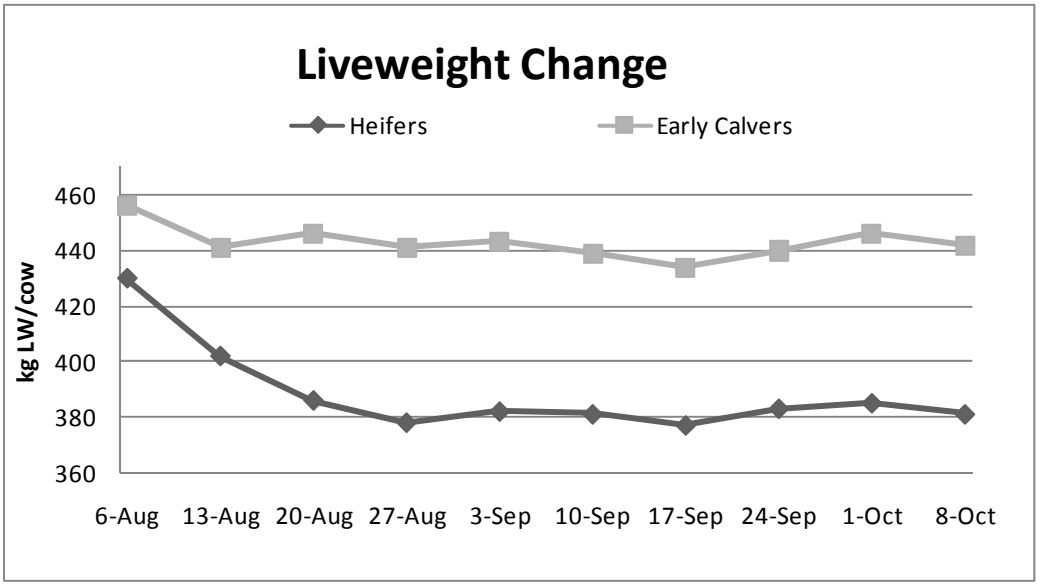
Cows will stop losing condition about 7 weeks after calving (8 weeks for first calvers and cows older than 6 years). For this to happen cows need to be offered enough energy for maintenance, milk production and CS gain. For example, a 460 kg cow producing 2 kg MS/cow requires above 210 MJME per day (50 MJME maintenance + 160 MJME production) to gain any condition (17.5 kg DM/cow). A milking cow will require 50MJME/kg LW per day to gain 1 kg LW and 1 CS is about 30 kg LW in a cross breed cow.

LUDF target is to calve cows at CS of 5 and heifer 5.5 and to have cows gaining weight before PSM.

To achieve the CS targets at calving the work starts in February the previous season. At LUDF a lot of emphasis is put on achieving these targets by drying light cows early and targeting all cows to be above 4.5 by the end of May. These targets have been achieved quite successfully the last 2 springs.

The main challenge at LUDF is to have cows gaining weight early enough before the PSM. The graph below shows the changes in liveweight for these 2 groups:

- Early calvers: includes 149 cows calved between 8 - 15 August (including 33 heifers).
- Heifers: Includes the change in live weight of 160 heifers calved during this period.



4. Heat Detection

Cows were tail painted 5 weeks before the PSM (23rd September) and pre-mating heats recorded to decide strategies with non cycling cows.

After mating starts tail paint is used for heat detection and cows checked and recorded every morning.

A good indicator of the efficiency of heat detection is the % of early calved mature cows submitted for insemination in the first 3 weeks. The results for LUDF the last two seasons was as follows:

	% of early calving mature cows inseminated in the first 3 weeks of Mating
Spring 2008	91%
Spring 2009	89%
Target	>95%

This season the heat detection practices will be compared to other 3 methods being use at the farm as well as part of some research projects. These methods are:

- Progesterone levels
- Cameras using KMARs
- Activity meters

5. AB practices

LUDF drafts the cows at morning milking. Cows are normally inseminated soon after milking is finished by an LIC technician.

6. Dealing with non-cyclers

The rate of cycling is being recorded. The target is to have 85% of the cows cycling by the PSM. We will have 11 cows and 12 heifers calved with less than 42 and 56 days before the PSM respectively. From the cows and heifers with enough time to cycle we will consider using some early hormonal intervention if the % of cycling cows is poor. We will make the decision about 10 days before PSM.

So far we had:

- 49 cows in the first 4 days (12 cows /day)
- 143 in the next 7 days (20 cows/day)
- Total 192 cycled so far

Last season we did not use any CIDRS, this season we are prepared to use as required if cycling is slow. The CIDRs will be used on the cows that have the best chance of responding to the treatment, i.e. young cows without any health issues.

7. Bull Management

The performance of bulls last mating was disappointing with 22 empty heifers from the 160 we had (14%). The performance of the bulls with the main herd was not great either. 26% of cows were not pregnant by the end of AB and only half (13%) were in calf at the end of week 10 of mating when we removed the bulls.

This season the bulls were purchased earlier than previous practice on the LUDF [late July]. This was to enable us to fertility test and manage the bulls feeding. The fertility test carried out was the measurement of the scrotal circumference. The reason is the strong positive correlation between scrotal circumference and testicular size and sperm production demonstrated in both Dairy and Beef bulls (Fagerlin; *et.al.*, (1972) and Hahn; *et.al.*, (1969). It has also been demonstrated that bulls with smaller testicles tend to produce a higher percentage of abnormal spermatozoa. The table below presents the ranking of bulls of different ages according to their scrotal Circumference.

Score for Scrotal Circumference by Age (extracted from "Bovine Medicine and Surgery")

Age of the Bull	Scrotal Circumference		
12-14 months	>34 cm	30-34 cm	<30 cm
15-20 months	>36 cm	31-36 cm	<31 cm
21-30 months	>38 cm	32-38 cm	<32 cm
>30 months	>39 cm	34-39 cm	<34 cm
Classification	Very good	Good	Fair

The breed of the bulls has an influence on the ranking but the numbers in the table above represent a good indication for most breeds of bulls used in the dairy industry.

Therefore, measurement of the Scrotal Circumference is likely to be the best single method of predicting the ability of a young bull to produce spermatozoa. In addition, when this technique is properly performed it is highly repeatable by the same operator and among operators.

The LUDF 20 R2 year old jersey bulls were bought on 27th July. Their scrotums were measured and 7 bulls out of the 20 were rejected for having a Scrotal Circumference of less than 32 cm (which was the cutting point we had). These 7 bulls were replaced for suitable ones. It is from this exercise that there are a few bulls out there that are not 100% fit for purpose. From a group of 20 in the yard, we measured 14 to get the 7 we wanted.

The bulls bought were also vaccinated with BVD vaccine, lepto vaccine, and injected with copper and selenium. They were also blood tested to make sure they were not carrying BVD or EBL.

We will put the 20 bulls with the 166 heifers. We will have 2 groups of 8 bulls with the main herd and rotate them daily leaving 4 spare ones.

8. Cow Health

BVD Vaccination:

a. 166 R2 heifers were vaccinated pre-Mating (about 8 $/heifer)
b. Mixed aged cows got a booster before Mating (about 4 $/cow)
c. Bulls were vaccinated (about 8 $/Bull)
d. We will be doing a Bulk Milk Test as soon all cows finish calving which it will tell us if there is a PI animal still in the herd. If the test says that it is still present we will have to decide if we will be looking for the PIs with blood testing, which is quite expensive.

AT risk cows

At risk cows -Reason	Numbers of cows (%)
Assisted calving	21 (3%)
Twins	12 (1.7%)
Milk Fever	28 (4%)
Total	61 (9%)

Commonly 10% to 15% of cows have a uterine infection 4 weeks before mating and many of these cows may not have any recorded problem at calving. All the cows will be Metrichecked 10 days before the PSM and we will Metricure as required.

Selenium levels were low when checked 3 weeks ago and another test was done this week. If levels are low again cows will be injected.

MATING CALENDAR

Mating Calendar Season 2010/2011 - TOTAL COWS IN THE HERD 673

Date	What happened
23rd September	Tail Paint applied to cows
4th October	Insert CIDR heifers +injection (Heifers)
11th October	Pull CIDR out +Injection (Heifers)
13th October	Fix time AB +Injection (Heifers)
14th October	Bulls are put with the heifers (16 Bulls with 166 heifers)
15th October	Metro Check all cows and Metrocure as required
16th October	Check cycling rate and make decision about intervention
25th October	**MATING BEGINS**

Cost benefit of Using DNA Proven Semen at LUDF

This mating the herd and R2's will be mated with DNA proven Crossbred.
The current published average value for the DNA team is $BW242 compared to the Daughter proven at $BW204
Half of this '38' point difference will be attributed to the calf born to this mating.
Thus the $BW19 difference will cost an additional $5.00 per insemination.

The total extra cost to generate 160 replacements we will assume to be
160 replacements x 5 straws needed to ensure a replacement = 800 straws
Additional cost of DNA proven semen 800 x $5.00 = $4,000

Benefit
160 x 19$BW x 4.6 average years in herd = $13,984
A 350% return on the investment seems a reasonable idea to us.

Evaluation of three synchrony programmes for dairy heifers.

- Scott McDougall and Chris Compton

The Key Questions this study aimed to address were:

1. What is the optimal synchrony programme for New Zealand heifers in terms of conception and pregnancy rates?
2. Which synchrony programme is most cost effective?
3. Is fixed time AI feasible?

Hypotheses:

1. More heifers would conceive to artificial insemination and be pregnant at day 21 after PSM with a GPG+P4 treatment than with a 'double PG' treatment
2. Pregnancy rates by day 21 after PSM would not differ between 'Cosynch' (i.e. set time AI at the time of 2nd GnRH) treated heifers compared to those treated with GPG+P4 with AI 12-24 hours after the final GnRH

Materials and Methods:

1137 heifers from 10 herds

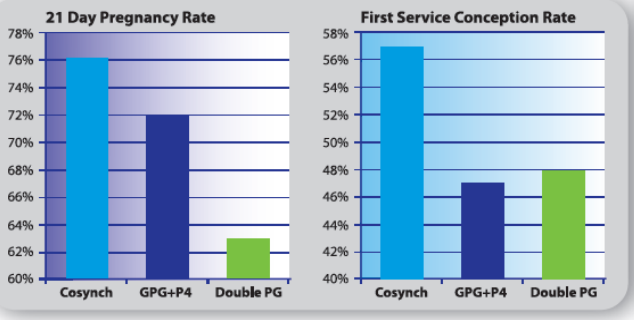
Heifers were randomly assigned to 1 of 3 treatment groups

1. 'Double PG':
   i.m. injection of 500 µg cloprostenol (PGF2α) 11 days apart (Day -13 & Day -2) with insemination upon oestrus detection (n = 380 or 33%),
2. 'GPG + P4':
   Insertion of intra-vaginal progesterone releasing device (Cue Mate), and injection of 100 µg gonadorelin at Day – 9 and 500 µg cloprostenol (PGF2α) at Day -2, and 100 µg gonadorelin on Day 0 with set time artificial insemination (STAI) at Day + 1 (n = 383 or 34%),
3. 'GPG + P4- Cosynch':
   As for 2 but with the STAI coincident with the final GnRH injection ("Co-synch") (n = 374 or 33%)

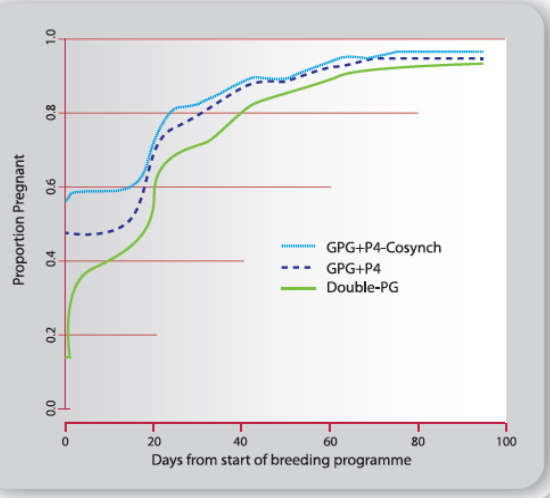
Results:

Heifers in the 'GPG+P4 - Cosynch' and 'GPG+P4' groups had higher 21 day in calf rates than heifers in the 'double PG' group.

Heifers in the Cosynch group had a significantly higher first service conception rate than those in the GPG+P4 group (p=0.023) and tended to be higher than those in the 'Double PG group (p=0.069).



Median conception date was significantly earlier for the GPG+P4 - Cosynch heifers.



Cost Effectiveness:

A partial budget demonstrates that both the 'GPG+P4' and 'GPG+P4-Cosynch programmes provide an economical benefit over the 'Double PG' programme. This benefit was significantly greater for the GPG+P4-Cosynch programme

Programme	Economic benefit over Double PG programme
GPG+P4	$1.28/head
GPG+P4 Cosynch	$26.90/head

Conclusions:

The Cosynch programme (synchrony of heifers with GPG+P4 and with a fixed time of artificial insemination at the time of the final GnRH injection) was found to provide the best biological and economic outcome of the 3 programmes tested.

In addition it was found that lower BCS and younger age at the commencement of the programme was associated with poorer conception rates.

Chasing BW: Cost / Benefit

Peter Gatley – General Manager Genetics, LIC

Background

Breeding Worth (BW) is an economic index comprising the seven traits deemed to have the greatest impact on net farm profit. Decisions regarding the component traits and their respective weightings are made by a pan-industry body, NZ Animal Evaluation Ltd (NZAEL), based on science and economics, with an industry-good focus.

Since its introduction as the National Breeding Objective in 1996, BW has been found to be a valuable asset to the industry, and has achieved a high level of credibility throughout the industry.

Because genetic gain is both permanent and cumulative, even modest annual increments have an enormous impact on productivity, and indeed, genetics is considered to be the largest single contributor to on-farm productivity improvement, accounting for 60% of the increase in per-cow production. Consequently, any improvement in the annual rate of genetic gain will be important to the retention of New Zealand's low-cost milk production status.

It is widely accepted that the biggest potential boost to the rate of genetic gain since the development of progeny testing and Artificial Insemination over 60 years ago, will come from the science of genomics.

It is now clear that genomic evaluation significantly increases the reliability of young sire evaluations, but there are different views on the subject of its readiness for market, and its value. This paper examines the evidence.

How does genomics confer an advantage?

For most of the last century, dairy cattle breeders world-wide have relied on observations of daughter performance to inform as to the genetic merit of sires. Today it is possible to analyse DNA from a newborn bull calf and the results help us predict how its daughters would milk, what they would look like, and even how they would behave in the shed. All of this is achieved while the calf is not even old enough to produce semen.

There are 3 billion base pairs in the DNA, and genomics involves identification of many thousands of the variants that are most informative in regard to heritable traits. Clearly this is a hugely complex task, and it is made more so by the fact that some genes interact with each other and/or with the environment. Understandably then, our current knowledge of genomics is embryonic, so there will be plenty of surprises, but also huge gains to be made as we unravel the mystery.

The primary advantage of genomics in its current form is achieved by shortening the generation interval. The importance of this is seen in the breeders' equation which drives genetic gain for any trait, in any species:

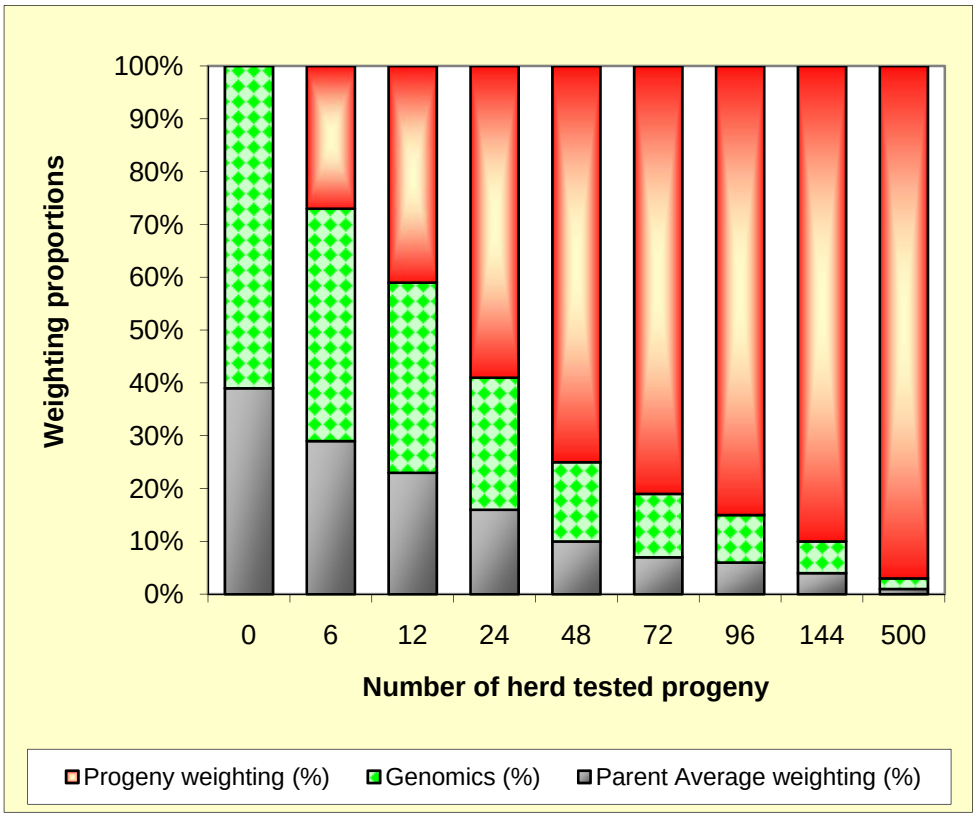
$$\text{Genetic Gain} = \frac{\text{Selection Intensity} \times \text{Accuracy} \times \text{Heritability}}{\text{Generation Interval}}$$

For example, halving the generation interval can be expected to double the rate of genetic gain. By circumventing the need for progeny testing, which takes several years, and enabling bulls to be selected for widespread use as yearlings or two-year-olds, the generation interval is substantially reduced. The main issue then, is the reliability of the genomic evaluation.

A typical bull calf with only ancestry information in its evaluation may have a reliability of ~35%, and a normal 80-daughter progeny test will lift individual reliability to 80%+. By comparison, the addition of genomic information to ancestry will lift individual bull reliability to 50-55%, but by using groups of young genomically selected bulls, team average reliability can reach acceptable levels and certainly exceed 90%. As long as the team average exceeds the BW of the alternative option, the farmer will achieve a net benefit in genetic gain.

How much influence does genomic evaluation have on a bull's evaluation?

Official BW for a young sire will be heavily influenced by genomic evaluation, but as progeny test data accumulates, the influence of genomics diminishes. By the end of the first lactation of a typical crop of ~80 daughters, genomics accounts for <15% of the sire's evaluation. When a widespread proof is achieved, genomics will account for <2% of the total.



Is there a systematic over-estimation in genomic evaluations?

Yes, this has been observed in NZ as well as the USA and Europe. The important question is whether or not, after any slippage, a net benefit has been achieved relative to the alternative.

In New Zealand, NZAEL have recommended that slippage be factored in to expectations by adjusting team averages downward by "15-30" BW units. LIC has chosen to deduct 20 units from its predicted team averages, and these adjustments feature on the Premier Sires wall charts that are provided to all dairy farmers. Note that if the 20-point reduction does occur, the teams will deliver considerable advantage over the alternative Daughter Proven product (HF 18 BW, J 39 BW, KX 38 BW). Even a 30-point reduction would deliver value to users of the Jersey and KiwiCross service this spring.

LIC is not comfortable with the over-estimation which appears to apply particularly to the Jerseys. LIC scientists are working with NZAEL on a solution that will obviate the need for any adjustment to official BW.

Have genomically selected bull teams delivered a BW advantage?

LIC made the decision to offer teams of genomically selected bulls at the earliest opportunity, in 2008, based on its retrospective analysis of prior bull teams. Many of the bulls used in 2008 now have a full lactation progeny test, and the others have ~50 daughters with typically one herd test. Based on the latest official NZAEL evaluations (9 Oct 2010), all three breed teams show some BW advantage as shown in the following table:

(2008 PS teams)	HF	J	KX
Predicted BW diff.	7	24	33
Current BW diff.	4	8	30
% of insems	1	34	64

With the addition of more progeny test data, it is possible that the advantage could be eroded, particularly in the case of Holstein Friesian and Jersey where the differential is small. It is, however, important to bear in mind the following points:

- The Holstein Friesian DNA Proven team advantage was predicted to be only 7 units, so the slippage to date has not been large. The reason for the small advantage was the fact that the 2008 Daughter Proven team was exceptionally strong.
- The Holstein Friesian team was withdrawn very early in the 2008 season and so accounted for only 1% of the inseminations.
- The Jersey team was negatively impacted very heavily by two bulls and the potential for this to occur in future has been diminished by significantly increasing the size of the teams used (from 16 bulls to 25 bulls), and by utilising all bulls in equal proportions, whereas in 2008 some bulls were more heavily used than others.
- The Jersey team differential advantage is small, but it conferred an additional benefit in respect of genetic diversity as the 2008 progeny tested team was in desperate need of new bloodlines.
- Likewise the 2008 KiwiCross team, albeit that it appears to have delivered a considerable benefit in BW terms, also provided some much needed genetic diversity at a time when the progeny test team was heavily dependent on one bull (Scotts Northsea) which was in the team for an extraordinary fourth consecutive year.
- Nearly two thirds of the inseminations were provided by the KiwiCross team which retains an impressive (30 BW) advantage over the alternative. It is noteworthy that 33 BW units was the differential predicted on the 2008 wall chart.
- LIC offered farmers the opportunity to avail themselves of this new technology as soon as it was possible. Many welcomed this approach which enabled farmers to make an informed individual choice about the risk and reward.
- LIC believes that the advance in our knowledge of genomics has been hastened because of the bold move to launch commercially. If this were strictly a research project, there would not be the same urgency or willingness to commit resource.
- It now appears that a net advantage has been conferred by the 2008 launch in respect of genetic gain, and it should be noted that each BW unit in the national herd is valued in industry good terms at ~$4m of net farm profit.

Only some of the bulls used in the 2009 DNA Proven teams now have a part-lactation proof, and others will not have daughters in milk until next spring, so little can be inferred by examining their current evaluations, but at this stage, we expect the bulk of the inseminations to have delivered an advantage. The following table provides the latest information:

(2009 PS teams)	HF	J	KX
Predicted BW diff.	22	34	41
Current BW diff.	10	37	36
% of insems	16	25	59

What BW advantage is required to justify premium pricing?

The genomically selected bulls provided by LIC currently carry a premium of $5 per insemination ($4.50 for most clients as the 10% Investamate discount applies). Taking into account the time-value-of-money and the number of inseminations required to generate a heifer replacement, NZAEL have calculated that an advantage of more than 10 BW units is required to justify the investment. On this basis, most of the inseminations carried out since 2008 are expected to deliver a net benefit to the early adopters, but it is contended that there is more to the value equation than just BW.

The issue of genetic diversity, as outlined above in relation to the Jersey and KiwiCross bull teams in 2008, is a factor which will be worthy of special consideration from time to time depending on the strength of the Daughter Proven bull teams. That is, moving to the DNA Proven option can provide instant access to new bloodlines.

The potential value to be generated by genomics has yet to be accurately ascertained. As the technology advances, it is estimated that the annual rate of genetic gain could increase by 30-50% or more. Even at the low end of this scale, the industry good value would be huge.

LIC's view is that genomically selected bull teams will be priced at a level that will justify a rational economic decision to utilize the technology for the benefit of individual farmers and therefore the industry as a whole.

Farmers who want their herd BW at the top end of the bell curve will be aware that it will be increasingly difficult to reach the upper quartile without making use of genomically selected bull teams.

How is genomic technology advancing?

The teams used in 2008 and 2009 were selected using the genomic technology as it was at the time. Advances are being made at pace on the back of rapid technology development and LIC's multi-million dollar investment in R&D, and there is reason to expect continual improvements in reliability.

- Each year more progeny tested bulls become available for genomic profiling to add to the dataset.
- Until recently the genomic analysis has relied heavily on 50k SNP panels. High density panels (>500k SNPs) are now becoming available.
- Genotyping of females including bull dams and SPS daughters is expected to add further value.
- The statistical tools used to identify the correlation between phenotype and genotype are being continually refined.
- Collaboration between LIC and other research initiatives has begun and will continue.

CONCLUSION:

Genomic selection is still in the embryonic stage of development, however it appears to be already delivering net value, and this will be enhanced as accuracy improves.

The gene discovery initiative which began in a partnership between LIC and Holland Genetics (now CRV) in 1994 has proven to be strategically important to the New Zealand dairy industry. Both organisations have made significant progress with genomics, and discussion is taking place in regard to pooling knowledge and data for the common good.

Genomically selected bull teams are expected to become the preferred option for the majority of New Zealand dairy farmers within the next several years.

How did LUDF do in the Earthquakes?

Comment from George Reveley.

LUDF got off very lightly but there is always something to learn.

September 4th
The herd was already on the platform with cups on.
Power was lost. The farm has no generator.
Cows in the yard were allowed to go, some had fallen over in the yard and were not immediately walking freely but not injured in a way that required any intervention.

People all went home to check out families and houses and returned at daylight to remove cows from the platform.

During the day - Questions faced:

- Is there an alternative dairy to milk the herd? Another rotary is about 4km cow walking away but it, like ours, was not wired for a generator.
- There was power at Prebbleton with very little damage to power supply infrastructure in the district. Lines company people were working in the district, will they get the job done? The farm is 600m from a major substation and power seldom stays off for very long.
- It was likely that the mains power could be returned to the LUDF at a similar time to getting a generator operational. Other farms further away from the city would definitely be waiting longer for power and therefore have a greater need for electricians and generators.
- Stock water? A stock water race was made available to the herd.
- Are the people OK? It was easier for people working.
- Information from lines workers mid afternoon indicated that power would be very likely before dark – do we rely on that information?

Power supply was returned to the farm at 6.10pm
Herd milked by 9.30pm
Bulk SCC did rise above 400,000 as a result of the missed milking.
Clinical mastitis rose in the weeks following.
Bullet dodged

INFRASTRUCTURE

The dairy

Rotaries with support towers at 900mm appear to have stayed on the support towers better than those with wider spacing. The welding and other refurbishment done this winter at LUDF apparently helped to keep the platform tight on its rollers.
The cow yard has some significant cracks appearing from aftershocks.
Wells, mainlines and effluent sumps appear to have no issues.

Thinking about the event

On the day and immediately following
Talking to others in the same situation was really helpful to find alternative strategies and helping us to settle down.

Changes for LUDF

- A generator able to deliver 50KVA will be purchased.
- Better equipment to move the platform in case of failure of the drive system will be purchased and stored ready for use.
- We will encourage staff to be ready for power cuts and longer periods of self-management.

Some things we have seen or know about for other farms

- Preparedness for major power failure is not adequate. These will re-occur via snow, wind & earthquake. More than 4 - 5 milkings were missed by a few.
- Rotary dairies with closer support towers and good maintenance were more stable.
- Reliability of some generators was not as it needed to be.
- Mastitis levels increased in herds with interrupted milkings but bulk SCC appeared to rise on other farms as well. A number of farmers wondered if the ongoing tremors were upsetting cows.

Getting back into business and adequacy of insurance

A complex set of situations have been faced by some and are remaining as an issue for a few.
Waiting for insurance assessors and then remediation of farm dairies and other infrastructure can generate very difficult decision processes especially because the time frames are so hard to estimate. Preparation we can make for such is to practice good decision making and know how to seek and use help.

Some of the more difficult situations:

1. Remediation of land - loss of spring pasture availability. Not covered by insurance who pays for the additional feed required in a Sharemilking agreement?

2. Insurance conflict with a SM with Business Continuity insurance and owners without the same level of cover. This generates potentially significantly different solutions and timetables to cope with the damage. Owners much less able to cope with cows going off farm. But the alternative for cows going away to other farms to be milked for a few days/weeks while the farm infrastructure is restored may be a better option than battling on trying to do everything necessary while the cows remain on farm.

Two final points

1. Knowing "Who you going to call" is important. Having their phone numbers in the right place is a very good idea. A once a year job at least.

2. Knowing what insurance is actually in place and try out a number of the "what if" scenarios.
   - You have a bridge to a significant area of your farm. It is lost in a flood. Will Business Continuity insurance cover the loss of production/alternative feed purchase as a result of loss of access to the feed?
   - Many trees fall and seriously block your tanker track and it is the only way in to the dairy. Covered?

Please reconsider your flood, wind, snow and earthquake recovery plans.

Comment from a local Dairy Farmer

Just a small thing - I once read something about having a central meeting place on the farm in the event of a disaster. We had all discussed this at the time - and it worked!

I learnt from the snow a few years ago that not only do I need to be prepared for my family - I need to be prepared for the whole farm's families. Batteries/ candles / water / food etc. If you can deliver this then everything keeps on going better on the farm.

Everyone reacts differently but most people need something to do. Try to find a job for everyone that will help someone else. If you are needed in a stressful situation it seems to help people's heads stay in the right place. This includes wives of staff.

Not sure that this is anything new.

Graham was prepared for a big snow event so had generators etc here ready to go. Have the house wired so it will run in a basic fashion on the generator.

Insurance Check: Business Interruption Insurance

Cover for Loss of Profits

Buildings and Contents policies typically cover the cost of repairing or replacing buildings and affected machinery following a major loss. However, repairs or replacement can take some time and while this process is happening, the farm may be unable to produce full income, and / or incur additional costs.

Insurance companies are able to tailor special Business interruption cover to maintain income and minimise the financial shortfall following a major loss to your buildings and/or contents.

What is automatically included in your Farm Contents policy?

- Often policies provide a degree of cover for reasonable additional costs to keep a farm operational, such as costs of hire equipment, transport costs to move stock, and additional supplementary feed costs. Check this cover is sufficient given the likely costs of these activities in the scale of your operation.
- If this amount is not likely to substantially cover probable costs, consider additional Insurance such as a Business Interruption Policy.

Business Interruption policies

Specific Business Interruption Insurance policies are available to address aspects such as:

- **Gross Profit**
  Up to the amount shown on the certificate for loss of profits due to an interruption to your business as a result of loss caused by an insured peril.
- **Additional Increased Costs of Working**
  Up to the amount shown on the certificate for the additional increased costs of working to resume or maintain normal operations.
- **Dual Wages**
  Up to the amount shown on the certificate for financial loss for the payment of dual wages to resume or maintain normal operations.
- **Outstanding Debtors**
  Up to the amount shown on the certificate for financial loss in regards to outstanding debtors' balances caused by loss of your accounting and business records.
- **Wages in Lieu of Notice**
  Payment for up to the number of weeks shown on the certificate for financial loss for the payment of wages for those employees who cannot work due to a business interruption loss covered by this policy.

Consider also the effects on your business of an 'event' at:

- Customers' and Suppliers' Premises
- Electric Power and Substations
- Prevention of Access
- Public Authority Action
- Natural Disaster

Insurance Companies typically also offer:

- Farm milk contamination/spoilage and non-collection
- Dairy milk contamination liability
- Statutory and employer's liability
- Moral obligation
- Farm and private vehicles
- Livestock

Information provided courtesy of FMG Rural Financial Services

Lincoln University Dairy Farm - Farm Walk notes

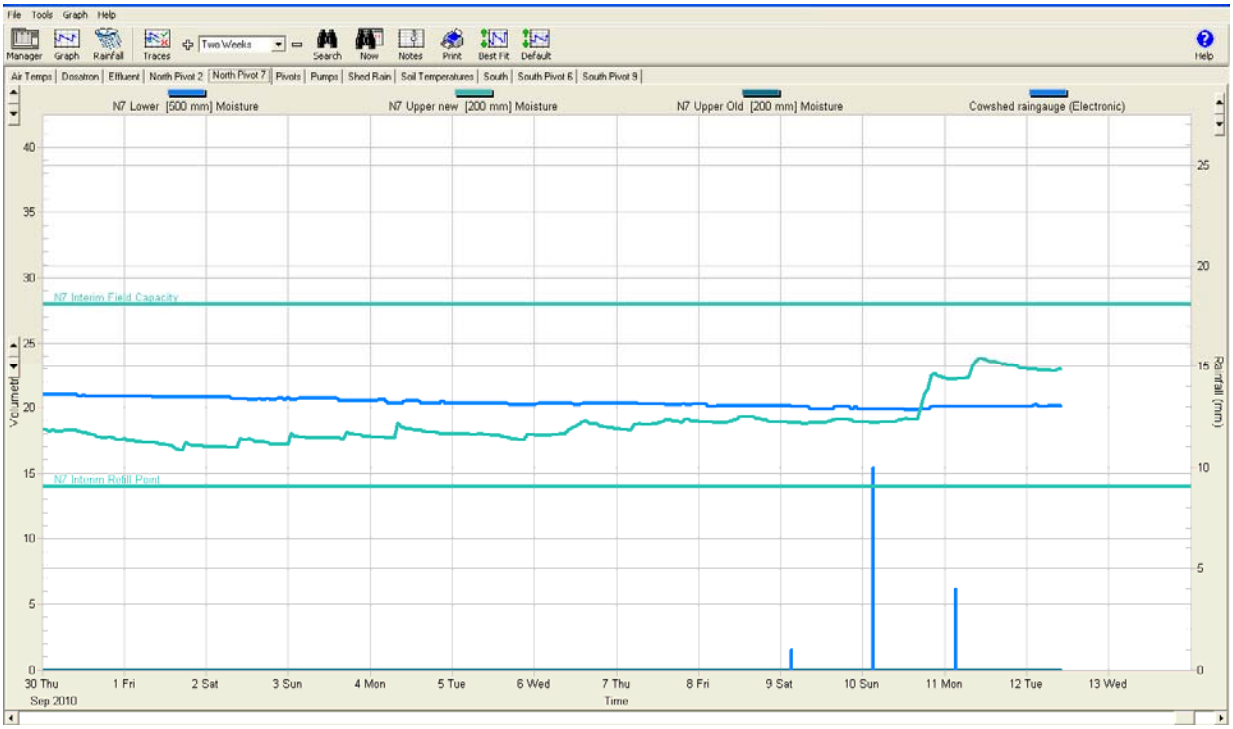
Tuesday, 12th October 2010

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 clicks**
3. **Continue Mg supplementation**
4. **Closely observe milking cows for mastitis**
5. **Observe and record pre-mating heats**

Summary of Key Factors affecting Grazing Management & Animal Performance

6. Soil temperature this week was 9.6°C, down from 10.2°C the previous week. The week started with 11°C and had 6.5°C yesterday at 9.00am.
7. 15 mm of rain this week. There is a bit of water lying around the heavier parts of the farm but soil moisture level did not rise significantly. Two days of irrigation required.



8. PASTURE GROWTH was 59 kg DM/ha/day, lower than the 67kg DM/ha/day last week.
9. Average PASTURE COVER was measured at 2198 kg DM/ha, very similar to last weeks 2193 kg DM/ha.
10. Same week last year growth rate was 57 kg DM/ha/day and average pasture cover was 2,128 kg DM/ha
11. 6 cows still to calve.
12. This morning 653 cows were milked into the vat, plus 7 colostrum, 2 treatment cows, 1 lame and 10 others.
13. Including all groups of cows, 56.4ha was grazed for the week, an average of 8 ha/day or 20 day round.
14. No silage was fed this week.

15. Feed Wedge today:

The target line in the wedge reflects the pre-grazing target of 2986 kg DM/ha and a post grazing of 1480 kg DM/ha, which is the pre-grazing needed to feed the cows considering the stocking rate of 4.2 cows/ha (675 cows/160 ha)), cows eating 17 kg DM/cow/day and a rotation length of 21 days.

16. **Key actions this week:**

- This week the round length will be maintained at between 20-21 days, and cows fed all grass. Despite the drop in temperature over the last 3 days, growth rates are likely to increase from now on and we are confident we will grow demand. In most years we have grown above demand from this week.
- This time of the year is very challenging, the farm moved from a deficit situation to a surplus one very quickly and we want to avoid feeding silage for too long and creating a surplus next week.

17. Under-sowing of 26 ha was done three weeks ago (S1, S9, N7 and ½ N9). Seed was broadcast into these paddocks because of concern that a 150mmm disc drill would not cover the bare patches adequately. Paddocks S7 and S8 will be Drilled with a 125mm coulter drill when next grazed.

18. Season to date we have applied Ammo 36 to 124ha. Second round of urea started 3 weeks ago. This week 30 Kg N was applied to 38 ha. (The week before 37 ha received 40 kg Nitrogen).

19. 56.3 ha received Super Sulphur 15 (North Block and S1 had 576 kg/ha and South Block had 518 kg/ha. The rest of the area will be done over the next couple of weeks.

20. No new lame cows this week, 24 lame cows since calving started on the 20 July.

21. 1 new clinical case of Mastitis, season to date 33 cows treated for Mastitis (3 heifers and 30 cows) (4.9 cows/100 calved). This rise in mastitis cases will in part be a result of the milking missed after the earthquake.

22. SCC has ranged from 162 -192,000. All cows are checked for mastitis once a week. The herd should be below 140,000 SCC given the very low levels immediately after calving.

23. Production this week was 2.02 kg MS/cow/day (2.00kg MS/cow last week) and 8.11 kg MS/ha/day (7.82 kg MS/ha last week).

24. We are rearing 200 heifer including 40 surplus heifers we will sell.

Preparation for mating

25. R2 heifers at grazing had their first BVD vaccination on 17th September, were also drenched for internal parasites, copper bulleted and given a selenium injection.
26. Heifers were cidred on 4th October using the CoSynch Heifer program and will be blanket mated tomorrow.
27. Milking cows were vaccinated for BVD on 27th September.
28. Four weeks ago 10 early-calved mixed aged cows, calved for over a month, were blood tested. The results came back as copper satisfactory and selenium below average. These cows were tested again and levels are still below targets so cows will be given a Selenium injection. We are providing the cows with enough Selenium in the stock water troughs but they may not be drinking enough water at present.
29. The herd will be metro-check and metro-cure next Monday.
30. From the start of the herd calving (8th August) 668 cows and heifers had calved by the end of 9 weeks. The target set is (98%) or 659 cows. This indicates that with adequate feeding there is a very good chance that pre-mating heat targets will be achieved.
31. The herd was tail painted on 23rd September and heats are being recorded to establish the rate of cycling. The hoped for outcome is that 85% of the herd (574) will have cycled by the planned start of mating on 25th October. 145 cows cycled in the last 7 days (21cows/day), similar to the week before of 20 cows /day. As mating approaches the rate hoped for will be above 27 per day (85% of 675cows/21days).
32. Mating strategies:
    - The cows cycling in the week prior to the PSM (25th October) will be injected with PG 7 days after their shown heat. These cows will be inseminated 2-3 days after the injection to observe heat. This strategy is likely to bring cows due to be mated in week 3 forward to be mated in week 1. If cows cycle at 25 cows a day this relates to 175 cows, and up to 90% are likely to respond to treatment. By doing this we condense our calving pattern.
    - Our intention is not to use any CIDR's this season but will do so if the number of cows cycling is too far below target.

Next farm walk will be on **Tuesday, 19th October 2010, 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).

Weekly Dataset from Lincoln University Dairy Farm

Date (Totals at end of period)	7-Sep-10	14-Sep-10	21-Sep-10	28-Sep-10	5-Oct-10
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	41/87/0	102/7/0	71/7/0	44/0/0	22/0/0
Culls (Includes culls put down & empties)	0	0	0	0	0
Culls total to date	1	1	1	1	1
Deaths (Includes cows put down)	3	0	2	0	0
Deaths total to date	9	9	11	11	11
Calved Cows available (Peak Number 680…)	556	575	604	630	658
Treatment / Sick mob total	7	6	6	8	7
lame, mastitis, other, colostrums	3/7/0/41	11/6/0/16	20/6/0/14	4/8/0/10	4/7/0/10
Milking twice a day into vat	473	524	555	604	620
Milking once a day into vat	0	11	19	8	4
Total Cows Milked into vat	473	535	574	612	624
Days in Milk actual cow days/Peak Cows	18	24	30	37	
MS/cow/day (Actual kg / Cows into vat only)	1.7	1.9	1.93	1.91	2.0
MS/cow to date (total kgs / Peak Cows 680)	22	33	44	56	70
MS/ha/day (total kgs / Total ha used - eg 161.5ha)	5.1	6.2	6.9	7.30	7.8
MS/ha to date (total kg / Total ha used)	92	135	184	235	289
Herd Average Condition Score					
Whole Herd LW (kgs)					
Soil Temp Tues 10.00am 10cm	7.9	10.0	7.5	8.3	10.2
Growth Rate (kgDM/ha/day)	37	65	21	45	67
Plate meter height - ave half-cms	11.6	12.9	10.6	10.4	12.0
Ave Pasture Cover (x140 + 500)	2124	2310	1991	1958	2193
Pre Grazing cover (ave for week)	3300	3300	3021	2644	2696
Post Grazing cover (ave for week)	1520	1500	1550	1450	1480
Highest pre-grazing cover	3300	3400	3431	2824	2865
Area grazed / day (ave for week)	4.60	3.90	7.70	6.10	5.90
Grazing Interval	35	41	21	26	27
Pasture ME (pre grazing sample)	12.8		12.7		
Pasture % Protein	17.0		23.7		
Pasture % DM	21.2		17.3		
Pasture % NDF	34.5		34.8		
Supplements Type	0	0	0	Grass Silage	Grass Silage
Supplements fed kg DM/cow/day in paddock	0.0	0.0	0.0	5.4	4.8
Supplements fed to date kg per cow (680 peak)	0	0	0	5.4	10.2
Supplements Made Kg DM / ha cumulative	0	0	0	0	0
Units N applied/ha and % of farm	40units33%	0	40units26%	40units41%	40units23%
Kgs/ha N to Date (on the NON-effluent area 133ha)	36	36	49	67	78
Rainfall (mm)	6	20	6	5	0
ET Weekly Soil & Science readings (mm)					
Days irrigated each week	0	0	0	0	3
Irrigation mm applied per week	0	0	0	0	17.4
Stock Water Consumed litres / cow / day	36	28	34	50	