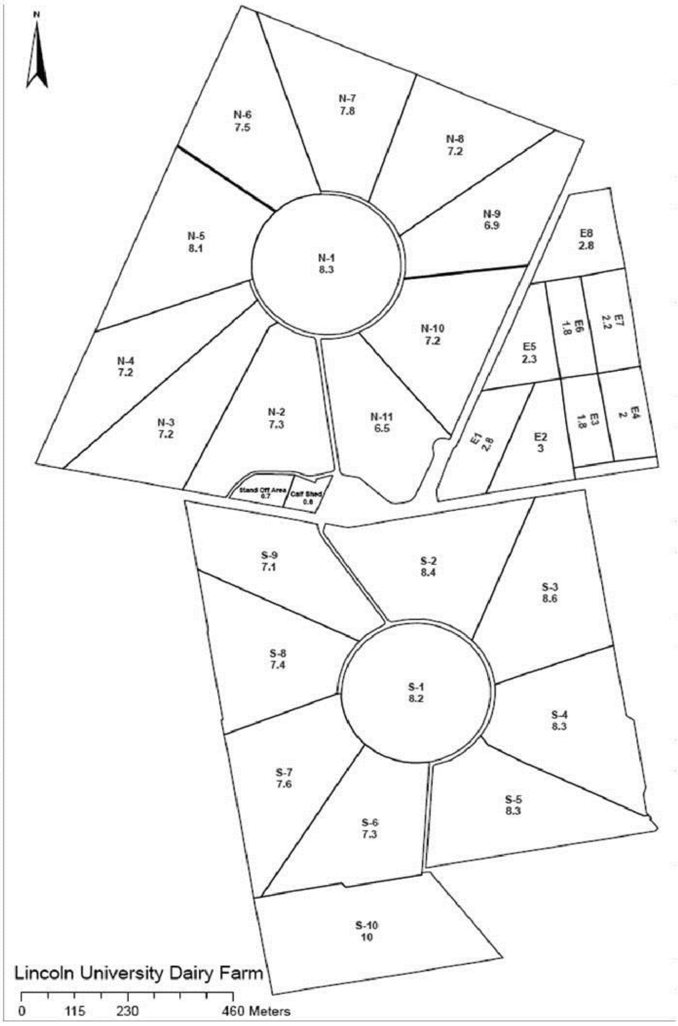
Lincoln University Dairy Farm Focus Day

19th February 2015



Staff

Peter Hancox – Farm Manager
Matt Weatherhead – 2IC
Alistair Linfoot – Dairy Assistant
Hamish Shoa – Dairy 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

SIDDC
South Island Dairying Development Centre

Partners Networking To Advance South Island Dairying

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Introduction

The 186 hectare irrigated property, of which 160 hectares is the milking platform, was a former University sheep farm until conversion in 2001. 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.

LUDF Strategic objective 2011-2015:

To maximise sustainable profit embracing the whole farm system through:

- *increasing productivity;*
- *without increasing the farm's total environmental footprint;*
- *while operating within definable and acceptable animal welfare targets; and*
- *remaining relevant to Canterbury (and South Island) dairy farmers by demonstrating practices achievable by leading and progressive farmers.*
- *LUDF is to accept a higher level of risk (than may be acceptable to many farmers) in the initial or transition phase of this project.*

Additional objectives

- To develop and demonstrate world-best practice pasture based dairy farming systems and to transfer them to dairy farms throughout the South Island.
- To consider the farms full environmental footprint, land requirement, resource use and efficiency in system decision making and reporting
- To use the best environmental monitoring and irrigation management systems in the development and implementation of practices, that achieve sustainable growth in profit from productivity and protection of the wider environment.
- To ensure optimal use of all nutrients on farm, including effluent, fertiliser, nutrients imported from supplements and atmospheric nitrogen; through storage where necessary, distribution according to plant needs and retention in the root zone.
- To continue the environmental monitoring programme and demonstrate technologies and farming practices that will ensure the average annual concentration of nitrate-N in drainage water from below the plant root zone remains below the critical value [16 mg N/L] specified in ECan's proposed regional rule in order for LUDF to remain a 'permitted activity' [Rule WQL20].
- To store and apply effluent such that there is no significant microbial contamination of the shallow aquifers.
- To manage pastures and grazing so per hectare energy production is optimised and milkers consume as much metabolisable energy [ME] from pasture as practicable.
- To optimize the use of the farm automation systems and demonstrate / document improved efficiencies and subsequent effect on the business.
- To achieve industry targets for mating performance within a 10 week mating period, including a 6 week in-calf rate of 79% and 10 week in calf rate greater than 89% i.e. empty rate of less than 11%.
- To continue to document and measure LUDF's influence on changes to defined management practices on other dairy farms.
- To ensure specific training is adequate and appropriate to enable staff members to contribute effectively in meeting the objectives of the farm.
- To operate an efficient and well organised business unit.
- To generate profit through tight cost control with appropriate re-investment and maintenance of the resources.
- To create and maintain an effective team environment at policy, management and operational levels.
- To actively seek labour productivity gains through adoption of technologies and practices that reduces labour requirements or makes the work environment more satisfying.
- To assist Lincoln University to attract top quality domestic and international students into the New Zealand dairy industry.

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

Mean 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
Support land [East Block]	15 ha
Unproductive land on platform	6.7 ha

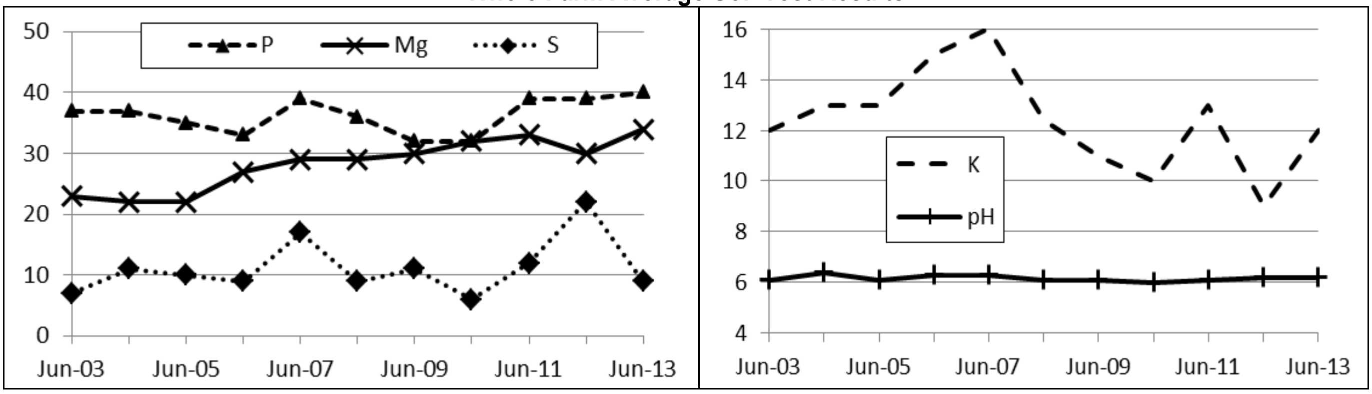
Soil types

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

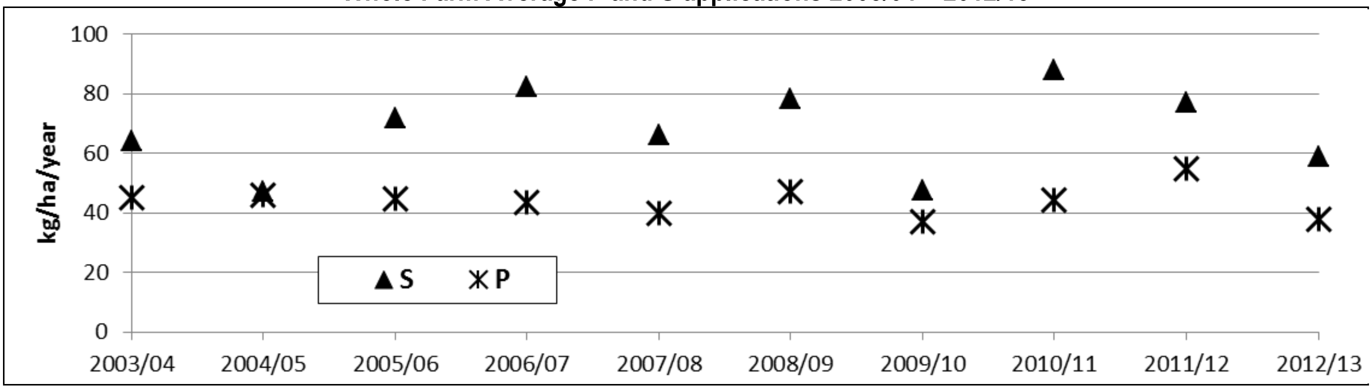
Soil test results and Fertiliser Applications

Target Soil Test Ranges: pH: 5.8 – 6.2, P: 30 – 40, K: 5 – 8, S: 10 – 12, Mg: 20+

Whole Farm Average Soil Test Results



Whole Farm Average P and S applications 2003/04 – 2012/13



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

Paddock	Period Regrassed	Grass Cultivar	Paddock	Period Regrassed	Grass Cultivar
N1	Feb-01	Brons. Imp	S1	Dec-05	Bealey
N2	Feb-11	Trojan	S2	Dec-10	Troj. Bealey
N3	Nov-12 / Sept 13	Shogun + Chicory /Plantain	S3	Feb-10	Bealey
N4	Jan 15	Base/Troj/Chicory/Plantain	S4	Dec-13	Bealey/Chicory/Plantain/Troj
N5	Dec-11 / Aug 13	Shogun	S5	Dec-08	Arrow - Alto
N6	April 14	Shogan (spray/drill)	S6	Dec-14	Shogan/Chicory/Plantain
N7	Jan -14	Bealey/Troj/Chicory/Plantain	S7	Sep-06	Arrow - Alto
N8	Jan -13	Bealey/Chicory/Plantain	S8	Oct-11	Troj. Bealey
N9	Oct-13	Bealey/Troj/Chicory/Plantain	S9	Dec-09	Bealey
N10	Jan-12	Tetraploids (FVI trial)	S10	Nov -14	Shogun/Chicory/Plantain
N11	Nov-07	Bealey	All paddocks also sown with clover		

Irrigation and effluent system

Centre-pivots	127 ha
Long Laterals	24 ha
K-Lines	10 ha
Irrigation System Capacity	5.5 mm/day
Length of basic pivot	402
Well depth	90m

- 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.

Mating programme – Spring 2014

KiwiX DNA for 365 cows (F8-F16); Holstein Friesian Daughter Proven for 280 cows (F0-F7); KiwiX Premier Sires Daughter proven for yearling Heifers. AI mate for 3 weeks in heifers and 6 weeks in main herd then follow with Jersey bulls. Heifers start mating 10 days early. 10 weeks mating for milking herd. Expect to rear 150 heifers.

Herd details – October 2014

Breeding Worth (rel%) / Production Worth (rel%)	146 / 48% 191 / 70%
Recorded Ancestry	99%
Average weight / cow (Dec) – Herd monitored walk over weighing	475 kg [Dec 2013]
Calving start date	Heifers – 23 July, Herd 3 August 2014
Est Median calving date	15 August 2014
Mating start date	25 October 2014

Empty rate (nil induction policy) after 10 weeks mating - 12% (2013-14 mating). 6 week in-calf rate 78%.

	2002/03	**Average 03/04 - 06/07**	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	**2013/14**
Total kg/MS supplied	228,420	**277,204**	278,560	261,423	273,605	264,460	297,740	300,484	**276,019**
Average kg/MS/cow	381	**425**	409	384	415	395	471	477	**440**
Average kg/MS/ha	1414	**1720**	1744	1634	1710	1653	1861	1878	**1725**
Farm Working Expenses / kgMS	$2.98	**$2.68**	$3.37	$3.88	$3.38	$3.86	$3.91	$3.84	**$4.28**
Dairy Operating Profit/ha	$1,164	**$2,534**	$8,284	$2,004	$4,696	$6,721	$4,553	$4665	**$7578**
Payout [excl. levy] $/kg [Milk price + div.]	$4.10	**$4.33**	$7.87	$5.25	$6.37	$7.80	$6.30	$6.12	**$8.50 F**
Return on Assets	4.4%	**6.18%**	14.6%	4.8%	7%	7%	6%	6%	**10%**

Stock numbers	2002/03	**Average 03/04 - 06/07**	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	**2013/14**
1 July cow numbers	631	**675**	704	704	685	694	665	650	**650**
Max. cows milked	604	**654**	680	683	660	669	632	630	**628**
Days in milk			263	254	266	271	272	273	**259**
Stocking rate Cow equiv. / ha	3.75	**4.05**	4.2	4.3	4.13	4.18	3.95	3.94	**3.92**
Stocking rate Kg liveweight / ha	1,838	**1964**	2,058	2,107	1,941	1914	1860	1878	**1872**
Cows wintered off No. Cows / Weeks	500 / 8	**515 / 7.8**	546 / 9	547 / 7	570 / 9	652 / 8.4	650 / 9.8	650/9.8	**650/11.4**
No. Yearlings grazed On / Off	0/118	**0/157**	0/171	0/200	0/160	0/166	0/141	0/138	**0/140**
No. Calves grazed On / Off	0/141	**0/163**	0/200	0/170	0/160	0/194	0/190	0/156	**0/150**
Est. Pasture Eaten (Dairybase) (tDM/ha)			17.9	17.2	16.2	16.9	17.3	16.8	**14.9**
Purch. Suppl - fed [kgDM/cow]	550	**317**	415	342	259	463	359	434	**506.8**
Made on dairy/platform [kgDM/cow]	0	**194**	95	64	144	160	154	93	**0**
Applied N / 160 eff. Ha			164	200	185	260	340	350	**250**

Staffing & Management

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

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

Contents

LUDF Strategic objective 2011-2015

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LUDF – focus for 2014/15 Season: Nil-Infrastructure, low input, low N-loss, high profit.

Farm system comprises

- 3.5 cows/ha,
- 150kgN/ha,
- 300kgDM/cow imported supplement, plus winter most cows off farm.
- FWE of less than $1.12million and
- Target production of 500kgMS/cow.
- To deliver a target profitability of $4000/ha at long-term average milk payout of $6.30/kgMS. ($1744/ha at $5.00/kgMS (milk price + dividend))

In Essence:

Upscaling results from P21 – LSE herd where 3 years of data have shown similar total production and profit is achieved with less total N-leaching than has occurred at LUDF.

The Opportunity:

What practices and principles are transferable to other farms, to retain profitability, with acceptable impact on the wider environment?

Overview of P21 farm systems demonstrations: Performance 2011/12 – 2013/14

David Chapman, Dawn Dalley, Anna Clement – DairyNZ;
Grant Edwards, Keith Cameron, Hong Di, Racheal Bryant, Jeff Curtis – Lincoln University;
John de Ruiter, Brendon Malcolm – Plant & Food Research

Key points:

1. The context for the P21 programme is the environmental regulations that are being bought in across NZ to control nutrient losses from farms - particularly, how farmers can continue to increase productivity and profit in the face of these regulations
2. Regional nutrient limits will require significant reductions in nitrogen leaching losses from current dairy farm levels in many regions, and especially in 'sensitive' catchments (e.g. Selwyn-Waihora).
3. The main objective of the P21 trial is to demonstrate dairy systems for the Canterbury region (irrigated) that are high-producing and highly profitable, but have low nitrate-N leaching losses
4. LUDF is the 'benchmark' farm for the P21 trial. LUDF has clearly demonstrated the key factors that drive high production and profit in the region, especially pasture and grazing management factors.
5. The 2 systems compared in P21 initially sat either side of LUDF in terms of stocking rate and inputs:
    a. P21 'LSE' = 3.5 cows per hectare (30 cow demonstration herd)
    b. LUDF = average 3.94 cows/hectare 2011/12 – 2013/14 (630 cow herd)
    c. P21 'HSE' = 5.0 cows per hectare (34 cow demonstration herd)
6. Both P21 systems are all-grazed – no standing-off on pads etc on milking platform or wintering area. We want to see how far we can go toward more profit and less nitrate leaching without pouring concrete.
7. In LSE, 95% of the cow diet on the milking platform comes from grazed pasture. Supplements (average 260 kg / cow per year) are only used to manage rotations and grazing residuals. Feed supply from pasture meets feed demand for most of the lactation, with supplements offered usually for short periods only.
8. In HSE, 80% of the diet on the milking platform comes from grazed pasture, and 20% from imported supplements (1000 kg / cow per year). Supplements are needed pretty-much throughout lactation.
9. Both systems place a strong emphasis on the efficiency with which resources are used for production. We are looking at inputs and management of the milking platform PLUS the winter support area. The efficient use of land for growing pasture and crops, efficient conversion of feed to milk and BCS by good quality cows, and careful tactical use of feed and fertiliser inputs are key ingredients
10. LUDF has adopted the P21 lower-input/high efficiency in the 2014/15 season. In doing so, it is testing how well this system can be 'scaled up' from 30 cows to 560 cows.

The following table gives an indicative comparison between LUDF and the P21 farmlets during the three seasons 2011/12 to 2013/14. It assumes that wintering is on kale for all three systems. The winter crop feeding and N leaching information comes from the P21 wintering experiment at Ashley Dene conducted over the same period.

Systems compared: LUDF and P21 (average of 2011/12 to 2013/14 seasons)

		P21 - LSE	LUDF	P21 – HSE
	Stocking rate, pastures, cows			
1	Stocking rate (cows/ha) / mean cow liveweight (kg, December)	3.5 / 507	3.94 / 474	5.0 / 499
2	Pasture grown (t DM/ha)	16.6	17.7	18.1
3	Pasture eaten (t DM/ha)	15.1	16.3	16.9
4	Pasture harvest efficiency (%)	91	92 (est.)	93
5	N fertiliser used on milking platform (kg)	159	313	309
6	Grazed pasture as % of feed offered on MP	95	91	80
7	Mean herd BW	149	112	137
8	Days in milk	270	268	254
	Milk production and nitrogen conversion efficiency			
9	MS/ha (kg/ha): milking platform	1782	1821	2355
10	MS/ha (kg/ha): milking platform + wintering	1452	1450	1777
11	MS/cow (kg)	510	463	467
12	Nitrogen conversion efficiency (N exported as % N imported) – milking platform + wintering	0.50	0.30	0.31
	Nitrate leaching			
	Nitrate-N leached (kg N/ha)			
13	milking platform (Overseer)	25	35	34
14	winter crop (lysimeters + cup samplers)	64	64	64
15	weighted average for MP plus winter crop	32	41	41
	Financial performance			
16	Op. profit at $6.30/kgMS ($/ milking platform ha)	4,310	4,395	4,345
17	Operating profit per total kg N leached from MP and winter crop area ($/kg N)	109	86	69

Note: several of the results for the P21 systems in this Table may change as we collect more information, for example on nitrate leaching and the effects of different winter crops. LUDF results above include the impact of reducing autumn cow numbers and production in 2013/14 season to meet LUDF's self-imposed N-loss target.

The comparison between LUDF and the P21 herds for profitability and nitrogen losses from the milking platform is indicative only because:

- LUDF's profitability is as reported elsewhere, adjusted for average payout. P21 profitability is based on actual feed / fertiliser inputs and assumptions for most other expenses, stock sales etc.
- Similarly, estimated nitrogen leaching from the LUDF milking platform accounts for the range of soils and inputs at LUDF, whereas the P21 data relates directly to the soils and inputs used in this research.

LUDF Budgeted Profitability and Expenses to date

See the October 2014 Focus Day notes for details of the budgeted expenses and notes in relation to this. Additional comments follow:

1. The initial budget was prepared with a $6.10 milk payout. This has been modified to reflect the current forecast of $4.70/kgMS + indicative dividend of $0.25-0.35c/share.
2. The reduction in cow numbers from last season equates to an 11% reduction in stock numbers; budgeted expenses have been proportionately reduced where possible, or as required in line with intended farm system changes. The overall reduction in budgeted expenses was 5.2%
3. Forecast profit is slightly higher for 2014/15 (if adjusted to the same payout) than was achieved in 2013/14, however recall the 2013/14 profit was constrained by LUDF's voluntary decision to reduce the number of cows on farm in the autumn (and therefore milk production) in order to meet its historical N-losses as predicted with Overseer™.
4. The profitability of the nil-infrastructure, low input system at LUDF this year is very dependent on milk production.

Farm System - Sensitivity of Profit to Production

Production level relative to budget	**100%**	**95%**	**90%**
Total Milk Production (kgMS)	280,000	266,000	252,000 kgMS
Milk production kgMS /cow	500	475	450 kgMS/cow
Net Revenue	$1,515,311	$1,445,311	$1,375,311
Cash Farm Working Expenses	$1,120,335	$1,120,335	$1,120,335
FWE/kgMS	**$4.00/kgMS**	**$4.21/kgMS**	**$4.45/kgMS**
Total Operating Expenses	$1,236,335	$1,236,335	$1,236,335
Dairy Operating Profit	$278,976	$208,976	$138,976
DOP/ha	$1,744	$1,306	$869

*A **5% drop in production** will result in **25% decrease in operating profit** while a 10% decrease in production will drop operating profit by 50% (at the current forecast payout).*

Driving profitability at LUDF:

LUDF's Profitability is primarily a function of **Milk Production x Payout minus Expenses**. LUDF has little impact on the payout – but has many opportunities to influence the other two criteria.

Therefore – high production from efficient use of grazed pasture is critical to achieving profitability. Not achieving desired production will have a significant impact on profitability. (LUDF must achieve production from pasture – it has very few available inputs to otherwise use for production).

Profitability vs Production

Little relationship between production and Profitability BUT

a. Very difficult to achieve high profitability at LOW levels of production
b. Very common to achieve high levels of production but NOT achieve high profitability.

Reproduced from the October 2014 Focus Day

Budget Review in light of the revised payout – Opportunities to further reduce expenditure:

1. The budget (below) reflects the current forecast milk payout.
2. The farm working expenses were ranked from highest to lowest to draw attention to those items with the biggest contribution to total expenditure
3. LUDF's highest single item of expenditure is staffing. LUDF made a decision at the start of the season to continue to operate the farm with four staff, even with the reduced number of cows. Staff on farm are employed on a permanent basis and therefore no revision of this will occur this season.
4. The employment costs do not include any relief milking / casual staff as the roster / systems at LUDF enable the farm to cover the workload and provide time off for staff within this level of staffing. Correspondingly there is no opportunity to reduce the amount of relief staff on farm this season.
5. Winter grazing costs largely cover the period from 1 June till calving so most of these costs have already occurred.
6. Both winter grazing and replacement costs are primarily a function of the stocking rate and therefore not items that the farm wants to change at present. In saying this, replacement costs are influenced by the number of youngstock retained. LUDF's policy of rearing additional heifers and then selling the lowest BW animals has generated additional income (not shown in the expense line) that offsets the cost of rearing and gives LUDF more options.
7. Irrigation costs as budgeted are necessary to grow the required feed and maintain the irrigation equipment.
8. LUDF expects to continue to purchase 300kgDM/cow as purchased grass silage. The reduced milk payout may lower the market price, though more often the price is driven by seasonal supply.
9. R & M costs could be deferred in some cases but are likely to result in higher future costs
10. Animal health, breeding, fertiliser spreading costs, and regrassing all provide some options for further evaluation of expenditure but risk reducing future productivity of the farm / herd.
11. AI mating of the yearling heifers has not occurred this season, in part due to the expense relative to the number of heifers we are generating from this, but also impacted by the limited facilities at the current grazer. This is disappointing as the yearling heifers have grown very well over this season and are looking good.

Actual vs Budgeted expenses to End January. **See below for details of the notes / variance.**

Year ending May 31	2014/15 Budget	Actual to end Jan	Budget to End Jan	Variance (Act—budg)	Notes
Milk production (total kgMS)	280,000	185,796	199,457	-13,662	
kgMS/ha	1,750	1,161	1,247	-86	
Peak Cow Nos	560	560	560	0	
Staff	3.7	3.7	3.7	0	
Income Milk Payout $/kgMS	$4.70	$4.70	$4.70		
Dividend /share	$0.30 /share	$0.30 /share	$0.30 /share		
Milk solids Revenue	$1,316,000	$873,239	$937,448	-$64,209	1
Dividend	$84,000	$55,739	$59,837	-$4,098	1
Surplus dairy stock	$138,511	$61,819	$74,098	-$12,279	2
Stock Purchases	-$23,200	-$25,280	-$23,165	-$2,115	
Gross Farm Revenue	**$1,515,311**	**$965,517**	**$1,048,218**	-$82,702	3
Expenses				$0	
Cow Costs Animal Health	$54,200	$40,634	$34,042	$6,592	4
Breeding Expenses	$42,340	$46,522	$35,918	$10,604	**5**
Replacement grazing & meal	$119,744	$168,102	$152,998	$15,104	**6**
Winter grazing - Herd incl. freight	$191,364	$176,321	$174,977	$1,344	
Feed Grass silage purchased	$70,502			$0	
Silage making & delivery	$9,728	$2,622	$9,728	-$7,106	**7**
Giberillin	$13,120	$5,596	$9,120	-$3,524	**8**
Nitrogen	$38,376	$26,104	$38,799	-$12,695	**9**
Fertiliser & Lime	$34,387	$27,305	$34,013	-$6,708	**10**
Irrigation - All Costs	$70,600	$45,095	$43,336	$1,759	**11**
Re-grassing	$36,985	$24,083	$27,712	-$3,629	**12**
Staff Employment	$259,884	$148,975	$155,160	-$6,185	**13**
Land Electricity-farm	$37,200	$17,165	$23,200	-$6,035	**14**
Administration	$24,700	$13,680	$14,329	-$649	
Freight & Cartage	$0	$1,250	$950	$300	
Rates & Insurance	$21,020			$0	
Repairs & Maintenance	$54,500	$20,492	$39,298	-$18,806	**15**
Shed Expenses excl. power	$9,850	$5,840	$6,272	-$432	
Vehicle Expenses	$31,336	$14,918	$24,386	-$9,468	**16**
Weed & Pest	$500	$850	$450	$400	
Cash Farm Working Expenses	$1,120,336	**$785,554**	**$824,688**	-$39,134	**17**
Depreciation est.	$116,000				
Total Operating Expenses	$1,236,336				
Dairy Operating Profit	$278,975				
DOP	**$1,744**				
Cash Operating Surplus	$394,975				
Cash Operating Surplus per ha	**$2,469**				

Explanatory Notes to Variance between Actual and Budgeted Expenses to date:

1 Lower milk production resulting in lower income (after adjusting for reduced milk price)
2 Surplus AI heifers were sold 1 Feb and therefore not shown in actual to end January.
3 Combination of above reducing income by $83,000
4 General increases in Animal health expenditure - including teat spray, BVD Lameness, Mastitis etc
5 Increases in Herd testing and AI compared to budget and replacement of a Protrack computer
6 LUDF continued to use milk powder as in past years. This makes milk production easily comparable across years. In past years it was financially worthwhile but not this year.
7 Limited silage made on farm (have regrassed instead)
8 Grazing Rotation limited use of GA in spring
9 Lower urea pricing
10 Timing difference
11 Higher electricity on Nth blk, offset by lower on Sth Blk, slightly lower R/M
12 Saving by direct drilling rather than cultivating S6. Similar area regrassed as budgeted.
13 No use of casual staff
14 partially timing difference, also upgraded milk refrigeration and added silo-wraps
15 partially timing difference, includes drainage development not yet undertaken
16 Savings in fuel price and vehicle R/M
17 Combination of above reducing expenses by $40,000

Summary: Reduction in income greater than reduction (to date) in expenses.

Other Aspects:

1. **Silo Wraps:** A thermal / insulated wrap has been added to each milk silo to help keep milk cool. Approximate cost $5,750 + GST.

2. **Refrigeration Unit:** the farms original refrigeration units were struggling to adequately cool milk and maintain a low milk temperature. This was particularly evident in the hot weather prior to Christmas when the units were replaced. The new unit will meet the changes required under the coming legislation changes (under 6°C within 2 hours following the completion of milking). Two 25kW refrigeration units (one for each silo) were replaced with a single 39kW unit, able to cool both silos. Approximate cost $14,000 + GST.

3. **Water heater:** Three replacement elements have been fitted to the water heater. Initial proposals suggested the heater needed replacing at a cost of $8-10,000, but upon further investigation it was determined one of the elements was not working, the second was only working at 50% and so the third unit was effectively working all day to heat the farms water requirements. This has to date cost approximately $500 however is blowing fuses so may not be completely resolved at present.

Performance to Date – Summary of Results to the End of January

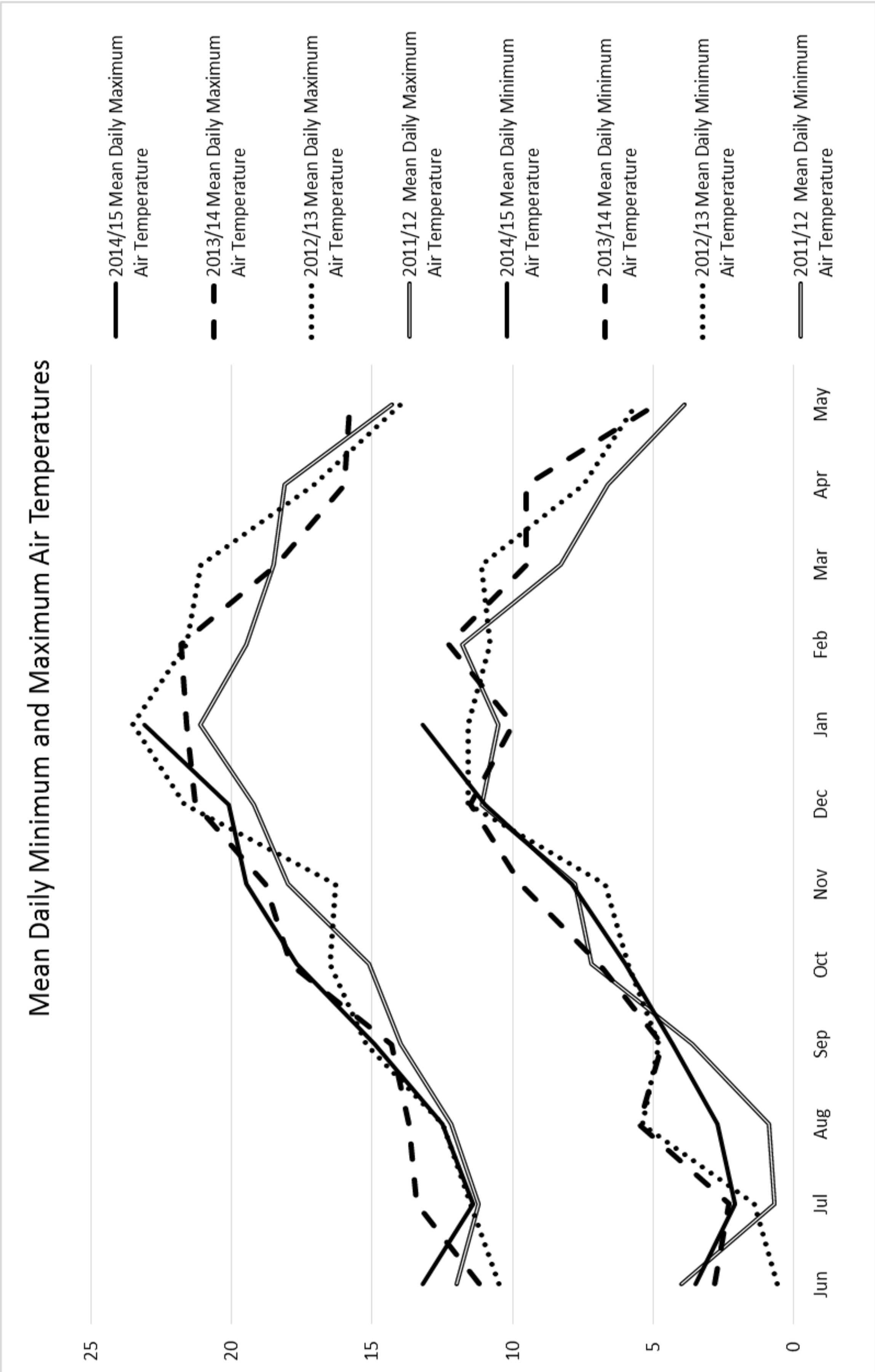
	2012/13	2013/14	2014/15	P21 – LSE (2014/15)
Total kgMS sold	198,441	196,621	187,790	
kgMS /peak cows	315 kgMS	313 kgMS	335 kgMS	356 kgMS
Total Cows in Milk	624	618	549	100% Peak cows
Total N fert applied	262 kgN/ha	181 kgN/ha	98 kgN/ha	98 kgN/ha
Total Silage Fed tDM	158 t DM	280 t DM	68 t DM	
Total Silage Fed / peak cows (kgDM/cow)	251 kgDM	446 kgDM	121 kgDM	26kgDM
Whole Herd Average Liveweight (WOW)	490 kg	480 kg	493 kg	538 Kg
Herd Ave CS	4.4	4.2	4.2	4.2

Comparing LUDF results between 2013/14 and 2014/15, to the end of January:

LUDF has produced

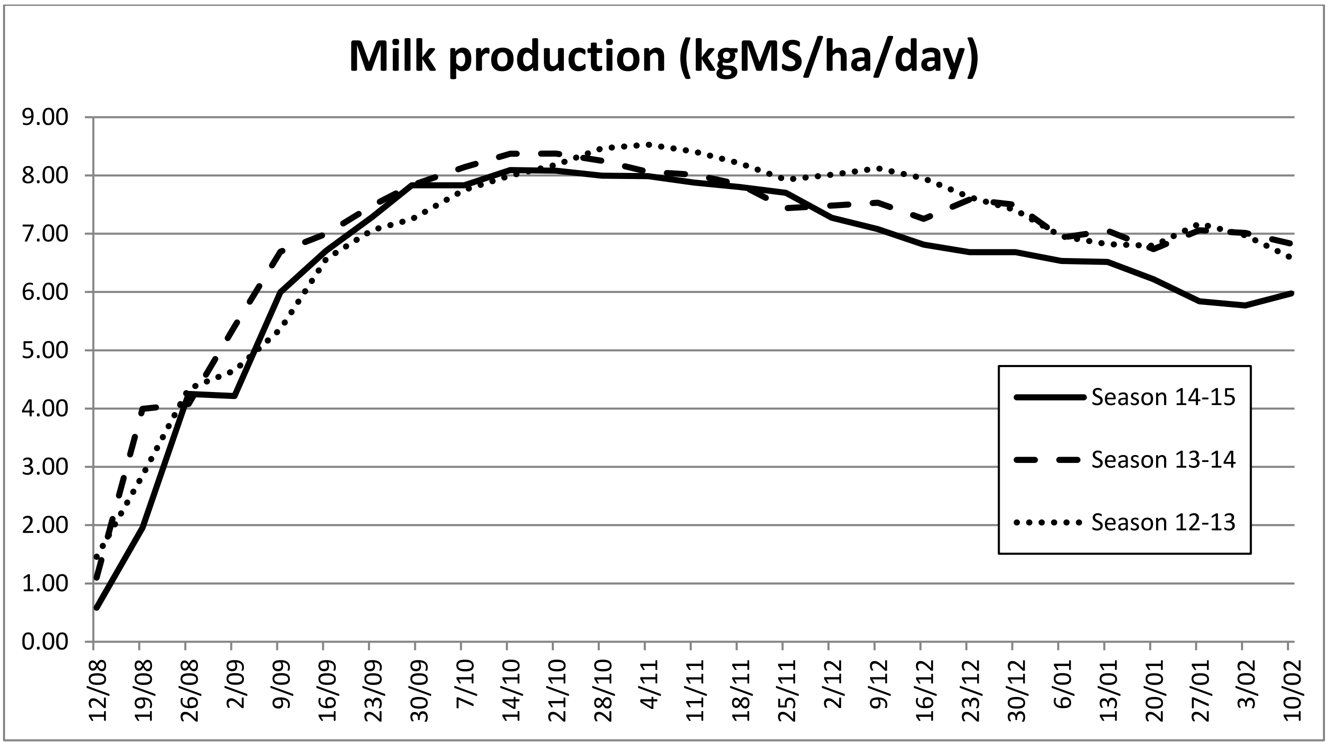
- 4.5% less milk this season,
- from 11% fewer cows,
- consuming 75% less imported silage and with the use of
- 45% less nitrogen fertiliser.
- Body Condition score and liveweight was similar to past years.
- Farm Working Expenses to the end of January are below budget and below past years total expenses to date for the end of January.

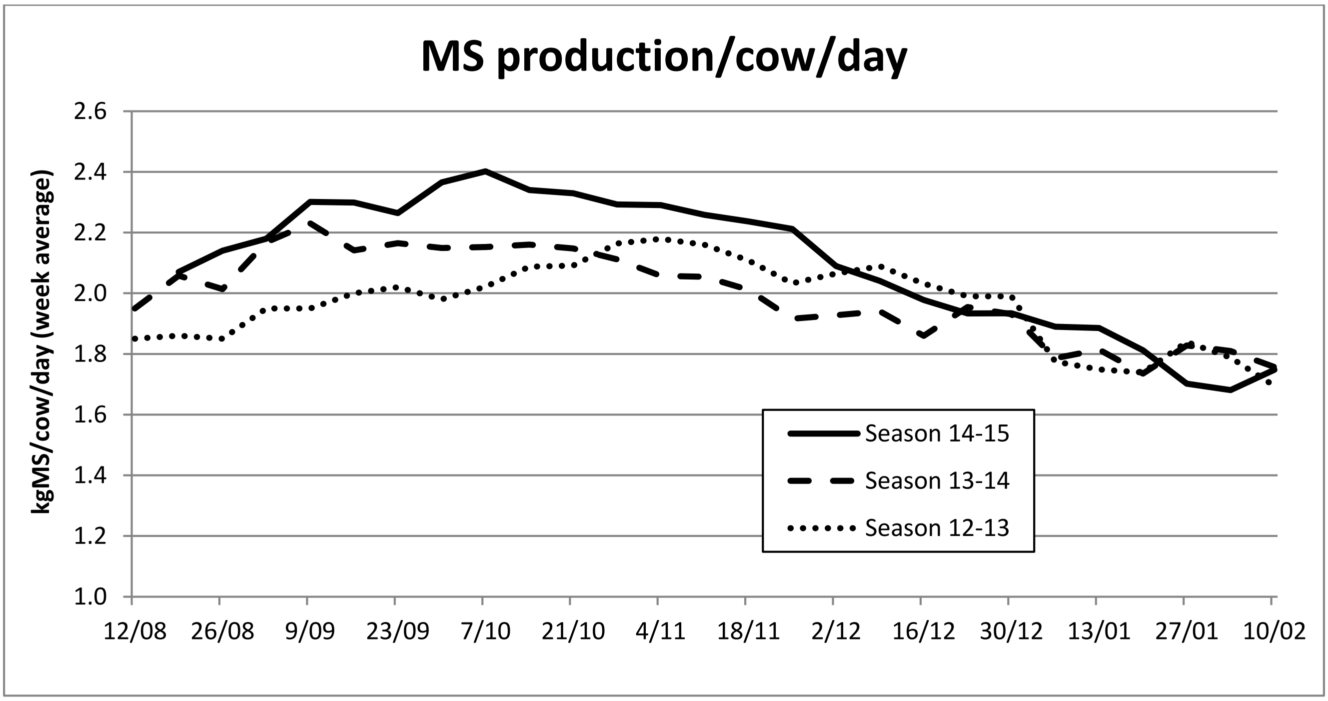
By comparison to the Research Dairy Farm, P21 LSE farmlet trial, LUDF has produced slightly less milk, for the same use of N-fertiliser. LUDF has used more imported silage BUT has regrassed 3 paddocks 15% of the farm whereas the Research Farmlet has not undertaken any regrassing.

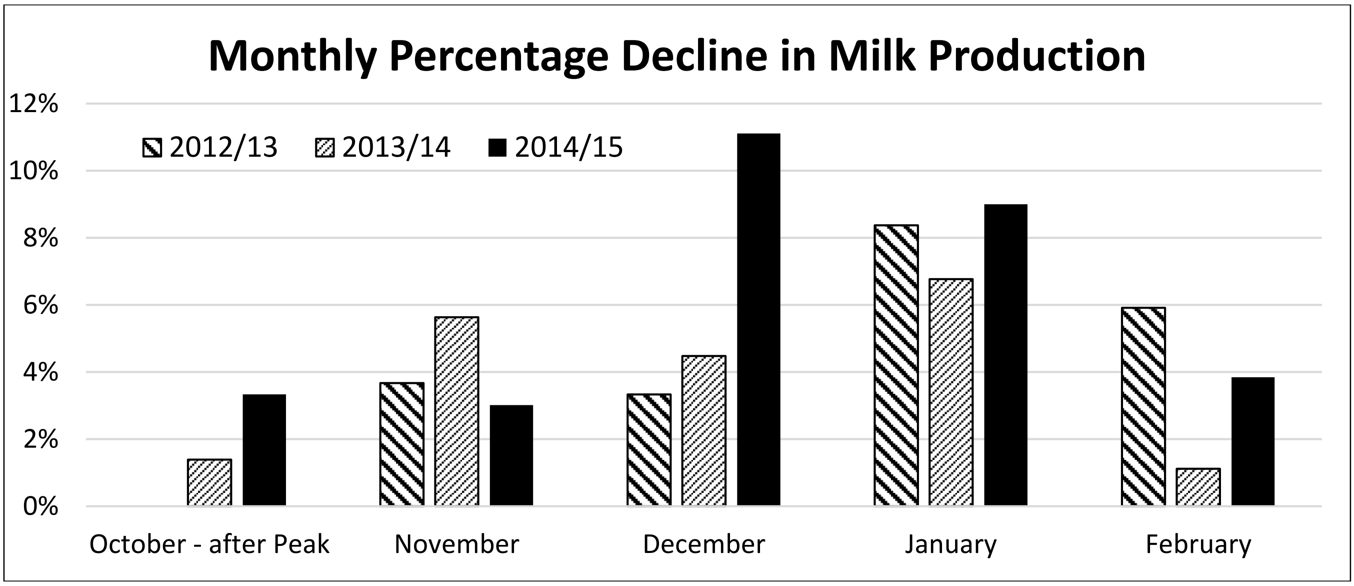

Mean Daily Minimum and Maximum Air Temperatures
2014/15 Mean Daily Maximum Air Temperature
2013/14 Mean Daily Maximum Air Temperature
2012/13 Mean Daily Maximum Air Temperature
2011/12 Mean Daily Maximum Air Temperature
2014/15 Mean Daily Minimum Air Temperature
2013/14 Mean Daily Minimum Air Temperature
2012/13 Mean Daily Minimum Air Temperature
2011/12 Mean Daily Minimum Air Temperature
0
5
10
15
20
25
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May

Analysis of LUDF 2014-2015 season to date

Being the first season of this low-input, low-infrastructure system, which an aim of producing 500 kgMS/cow/season with 150 kgN and 300 kg supplement in the form of high quality silage, there were a lot of unknowns in terms of peak production, cow condition, the ability to harvest the grass produced.
In this next session we will focus on showing what was achieved so far, where some key learnings have happened and where do we see the season going from here.



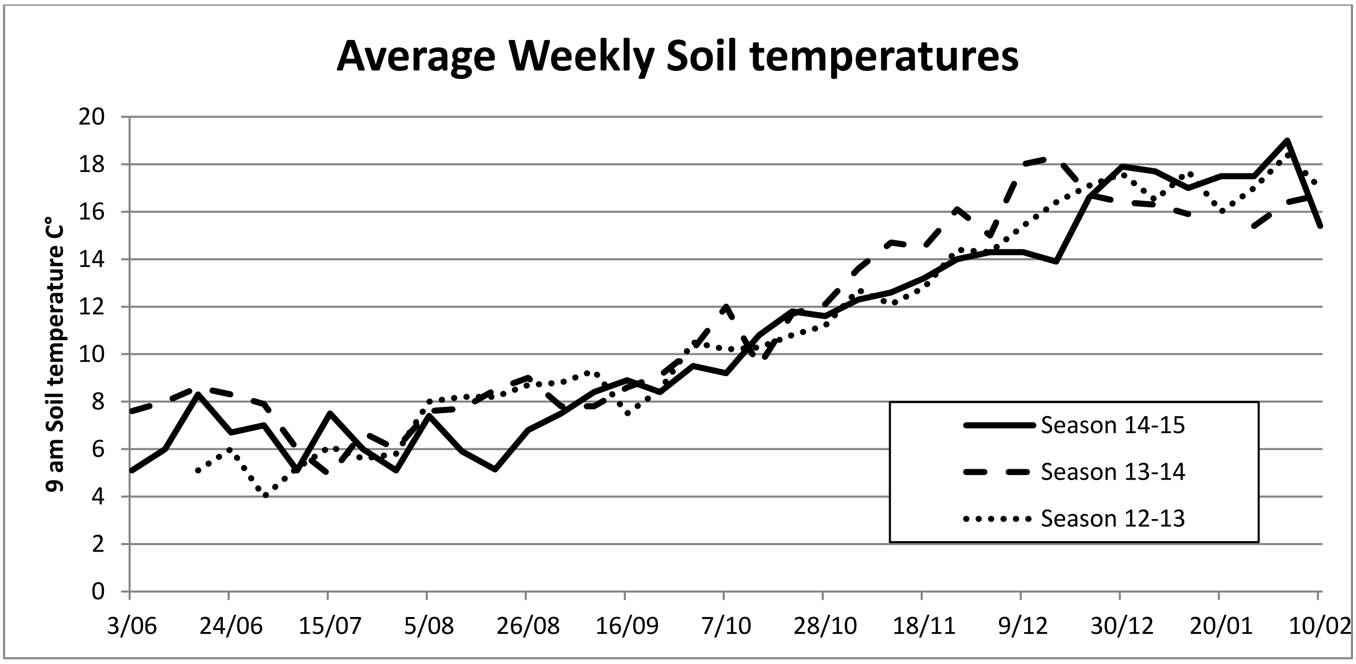


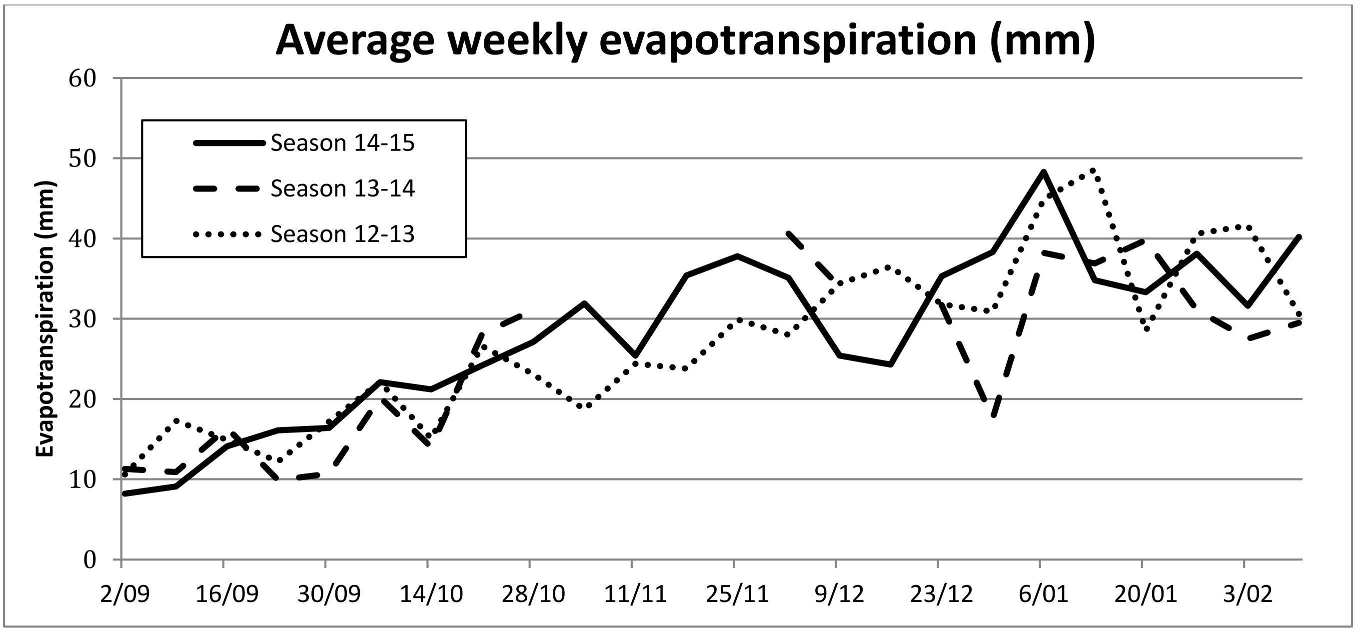


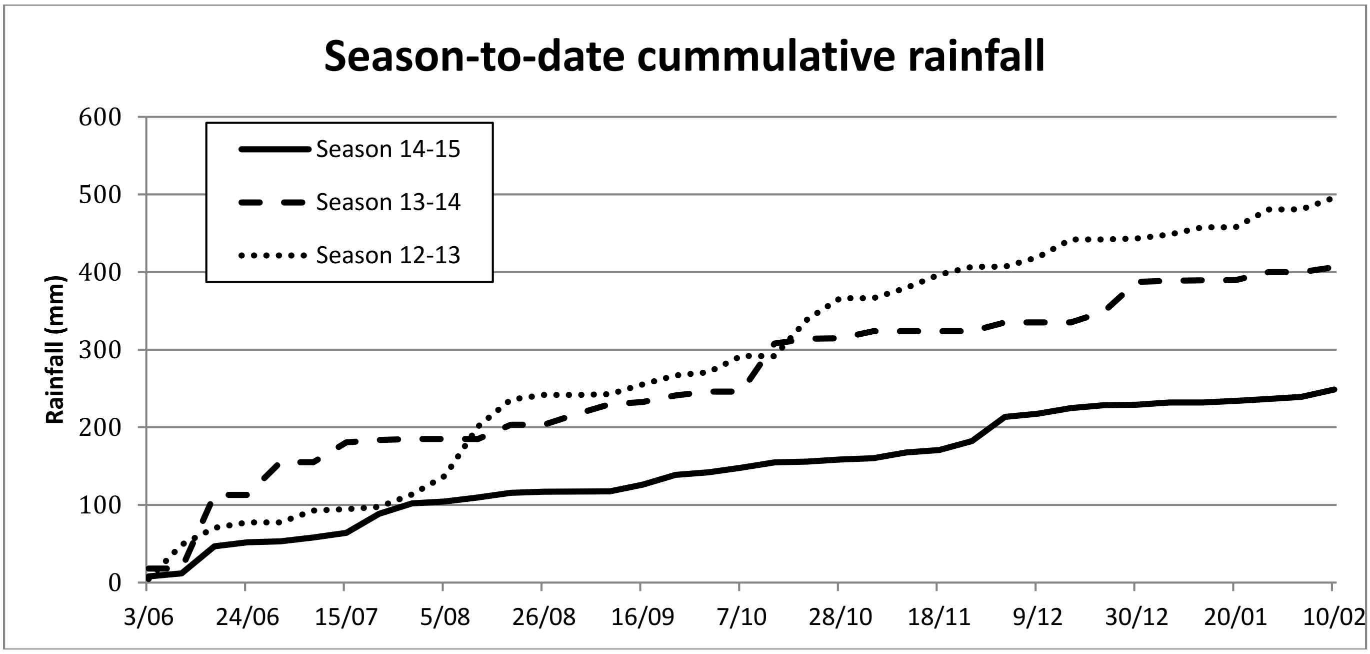
The monthly percentage decline displayed above is the average milk production per cow for the month, compared to the average production per cow for the prior month. The October data is for the decline for the period from peak to the end of October. In 2012/13 the peak didn't occur till into November.

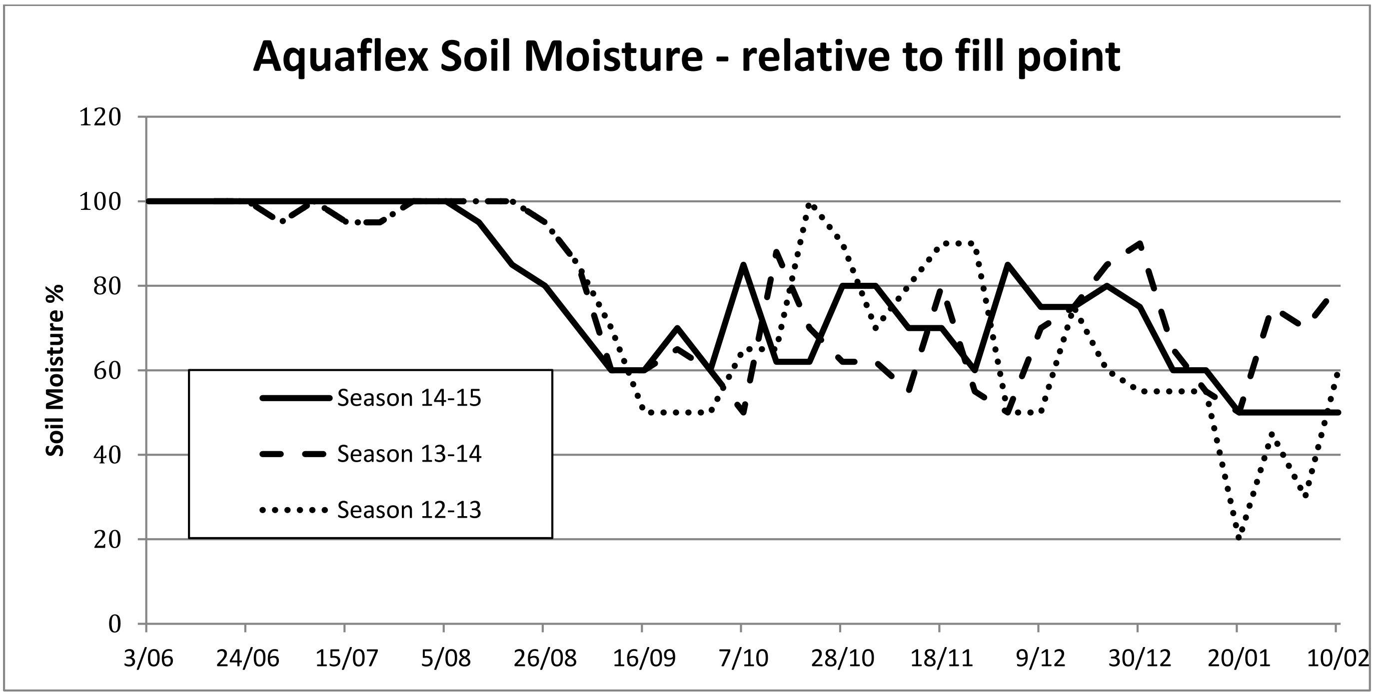
To produce the target milk required this season, it was anticipated peak per cow production would need to be at least 2.3 kg MS/cow/ha with a long slow decline.
Effectively, cows peaked at 2.4 kgMS/cow/day on the 7th of October 2014 and that level of production was well maintained until December (average decline of 3%/week through October and November).
During December, grass management was crucial to maintain milk production. The table above shows that during this month, the % drop in production became more pronounced. December was a very hot month when we occasionally reached 30 °C temperatures over a period of a few weeks. This is clearly above ideal growing conditions for ryegrass, such that maintaining pasture quality was challenging. (see page 23-25 for grass quality information).
A similar percentage drop in production was observed again during January.

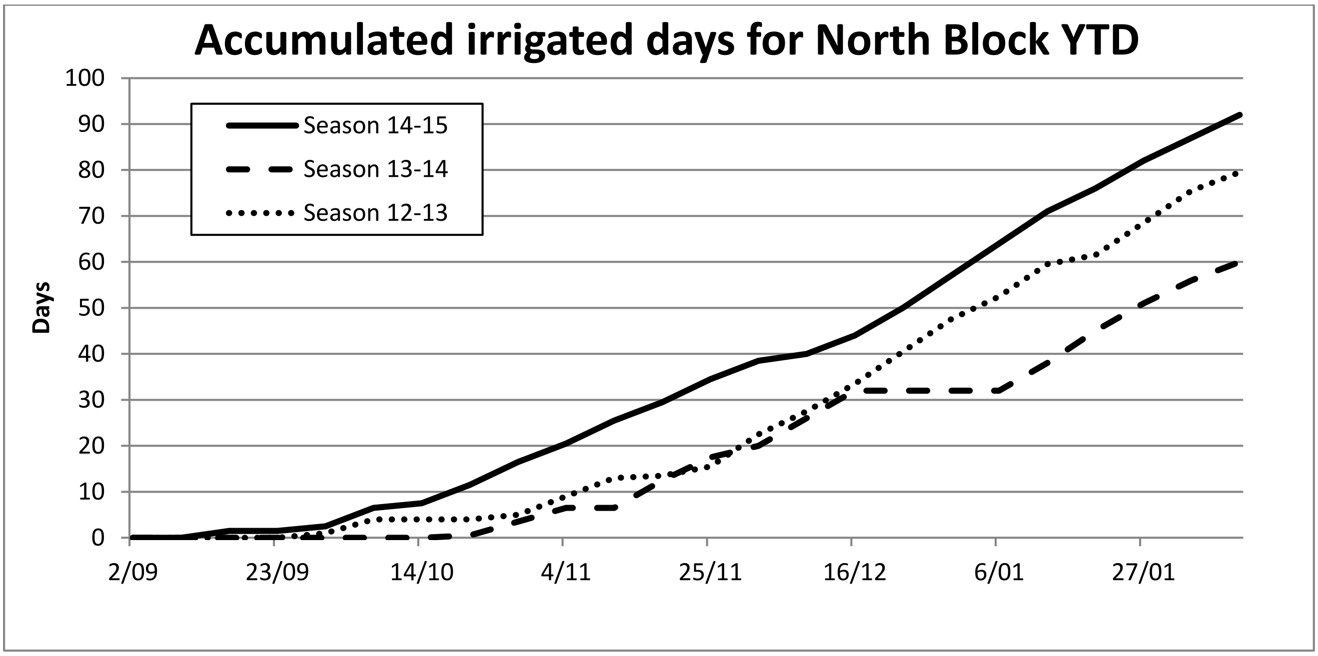
Weather and environment






Season-to-date cummulative rainfall
Rainfall (mm)
0
100
200
300
400
500
600
Season 14-15
Season 13-14
Season 12-13
3/06
24/06
15/07
5/08
26/08
16/09
7/10
28/10
18/11
9/12
30/12
20/01
10/02


Aquaflex Soil Moisture - relative to fill point
Soil Moisture %
0
20
40
60
80
100
120
Season 14-15
Season 13-14
Season 12-13
3/06
24/06
15/07
5/08
26/08
16/09
7/10
28/10
18/11
9/12
30/12
20/01
10/02

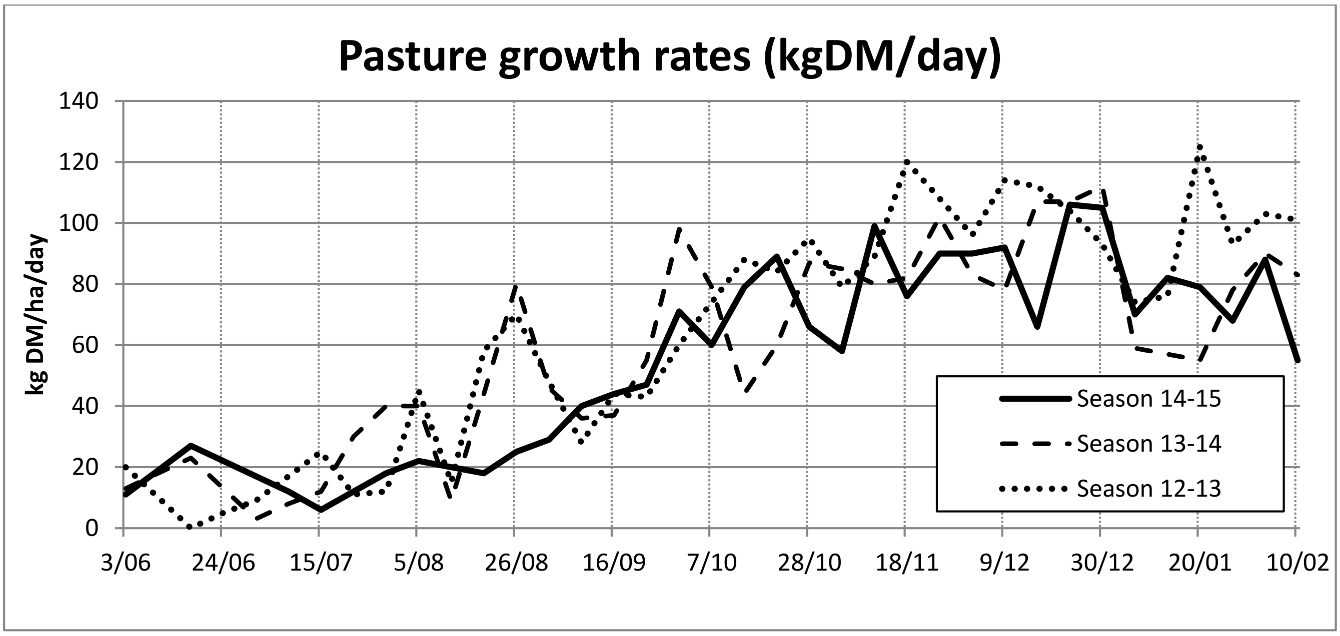


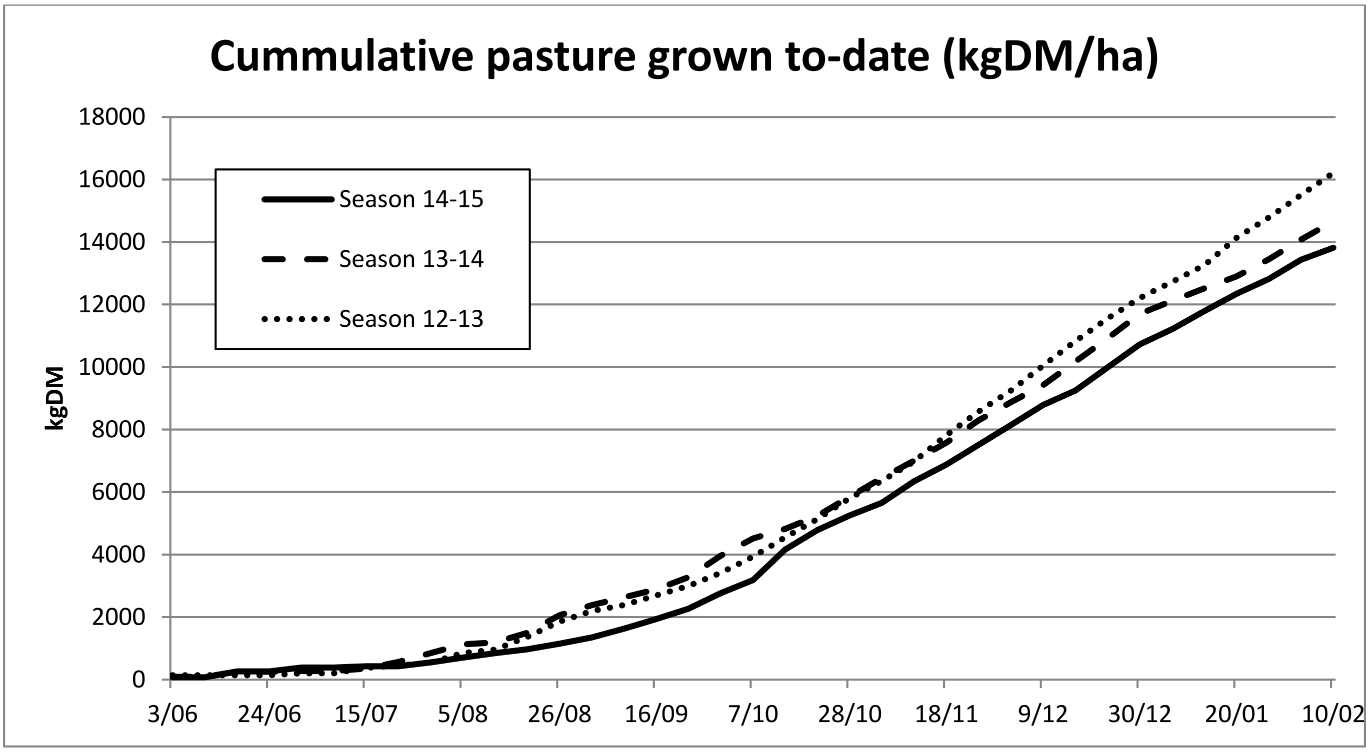
This season, so far, has been characterized by:

- Very high air temperatures for longer periods of time with little to no overcast days
- Lower rainfall than usual

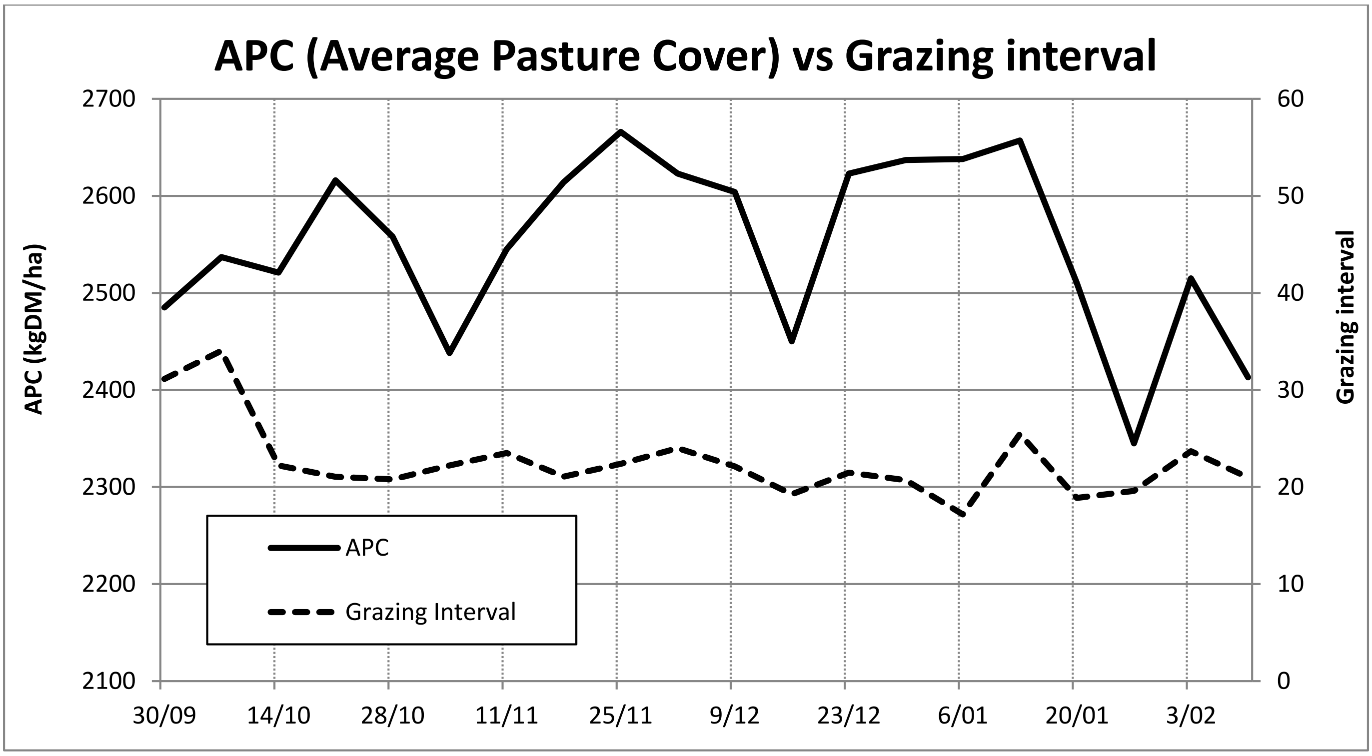
This combination has made the soil's capacity to hold moisture a challenge.
The farm started irrigating 4 weeks earlier and has irrigated the North block for 92 of the past 133 days (70% of this time). By comparison last year the North block pivot only operated for 45% of this period.
All of the above has made grass management a challenge during the summer months, mostly during December and then again during January (which is, coincidentally, when the biggest drops in milk production have occurred)

Pasture (grazing and quality)

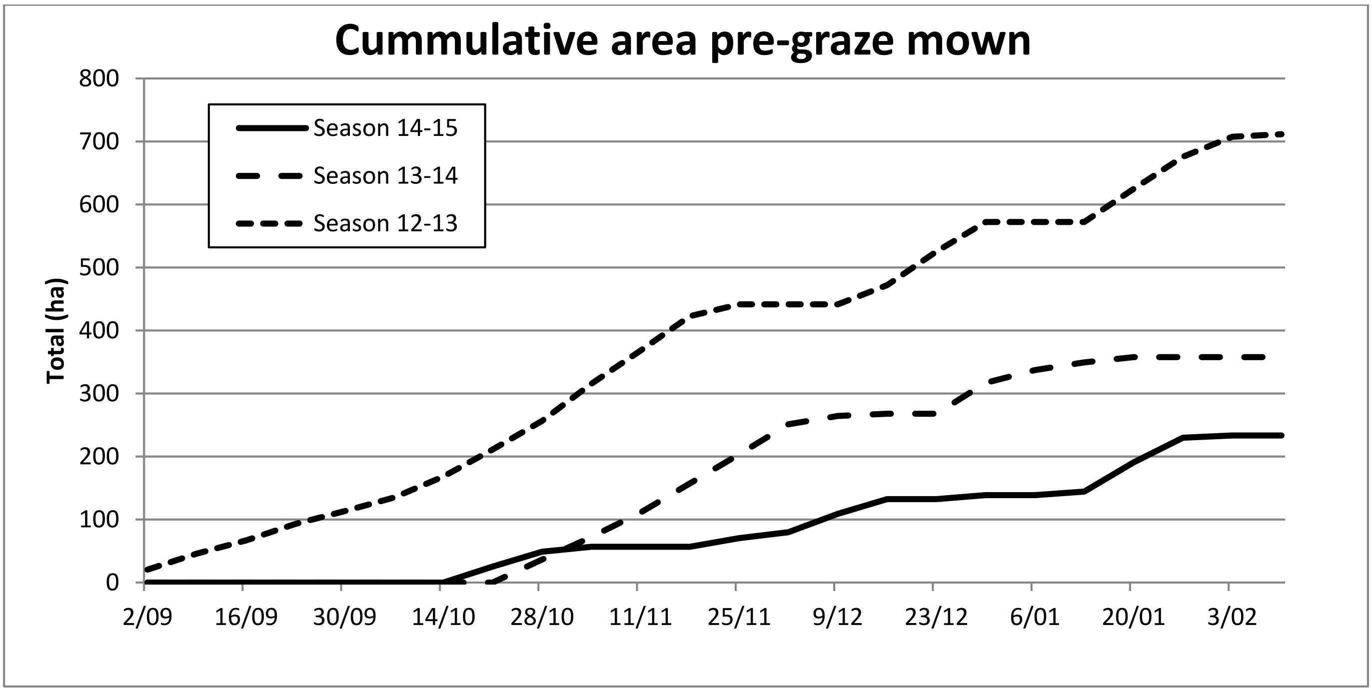




Cummulative pasture grown to-date (kgDM/ha)
kgDM
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Season 14-15
Season 13-14
Season 12-13
3/06
24/06
15/07
5/08
26/08
16/09
7/10
28/10
18/11
9/12
30/12
20/01
10/02



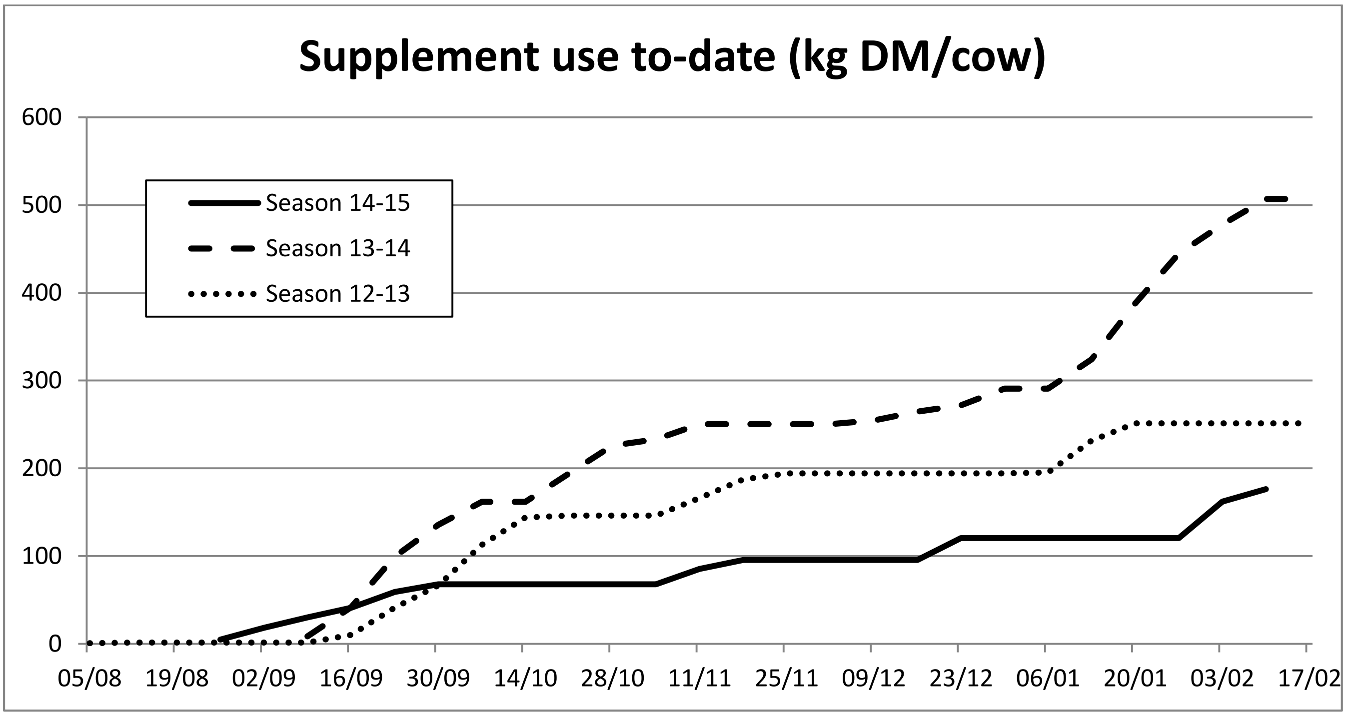
APC (Average Pasture Cover) vs Grazing interval
APC (kgDM/ha)
2700
2600
2500
2400
2300
2200
2100
Grazing interval
60
50
40
30
20
10
0
APC
Grazing Interval
30/09
14/10
28/10
11/11
25/11
9/12
23/12
6/01
20/01
3/02

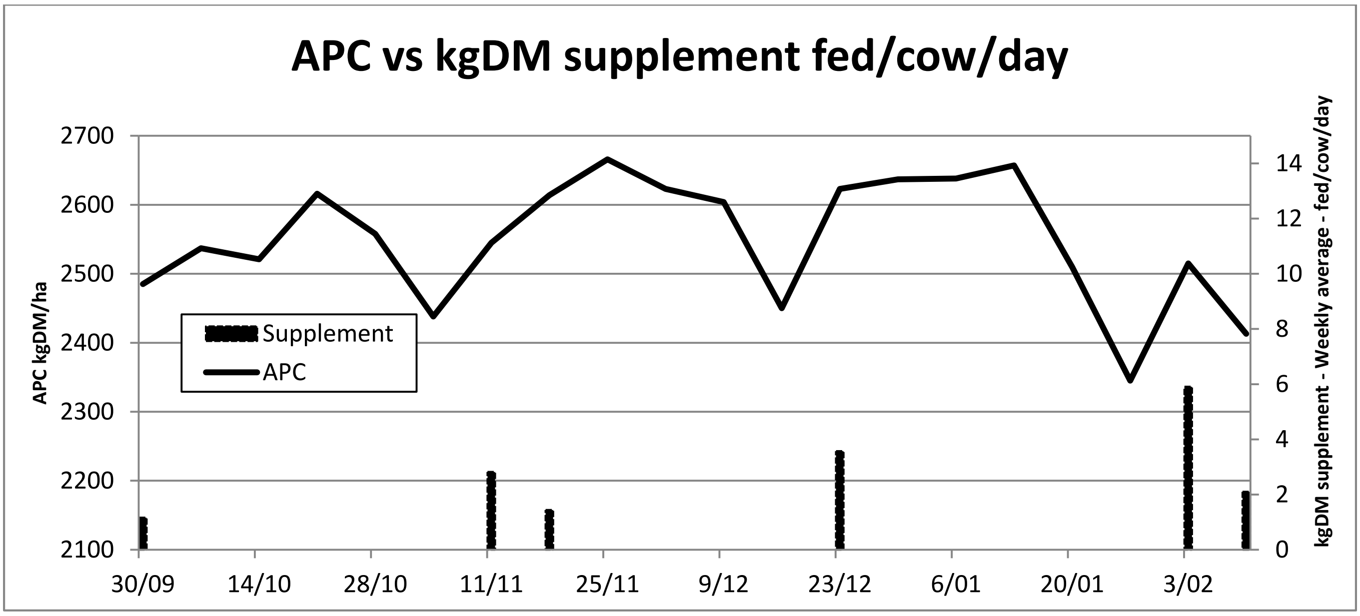


In terms of pasture growth, the above conditions have made it very challenging to think ahead and prepare for what each week brought. Pasture growth rates were never consistent, dropping and increasing without a consistent pattern.
The previously seen summer high growth rates (over 100kgDM/ha/day) only ocurred twice so far.
In this new system, during the hotter months, the farm seems to be comfortable with a 22 day round, as long as APC remains around that 2500 kgDM/ha.

During high pasture growth periods the farm has on occasion used pre-graze mowing to assist with holding the desired rotation length and maintain high pasture quality for the next round. As shown in the graph above the cumulative area pre-graze mown this season is however lower than past years.

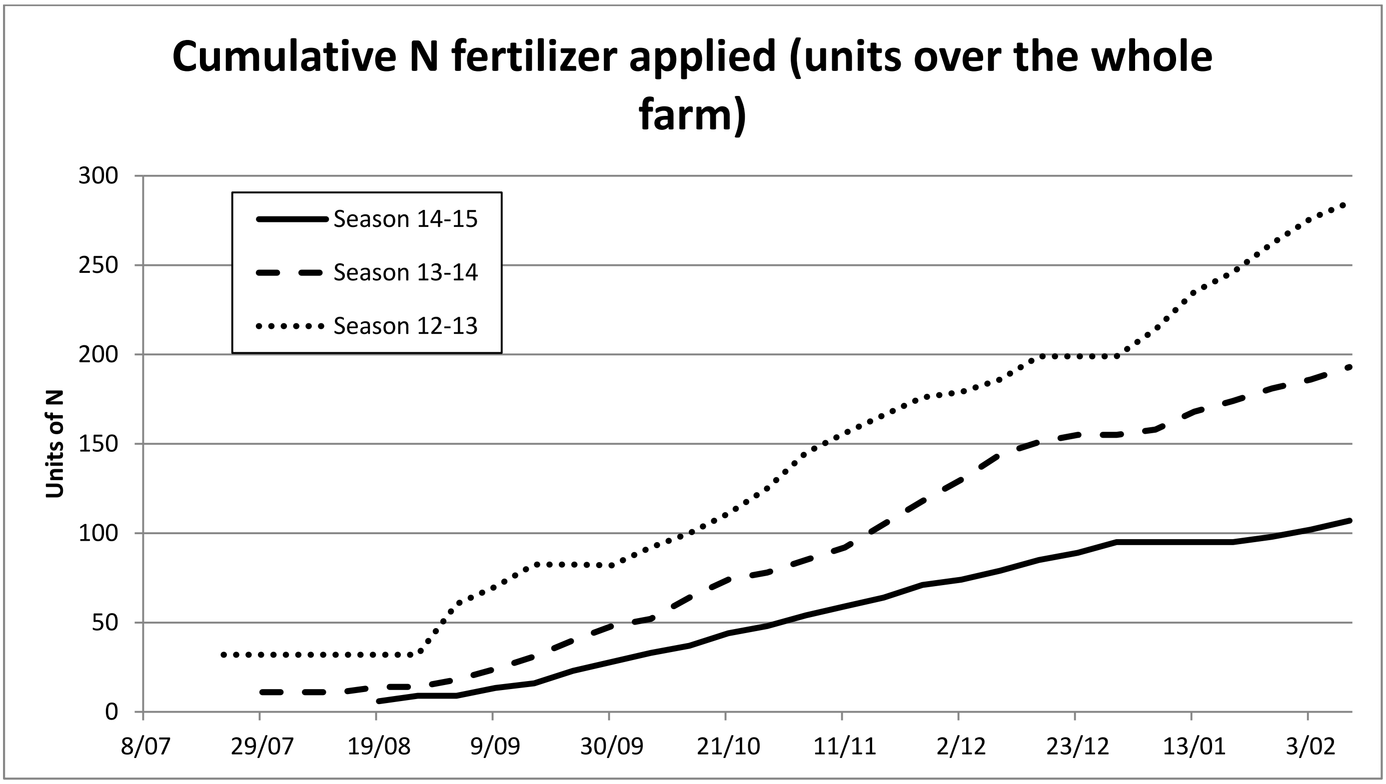
Supplements and Nitrogen use





The use of supplements has been very carefully considered every time average pasture cover (APC) has fallen, given that the farm only has 300 kgDM silage allocated/cow for the season.
So far, supplements has been used sporadically when pasture supply has not met demand at the rotation length the farm wants for that time period. As seen above, APC has lifted following the feeding of silage. Without silage cows could have stripped body condition to meet energy demands, dropped milk production, or eaten harder into the base of the pasture – potentially slowing regrowth. Futher consideration of the use of supplements in autumn will be discussed below.

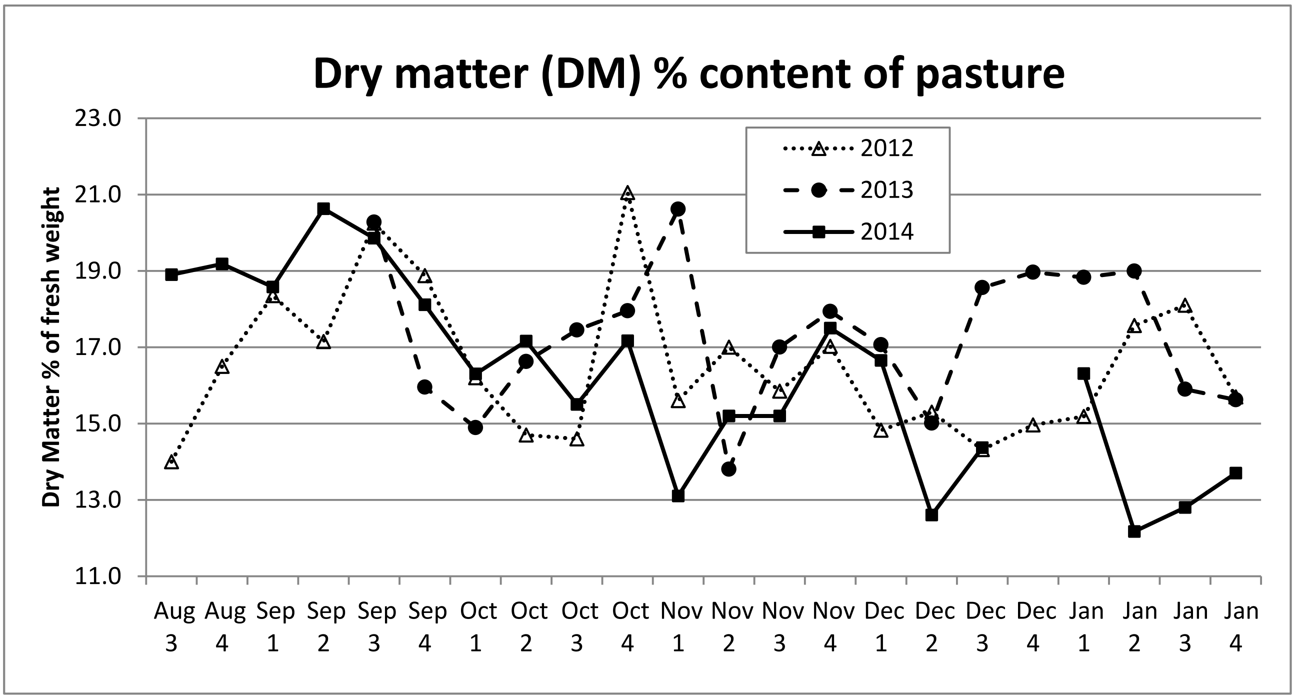
Nitrogen use



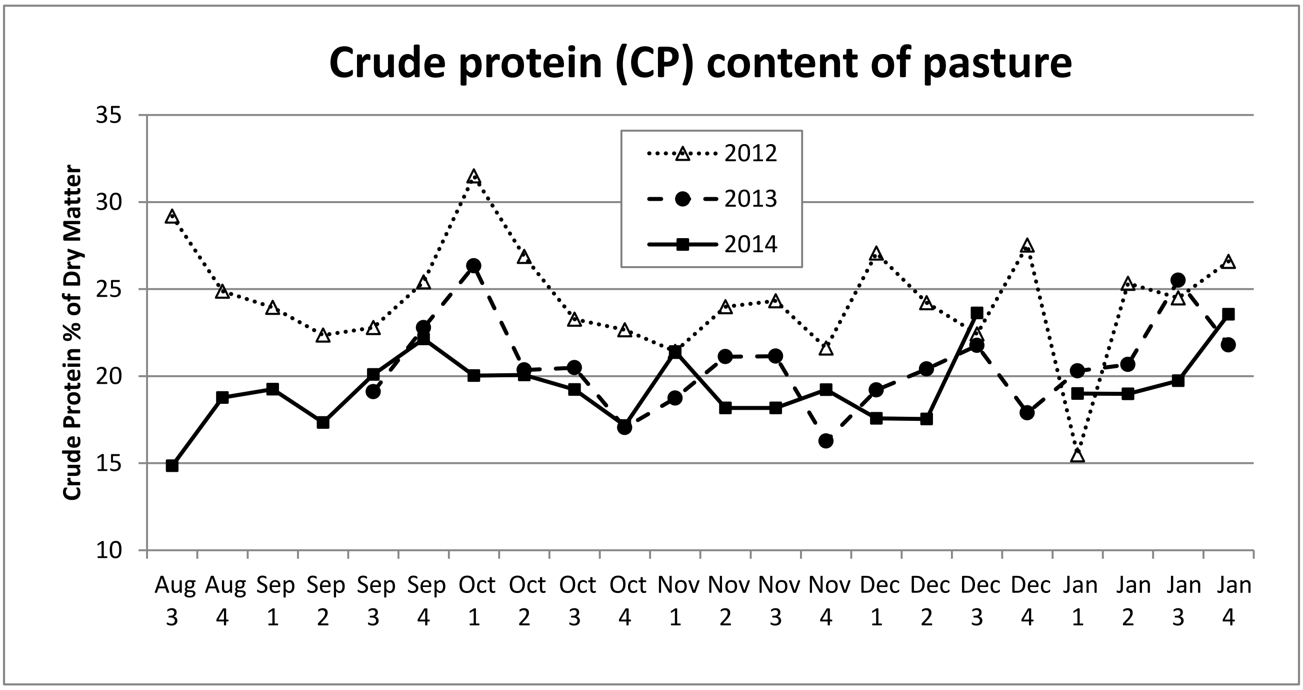
In terms of Nitrogent use (in the form of urea) the farm considered applying fewer applications of N at higher application rates, or less N per ha applied each time but more often. Given the target round length of 22 days, it was decided that applying N (urea) at a rate of 25 kg N/ha following grazing from September to November and again in Februay and March should achieve the most efficient use of the available N Fert. In practice the farm was able to continue applying further into December as no N was applied to the effluent blocks, nor paddocks while they were out of the rotation for regrassing.

Nitrogen applications began again in late January and are following grazing till late March. As lower N responses are likely in April the plan is to have used the farms annual N fertiliser by the beginning of April.

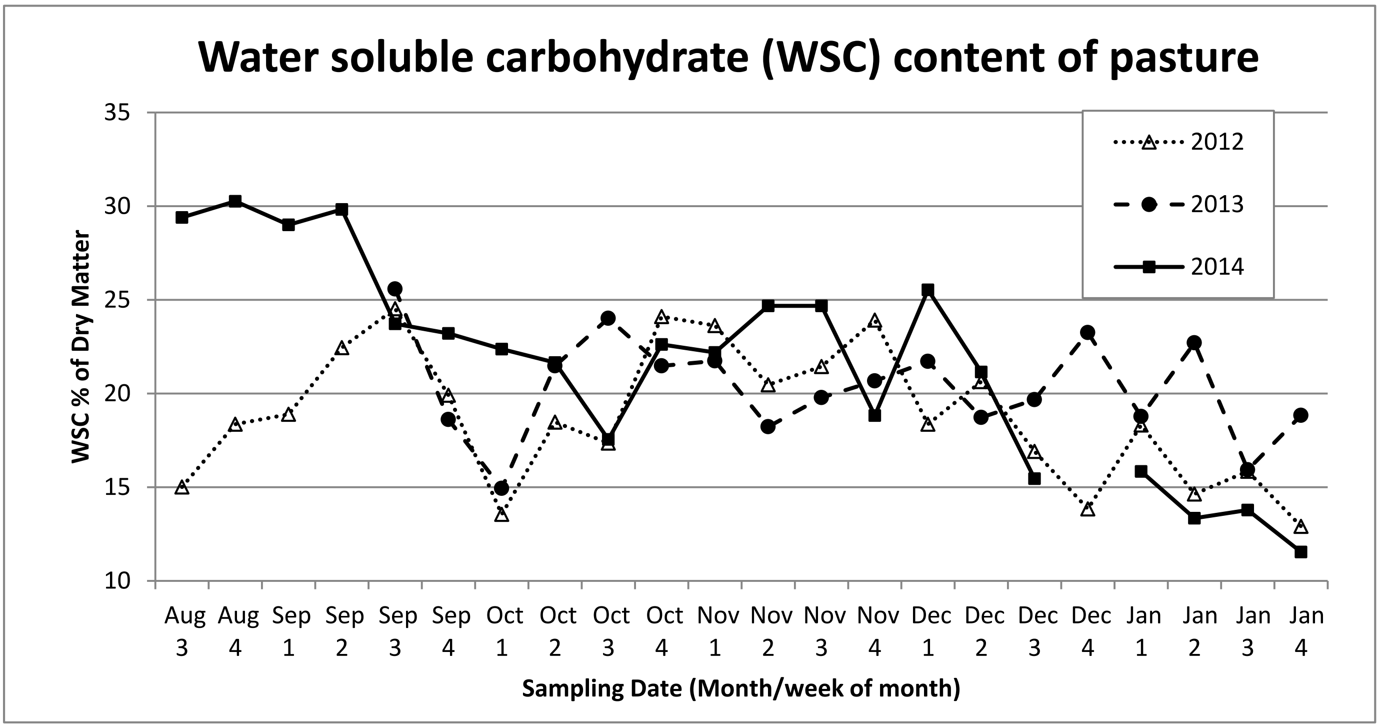
Pasture quality



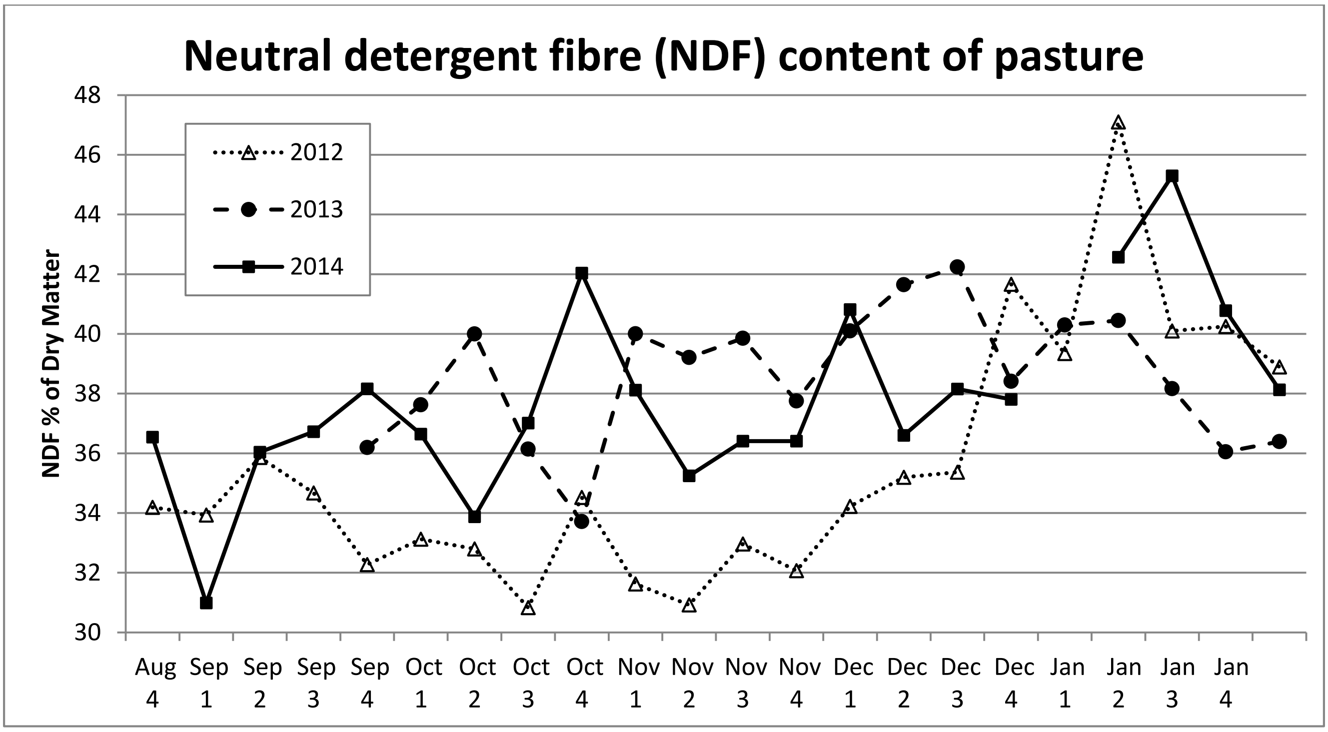
The dry matter (DM%) content of LUDF pasture appears to have trended lower than 2013 and 2014. We don't have a definitive explanation for this change. With the slightly slower grazing round for the 2014/2015 season compared to other seasons, as well as reduced N fertiliser usage we might have predicted slightly higher DM% for the current season, not lower.



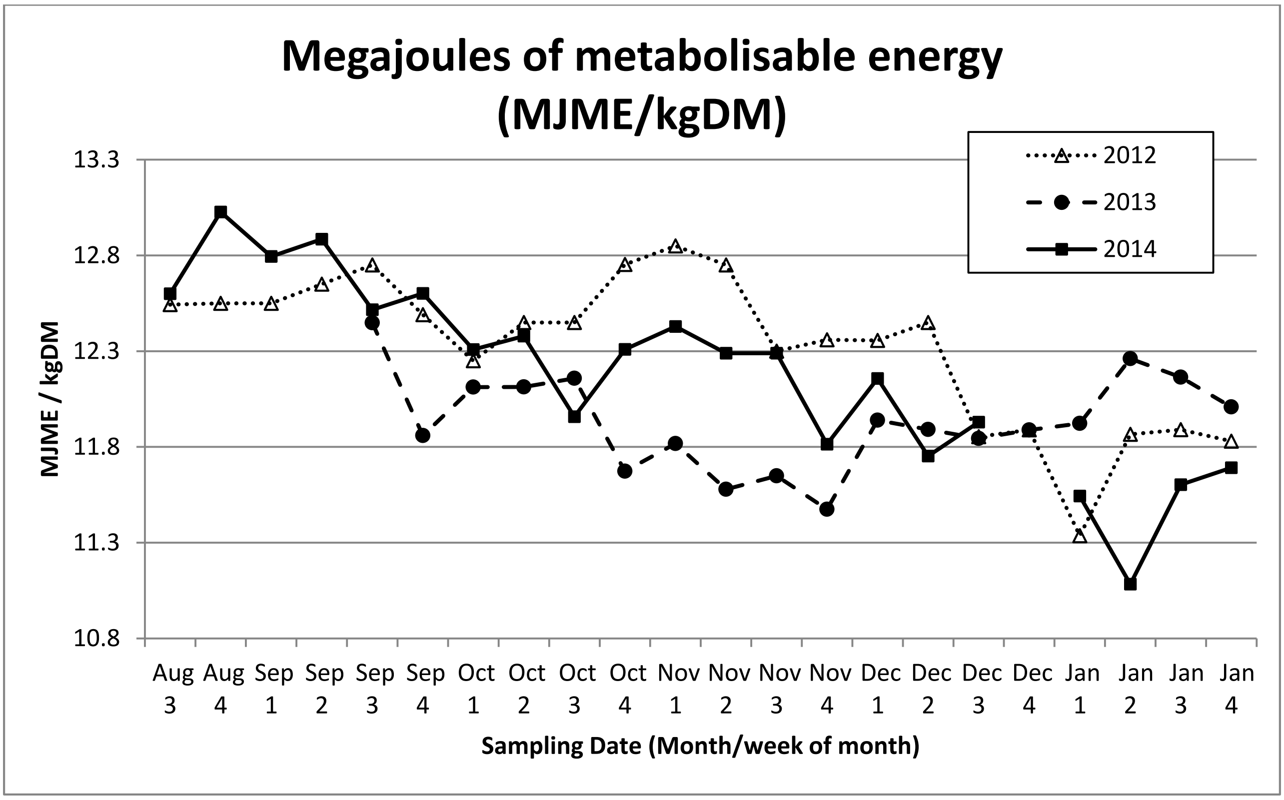
Compared with the pasture samples harvested in 2012, crude protein (CP) content of this seasons pasture appears lower, not unexpected given the current N usage (150kgN per ha) compared with for the 2012/2013 season (351kgN per ha). Interestingly the pasture CP content for this year appears very similar to that from the 2013/2014 season when 250 kgN per ha was applied.



The levels of water soluble carbohydrate content of pastures have shown similar variation throughout the year to the previous two years. Through the hotter weeks of January 2015, WSC levels were low, most likely reflecting the effects of warm night time temperatures. WSC accumulated from photosynthesis during the day are respired (used up) overnight when night time temperatures are warm.



Levels of pasture neutral detergent fibre (NDF) appear similar this season, compared to last year, but are on average higher than for 2012/2013. Higher pasture NDF content seen in January likely reflect the effects of hot weather and effects of environmental stressors on the plants including high evapotranspiration rates.



Similar comments as for WSC and NDF can be made regarding this seasons MJME results. Results on average are similar to previous years with a high MJME content early in the season falling as the season progresses, firstly as a result of ryegrass flowering, followed by the effects of heat and high evapotranspiration rates during January.

Regrassing at LUDF:

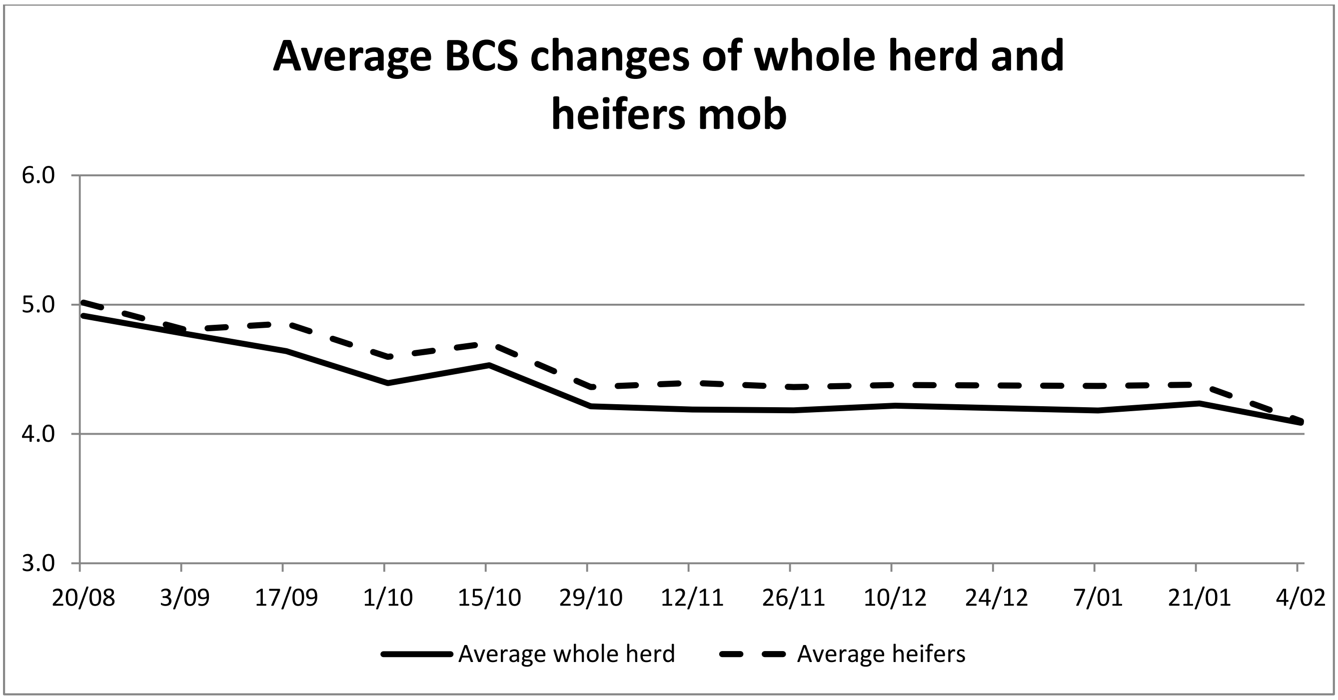
Three paddocks have been regrassed this season as follows:

Paddock / Area	Date Sprayed	Date back in Grazing round	No. Days not available for grazing	Establishment process
S10 – 10 ha	22 October	30 December	69	Cultivation
S6 – 7.3 ha	8 December	20 January	43	Direct Drill
N4 – 7.2 ha	16 January	15 March (est)	58	Shallow Cultivation

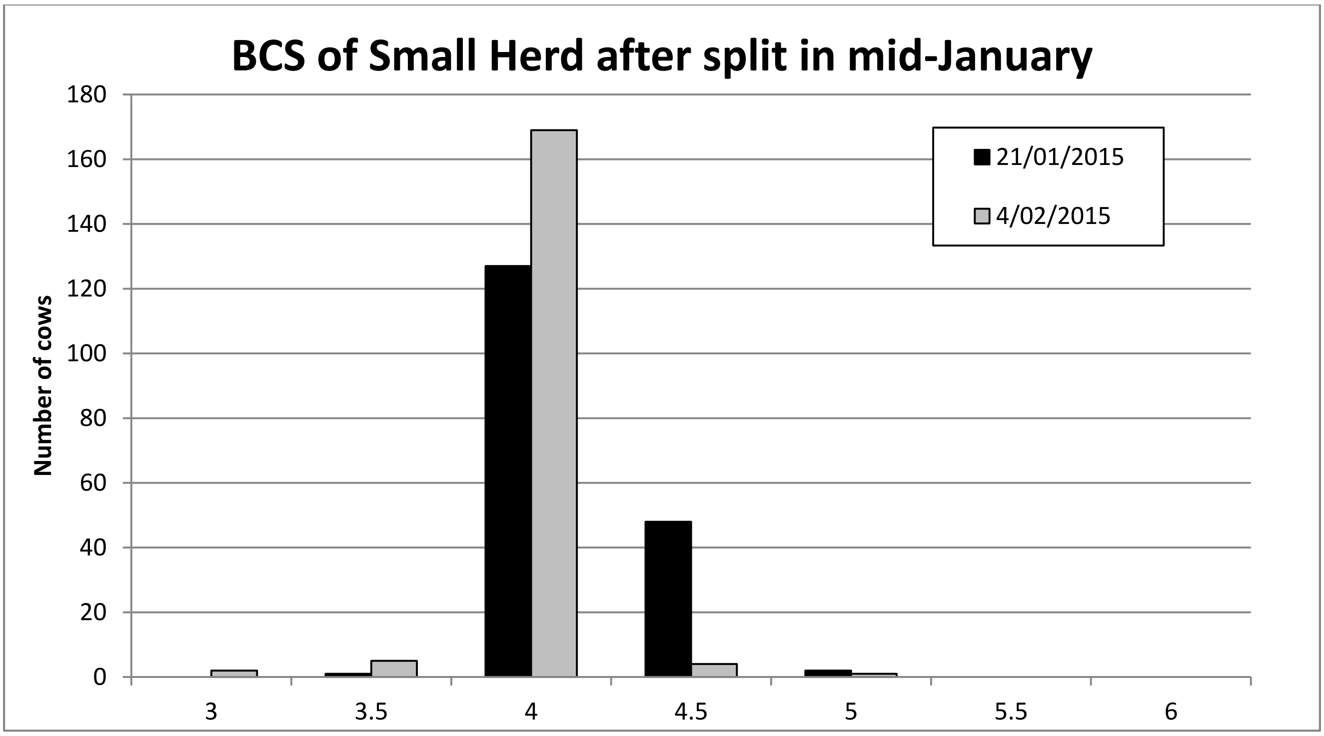
Assuming an average growth rate of 50kgDM/ha/day for the paddocks if they had not been sprayed and resown, the regrassing has reduced pasture production by approximately 71 tonne DM. This equates to 127 kgDM/cow or $28,000 (at 40c/kgDM) if was replaced as bought in feed. LUDF has continued to regrass based on identifying paddocks with yield limitations that can be overcome with / through the regrassing process. (see additional information below on regrassing).

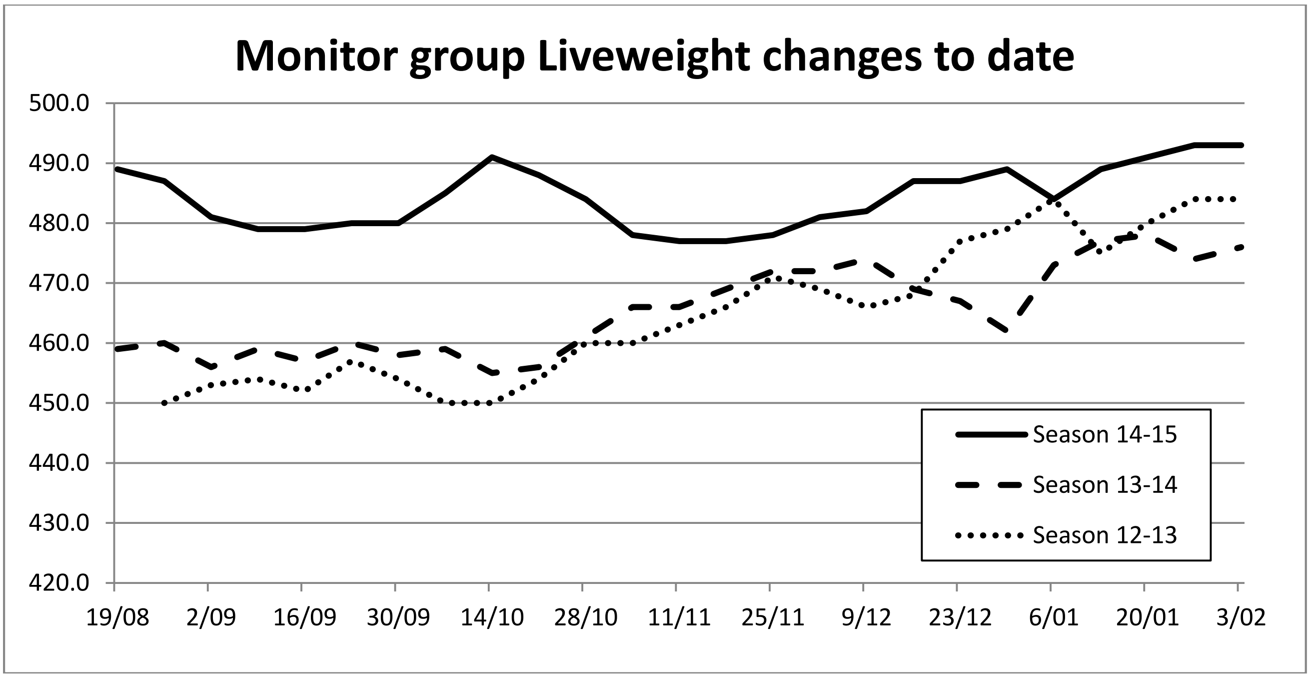
Herd BCS and health 2014/2015

BCS



BCS of Small herd after being split mid-January 2015



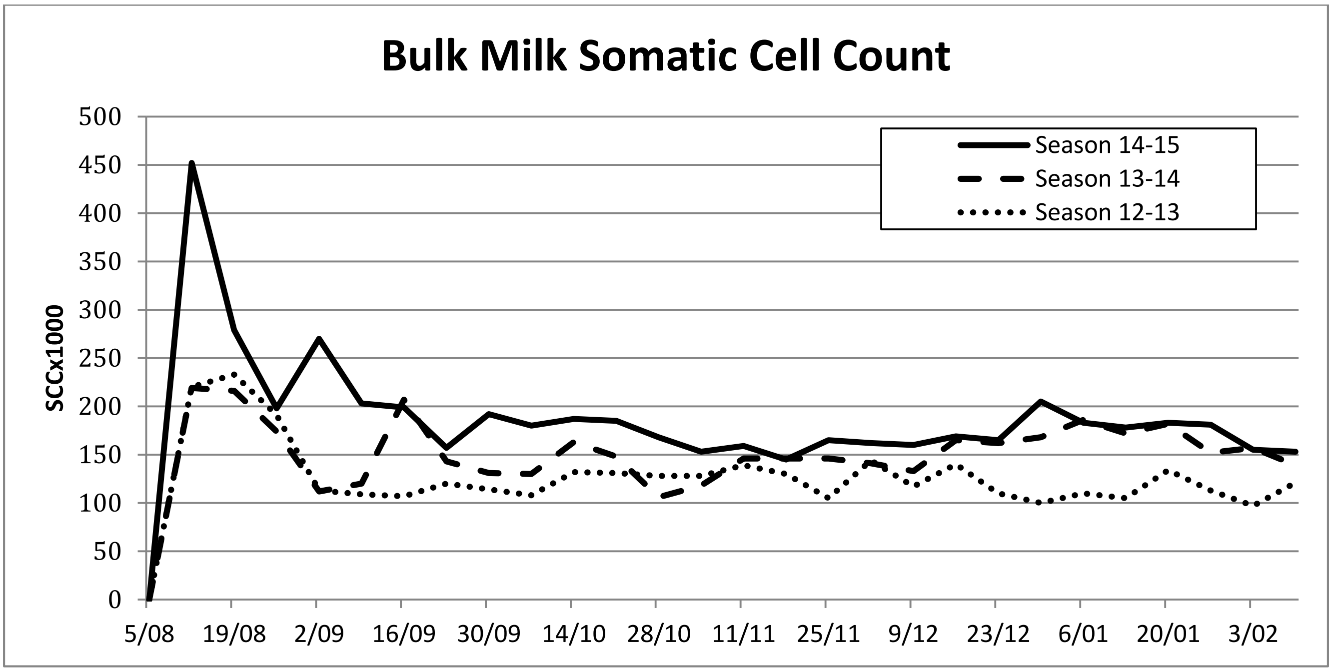


The Livewight of the monitor herd has remained between 475 and 495 kg through the season so far (equivalent to 2/3 of a BCS (1 BCS is approximately 32 kg for this herd))

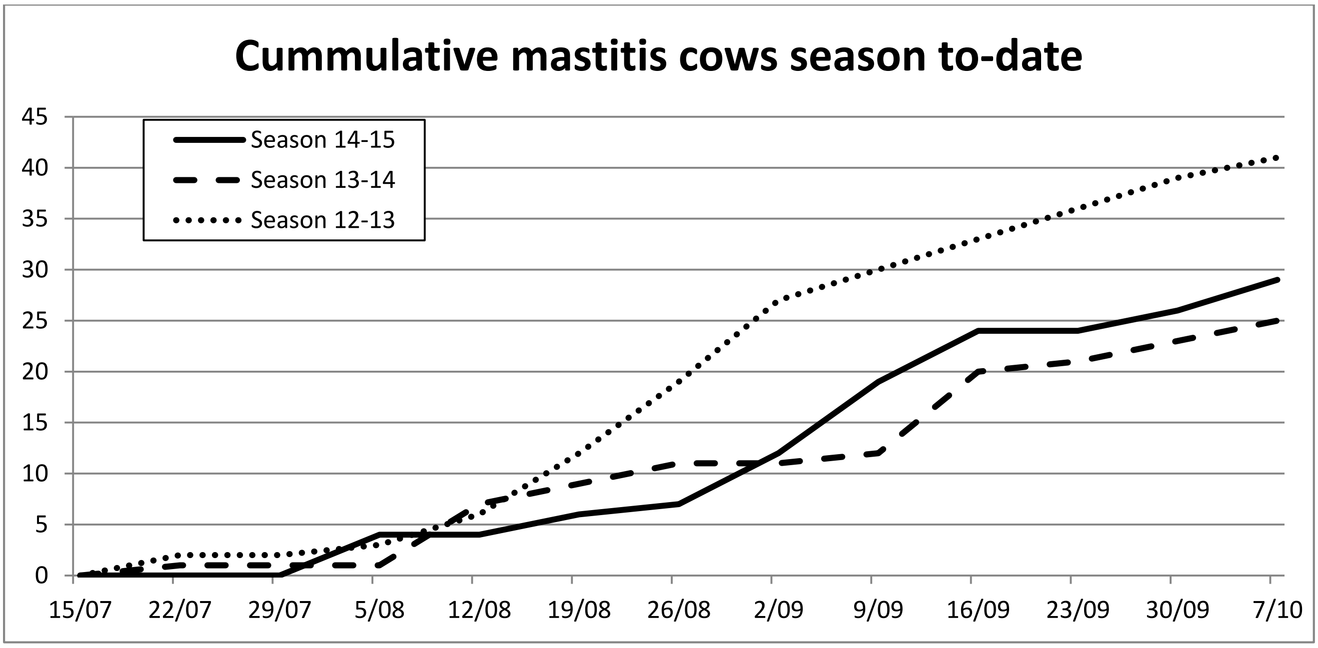
In terms of average BCS for the whole herd compared with the heifers, there has been a 0.2 BCS difference between both groups, consistently achieved through the whole season, except at the last BCS event. By this time the herds had been re-shuffled with most of the heifers going into the main herd. The small herd is now made of early calving, low BCS cows and heifers. This seems to have affected the BCS of the heifers as an age group and their BCS has dropped to 4.1 during this last BCS event.
Also MA cows have dropped BCS again over the last two weeks from almost 4.3 to 4.1.
As an avearge, the herd has never been at BCS 4 or below this season, a deliberate but pleasing result given the challenge in balancing feed supply/demand and maintaining top quality pasture through the season.

Health

BMSCC

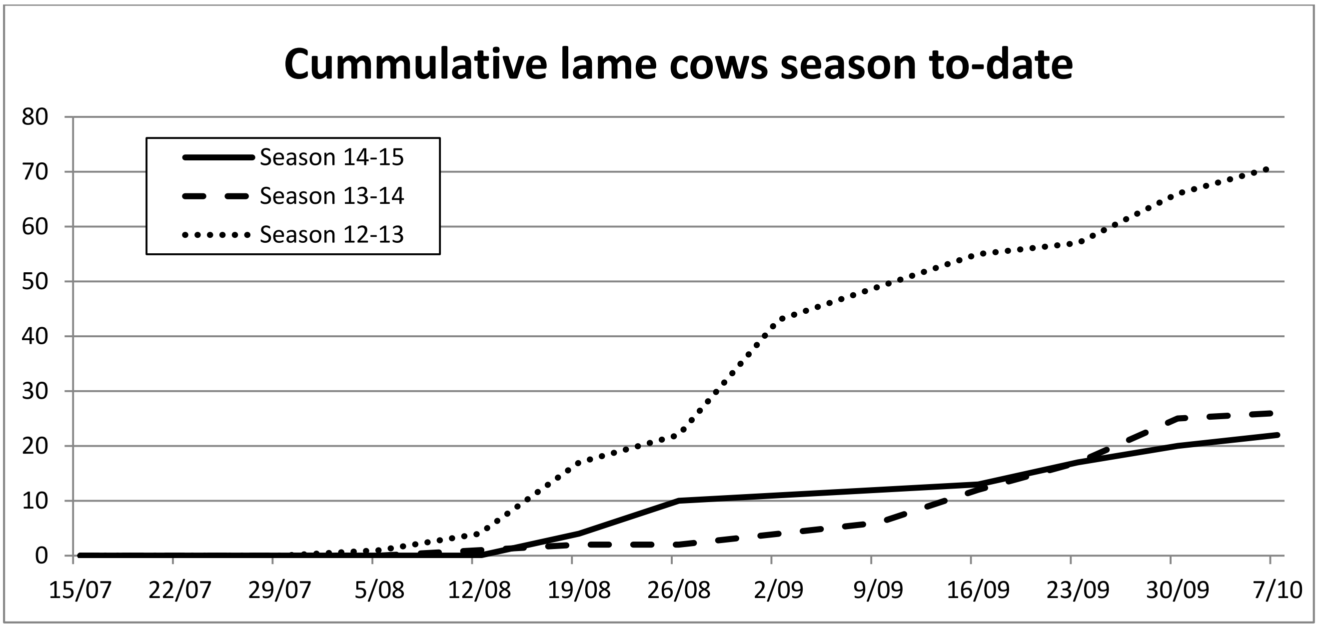


Mastitis



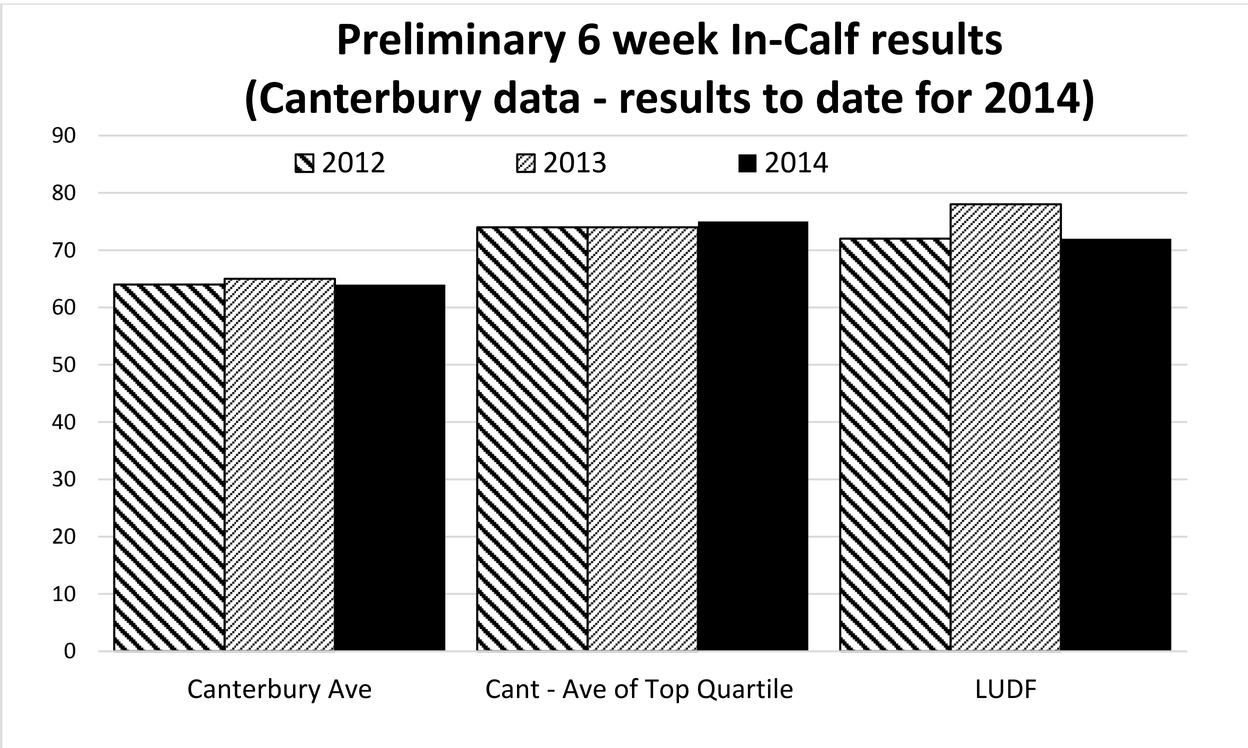
Both BMSCC and the number of mastitis cases seem to be under control and have not presented an issue so far.

Lameness



Lame cows are picked up very quickly from the herd and treated effectively. Many of the cases seem to be inflamation only and do not require further treatment than trimming.

In-Calf Results



Note: Canterbury Average data for 2013 represents 417 farms with detailed Fertility Focus Reports. Preliminary data for 2014 is from 140 farms.

Fertility Focus 2014: Seasonal

Lincoln University
The Manager (University Dairy Farm) Hancox

Report date:	13/02/15
PTPT:	BQCY
Herd Code:	6/114
No of cows included:	561
These cows calved between:	17/06/14 and 23/12/14
Mating start & end date: (based on AB or pregnancy test data)	25/10/14 - 05/01/15
Next planned start of calving:	03/08/15
Duration of mating:	73 days
Duration of AB period:	42 days

Version 2.11

1 Overall herd reproductive performance

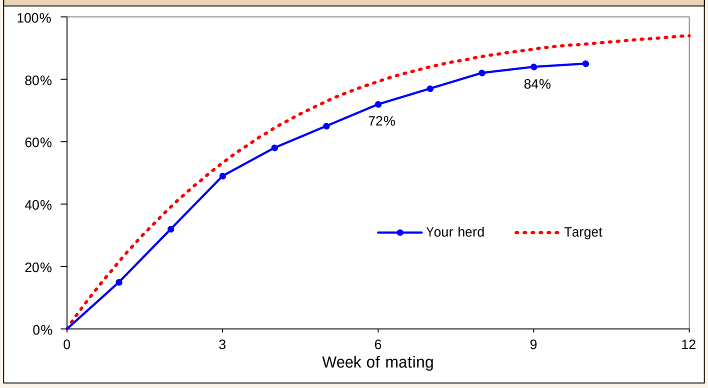
6-week in-calf rate
Percentage of cows pregnant in the first 6 weeks of mating

Your herd	72% (71-73%)	☆☆☆
Aim above	78%	

Not-in-calf rate
Percentage of cows not pregnant after 73 days of mating

Your herd	13% (12-14%)	☆
Aim for	8%	

% of herd in calf
Cumulative by week of mating



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	89%	☆☆☆☆☆
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	54%	☆☆☆
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	80%	95%
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	68%	91%	98%
Aim above	60%	87%	98%
	☆☆☆☆☆	☆☆☆☆☆	☆☆☆☆☆

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

Your herd	87%	☆☆☆☆☆
Aim above	85%	

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

Your herd	86%	☆☆☆
Aim above	90%	

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

Your herd	93%	☆☆☆☆☆
Aim above	95%	

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

Treated	By MSD	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!
☆☆☆	Above 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
Expected not-in-calf rate helps assess management affecting performance after week 6 (including bull management and herd nutrition).

	Not-in-calf rate	
Your herd	13%	Seek advice
Expected	9%	

Behind Your Detailed Fertility Focus Report

Version 2.11

Report period: Cows calved between 17/06/14 and 23/12/14.
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 seasonal 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:	13/02/15
PTPT:	BQCY
Herd Code:	6/114
Calvings up to this date requested for analysis:	12/02/15
No of cows included:	561
These cows calved between:	17/06/14 and 23/12/14
Mating start & end date: (based on AB or pregnancy test data)	25/10/14 - 05/01/15

Part A) Herd records cross check
Check that the herd records in the table are complete and correct.

2014/15	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
No. of calvings	2	48	402	105	16								573
No. of AB matings					171	544	36						751
No. of preg tests								551	137				688
No. of non-aged/late aged positive preg tests													0
No. of cows culled or died	50		13	5	3	2	2	4					79

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.

Records available for not-in-calf rate

Recorded pregnant	483
Recorded empty	66
Doubtful/recheck*	1
Culled without pregnancy test	9
No record of cull or pregnancy test	2
Cows analysed	561

*Includes cows whose most recent empty diagnosis was less than 35 days after mating end date.

2 Drivers of the 6-week in-calf rate

3-week submission rate

557 cows had calving dates in the required range and were not culled before day 21 of mating and 89% of these were submitted during the first 21 days of mating.

Non-return rate

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

Conception rate

The conception rate was calculated for 740 AB inseminations on and between 25.10.14 and 05.12.14.

3 Key indicators to areas for improvement

Calving pattern of first calvers

117 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

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

3-week submission rate of first calvers

114 first calvers had calving dates in the required range and were not culled before day 21 of mating and 86% of these were submitted during the first 21 days of mating.

Heat detection

261 cows at least 4 years old at calving had calved at least 8 weeks before mating start date and were not culled before day 21 of mating and 93% of these were submitted during the first 21 days of mating.

Pre-mating heats

557 cows had calving dates in the required range and were not culled before day 21 of mating and 484 of these had a pre-mating heat recorded.

Non-cycling cows

557 cows had calving dates in the required range and were not culled before day 21 of mating and 1 of these were identified as being treated for non-cycling.

Performance after week 6

Your herd's not-in-calf 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 cows were induced, ensure all inductions are recorded.

Fertility Focus 2013: Seasonal

Lincoln University
The Manager (University Dairy Farm) Hancox

Report date:	13/02/15
PTPT:	BQCY
Herd Code:	6/114
No of cows included:	627
These cows calved between:	17/06/13 and 23/12/13
Mating start & end date: (based on AB or pregnancy test data)	25/10/13 - 06/01/14
Next planned start of calving:	03/08/14
Duration of mating:	74 days
Duration of AB period:	42 days

Version 2.11

1 Overall herd reproductive performance

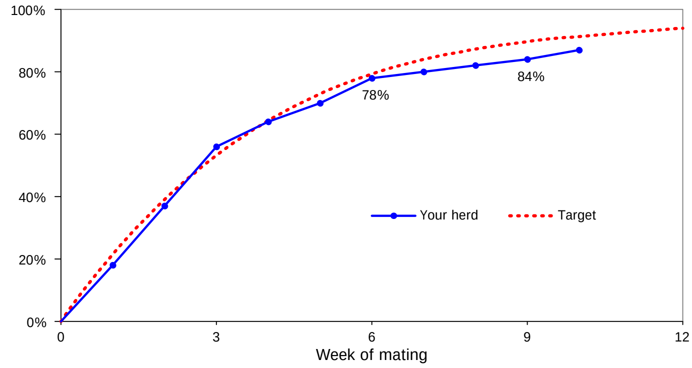
6-week in-calf rate
Percentage of cows pregnant in the first 6 weeks of mating

Your herd	78% (77-78%)	☆☆☆☆☆
Aim above	78%	

Not-in-calf rate
Percentage of cows not pregnant after 74 days of mating

Your herd	12% (11-12%)	☆
Aim for	7%	

% of herd in calf
Cumulative by week of mating



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	88%	☆☆☆☆☆
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	61%	☆☆☆☆☆
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	88%	98%
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	62%	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	81%	☆☆☆☆☆
Aim above	85%	

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

Your herd	89%	☆☆☆☆☆
Aim above	90%	

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

Your herd	95%	☆☆☆☆☆
Aim above	95%	

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

Treated	By MSD	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!
☆☆☆	Above 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
Expected not-in-calf rate helps assess management affecting performance after week 6 (including bull management and herd nutrition).

Not-in-calf rate		
Your herd	12%	Seek advice
Expected	8%	

Behind Your Detailed Fertility Focus Report

Report period: Cows calved between 17/06/13 and 23/12/13.
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 seasonal 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:	13/02/15
PTPT:	BQCY
Herd Code:	6/114
Calvings up to this date requested for analysis:	30/03/14
No of cows included:	627
These cows calved between:	17/06/13 and 23/12/13
Mating start & end date: (based on AB or pregnancy test data)	25/10/13 - 06/01/14

Version 2.11

Part A) Herd records cross check
Check that the herd records in the table are complete and correct.

2013/14	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
No. of calvings		70	416	136	23								645
No. of AB matings					180	567	51						798
No. of preg tests							128	625	140				893
No. of non-aged/late aged positive preg tests							128						128
No. of cows culled or died	1	1	7	9	11		1	1	3	109			143

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.

Records available for not-in-calf rate

Recorded pregnant	553
Recorded empty	70
Doubtful/recheck*	2
Culled without pregnancy test	2
No record of cull or pregnancy test	0
Cows analysed	627

*Includes cows whose most recent empty diagnosis was less than 35 days after mating end date.

2 Drivers of the 6-week in-calf rate

3-week submission rate

627 cows had calving dates in the required range and were not culled before day 21 of mating and 88% of these were submitted during the first 21 days of mating.

Non-return rate

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

Conception rate

The conception rate was calculated for 789 AB inseminations on and between 25.10.13 and 05.12.13.

3 Key indicators to areas for improvement

Calving pattern of first calvers

120 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

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

3-week submission rate of first calvers

117 first calvers had calving dates in the required range and were not culled before day 21 of mating and 89% of these were submitted during the first 21 days of mating.

Heat detection

261 cows at least 4 years old at calving had calved at least 8 weeks before mating start date and were not culled before day 21 of mating and 95% of these were submitted during the first 21 days of mating.

Pre-mating heats

627 cows had calving dates in the required range and were not culled before day 21 of mating and 505 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 not-in-calf 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 cows were induced, ensure all inductions are recorded.

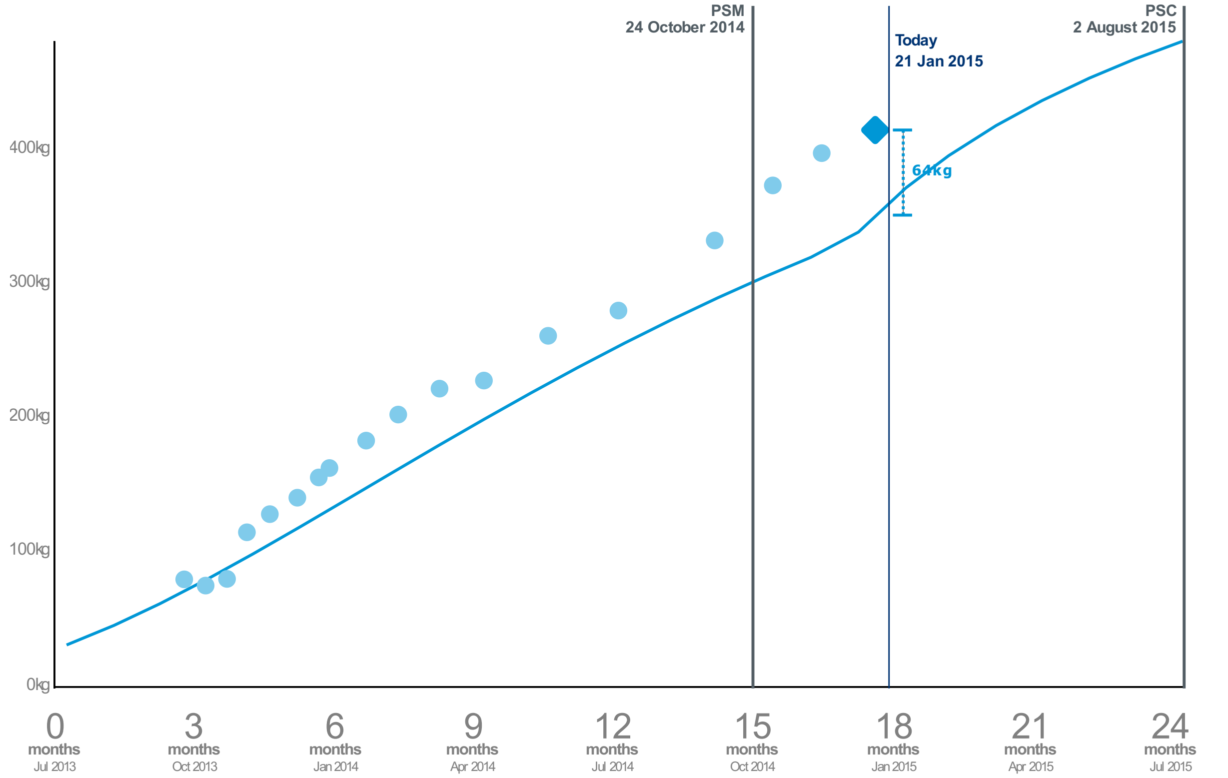
2013 Spring Born

12/01/2015

BQCY

Young stock trend

All 149 animals in this weighing are displayed



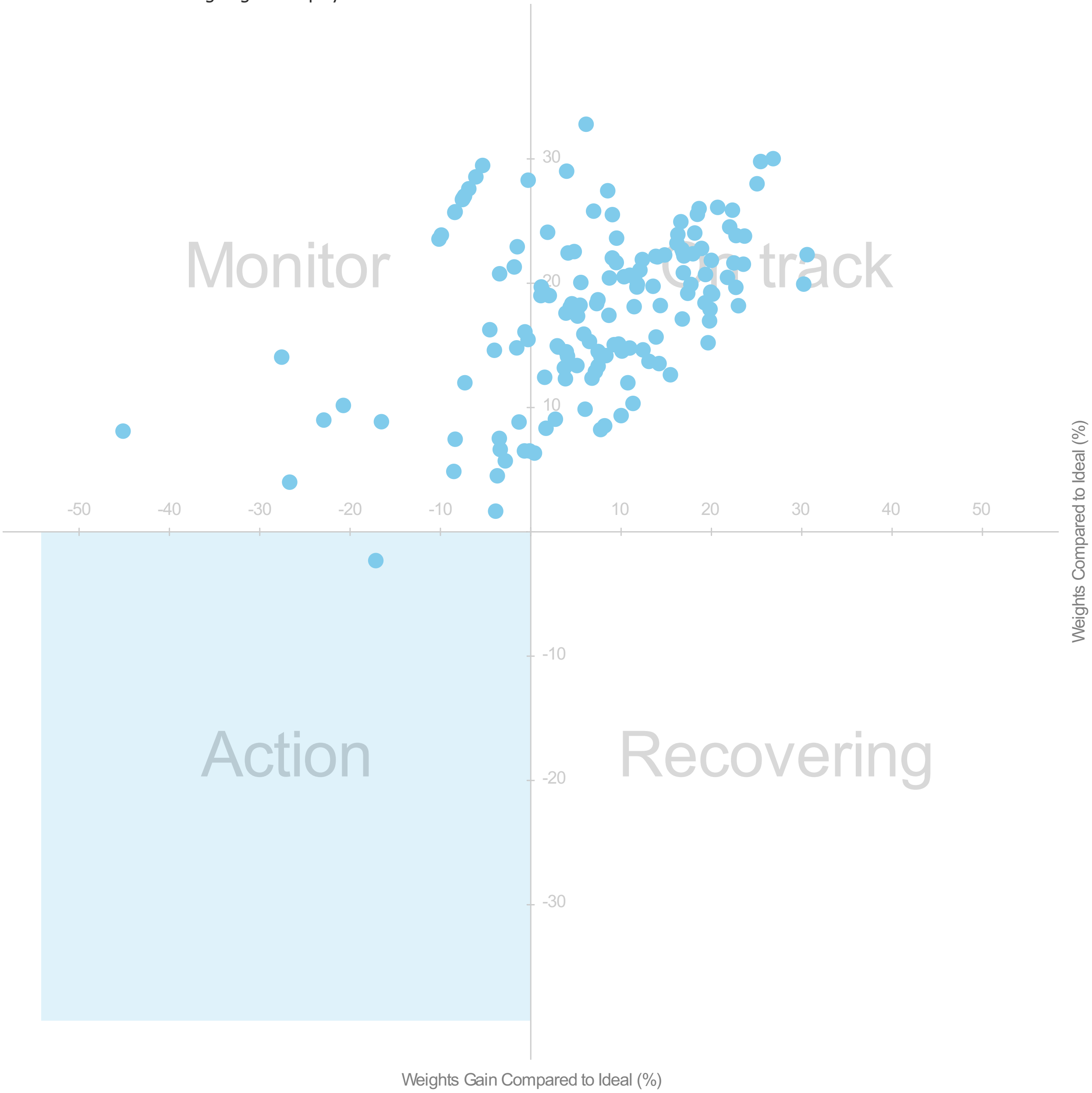
2013 Spring Born

12/01/2015

BQCY

Animal performance

All 149 animals in this weighing are displayed



Take action with these animals

Official Id	AE Breed	Current Weight (Kg)	Weight Gain (Kg/day)	Gain Required by PSC (Kg/day)	Variation from Ideal (%)	Previous Category
BQCY-13-83	HF x J	351	0.29	0.70	-2.32	Monitor

Showing 1 to 1 of 1 entries

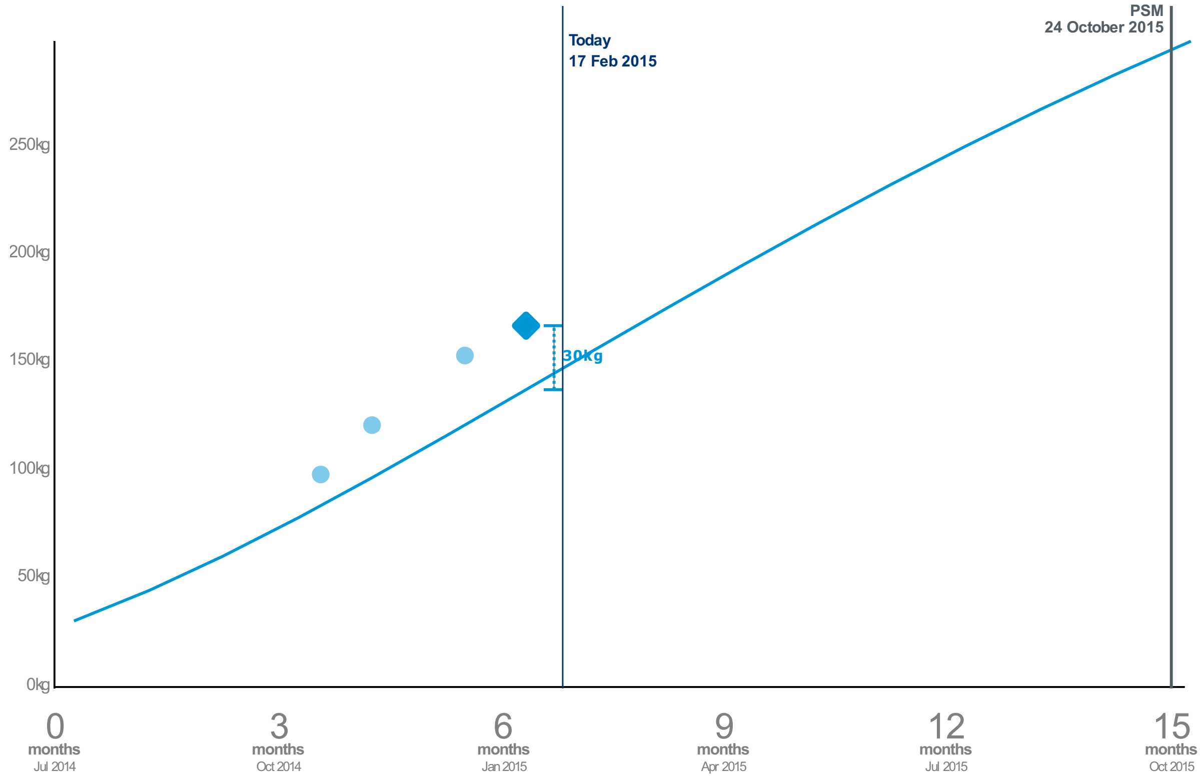
2014 Spring Born

2/02/2015

BQCY

Young stock trend

All 156 animals in this weighing are displayed



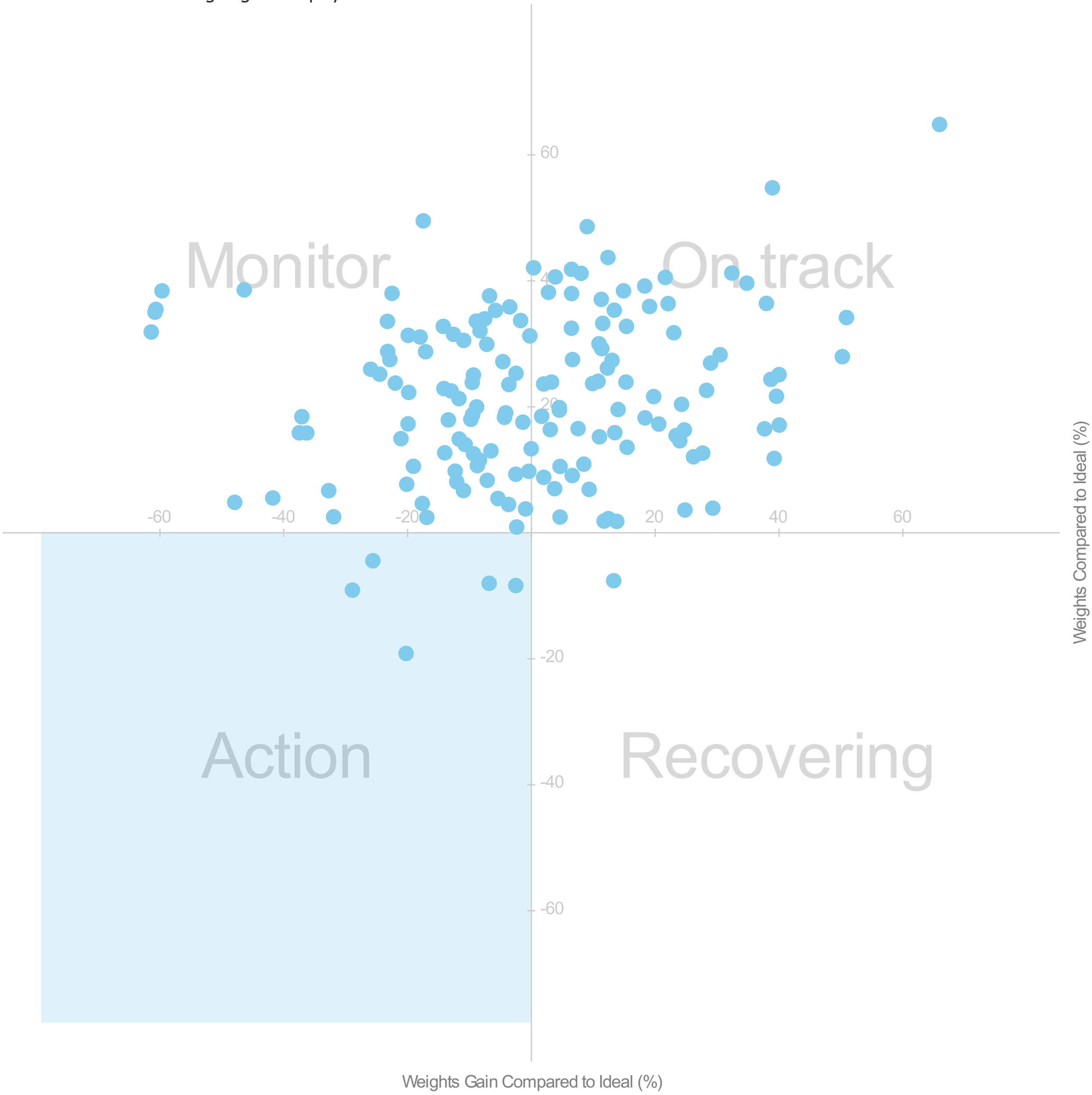
2014 Spring Born

2/02/2015

BQCY

Animal performance

All 156 animals in this weighing are displayed



Take action with these animals

Official Id	AE Breed	Current Weight (Kg)	Weight Gain (Kg/day)	Gain Required by PSM (Kg/day)	Variation from Ideal (%)	Previous Category
BQCY-14-97	HF x J	132	0.40	0.62	-4.44	Monitor
BQCY-14-182	HF x J	125	0.60	0.63	-8.37	Recovering
BQCY-14-189	HF x J	111	0.48	0.69	-19.16	Recovering
BQCY-14-194	HF x J	125	0.56	0.63	-8.02	Recovering
BQCY-14-195	HF x J	130	0.40	0.67	-9.10	Recovering

Summary – Changes to Management at LUDF

	Historically	2014/15 Season
1. Spring Rotation Planner (SRP)	Used in conjunction with silage, N fert and GA, typically finishing mid-September	Proactively managed SRP and held out end first round to 23 September.
2. Rotation Length	Average 22 days Sept – Jan 27 days Sept 22 days Oct - Nov 19 days Dec – Jan 7 grazing rounds since beginning September	Average 26 days Sept - Jan 39 days Sept 23 days Oct – Nov 21 days Dec – Jan 5.9 grazing rounds since beginning September
3. Average Pre-Graze Cover	3118 kgDM/ha (average Sept – January)	3328kgDM/ha (average Sept – January)
4. Average Post Grazing Cover	1607 kgDM/ha	1652kgDM/ha
5. Nitrogen Fertiliser Use	200-350kgN/ha year	Limit of 150kgN/ha/year
a. Frequency of N-fertiliser application	Before calving on paddocks with less than 2200kgDM/ha, then after every grazing, limited use mid-Summer	No N pre-calving, Following each grazing till end December, start again end January. Slower Grazing Rotation means less frequent N applications (15% decrease)
b. Rate	25-40kgN/ha/application	25kgN/ha/application
6. Regrassing	Typically 3 paddocks	3 paddocks regrassed
7. Tight Cost Control	Good cost control to keep total expenses low without eroding the future profitability of the farm. High and efficient production from pasture then offsets farm working expenses to produce a lower than average operating cost and a sustainable profit (depending on payout).	
8. Weekly Farm Walk	Actively measure pasture cover weekly, calculate APC, predict future cover, plan and respond to surplus / deficits	
9. Pasture Allocation	Allocate daily area /cow based on Farm walk / APC, milk production, cow response, grazing residual	
		Continued…

10.Split Herd	Split herd based on 1/3 - 2/3 split with small herd initially comprising heifers and light CS MA Cows. Through late spring some well-conditioned heifers were moved into the main herd and replaced with light MA cows. Following the early pregnancy scan, light BCS, early calving cows have replaced later calving and / or better BCS heifers. At the end of lactation the small herd may become a group of higher BCS / later calving cows.
11.BCS based drying off protocol	Frequent BCS including adhering to BCS targets for drying off based on current CS and days remaining till calving. Milk production is not / will not be chased at the expense of BCS targets (per individual cow) at calving.
12.Herd Test to identify cow performance	Routine herd testing allows identification of low producing cows, particularly important when considering drying off low producing cows.
13.Heifer mating 2 weeks prior to MA cows	Mating heifers early at LUDF has become part of the successful lift in 6-week InCalf results – as this allows the freshly calved heifer more time to cycle and get back in calf in a timely manner.

Johne's Disease Management

JOHNE'S DISEASE RESEARCH CONSORTIUM

DairyNZ

1

The Consortium

Created in 2008

To understand Johne's Disease in New Zealand livestock; develop ways to manage it; reduce the impact.

2

The disease

Wasting disease of cattle, sheep and deer

Infection by Johne's bacteria – *Mycobacterium avium paratuberculosis* (MAP)

Most new infections in very young animals

Most disease (in dairy cows) in older animals, 7+ years old

Jerseys have 3x clinical disease

Bacteria inflame intestine so nutrients not absorbed

Signs - lose body condition, persisting diarrhoea, milk production drops, eventual death

3

Disease incidence JDRC survey (Massey Univ.)

Region	No. herds	% Clinical JD	
		Herds	Range, cases/herd
Northland/Auckland	18	55.5	0 - 2.6
Waikato	67	31.3	0 - 6.2
Bay of Plenty	31	25.8	0 - 1.6
Taranaki	116	52.6	0 - 3.7
Manawatu/Wellington	23	47.8	0 - 2.1
NORTH ISLAND	255	43.8	0 - 6.2
SOUTH ISLAND	202	67.8	0 - 6.0
NEW ZEALAND	457	54.3	0 - 6.2

4

Disease incidence JDRC survey (Massey Univ.)

Region	No. herds	% Clinical JD	
		Herds	Range, cases/herd
Nelson/Marlborough	27	59.3	0 - 6.0
Westland	41	78.0	0 - 3.0
Canterbury	52	69.2	0 - 2.4
Otago	29	58.6	0 - 3.7
Southland	53	67.9	0 - 1.7
SOUTH ISLAND	202	67.8	0 - 6.0
NORTH ISLAND	255	43.8	0 - 6.2
NEW ZEALAND	457	54.3	0 - 6.2

5

Tools for management

Five point dairy toolbox

- Test-and-cull high risk cattle
- Calving and colostrum management
- Calf management pre-weaning
- Replacement heifer management
- Biosecurity and purchasing stock

6

Access Resource

Toolbox AND Booklet

DairyNZ website www.dairynz.co.nz/animal/health-conditions/johnes-disease/

JDRC website www.jdrc.co.nz

Phone 0800 4 DairyNZ

Your vet

7

AND

LIC were funded to examine genetic resistance/susceptibility.

A Johne's Index has been developed.

Should be coming as additional sire information when selecting semen.

Will be made available to all genetics companies supplying New Zealand farmers.

8

Feed planning: Autumn, Winter & Spring 2015

❶ **Total number of cows needed for peak milk spring 2015**

- Calculated by proposed stocking rate *x* effective ha.

❷ **Total number of *rising two heifers*** in calf (as pregnancy tested summer 2015)

- Complete this now if not already done; cull empties.
- Recheck pregnancy test pre-winter to avoid overwintering empty heifers.

❸ **Allow for pregnancy losses** of between 4.5% and 5% from summer scanning to peak milk next spring.

- 1.5% on average from summer scanning to 1st June. Remainder of losses from June to peak milk.

❹ **Pregnancy test all in milk cows**

- Best to pregnancy test all cows including rechecks. Relying on heat detection alone is risky.
- Recheck pregnancy test pre-winter to avoid overwintering empty cows. Finding empty cows will in *most* cases cover costs of a late April / May final pregnancy test.

❺ **Autumn culling of in milk, empty cows**

- Is not cost effective to keep milking empty, in milk cull cows if you are needing to feed out supplements. Calculate expected income per cull cow less daily cost of feed.
- Better to feed in calf, in milk cows well with feed spared by culling of empty cows.

❻ **Autumn culling of in calf cows for other traits**

- Cull cows that are in calf but won't be milked next season; Cull on production worth (PW), repeat mastitis cases (usually 3 cases or more), 3 teaters, udder conformation, high SCC at herd test, temperament, chronic lameness etc.

❼ **Feed budgeting**

- Feed demand compared with feed supply
  (a) **Autumn**
    - Confirm cull numbers therefore numbers of in-calf cows remaining in milk.
    - Decide on feeding levels for in milk and dried off cows on milking platform.
    - Finalise nitrogen fertiliser strategy.
    - Summarise supplements on hand, or due in.
    - Agree on closing average pasture cover for May 31st.

  (b) **Winter**
    - Finalise numbers of dry cows and R2s to carry through winter.
    - Determine feed demand (kgDM per cow per day x number of days x number of cows).
    - Make sure winter grazing is secured (NOTE: This year it will be urgent to be talking with grazier NOW)
    - Ensure enough supplementary feed is on hand especially for crop transition period

(c) **Spring**

- Finalise numbers of cows to peak milk and per cow feed demand through spring
- Decide on feeding levels for calving cows
- Agree on target average pasture cover at calving
- Plan nitrogen fertiliser use
- Ensure supplements are on hand for late winter / spring feeding

❽ Body condition score decisions for Autumn

- Preserve cow body condition score (BCS) for spring calving!
- Decision rules about who to dry off and when; Page 38 in DairyNZ Facts and Figures book (below)

Table: Days needed for cows to achieve target calving body condition score (BCS) at calving. Based on a MA cow needing to calve at **5.0 BCS**, and R2 and R3 calving **at 5.5 BCS**. (***Page 38****, from DaIryNZ Facts and Figures*)

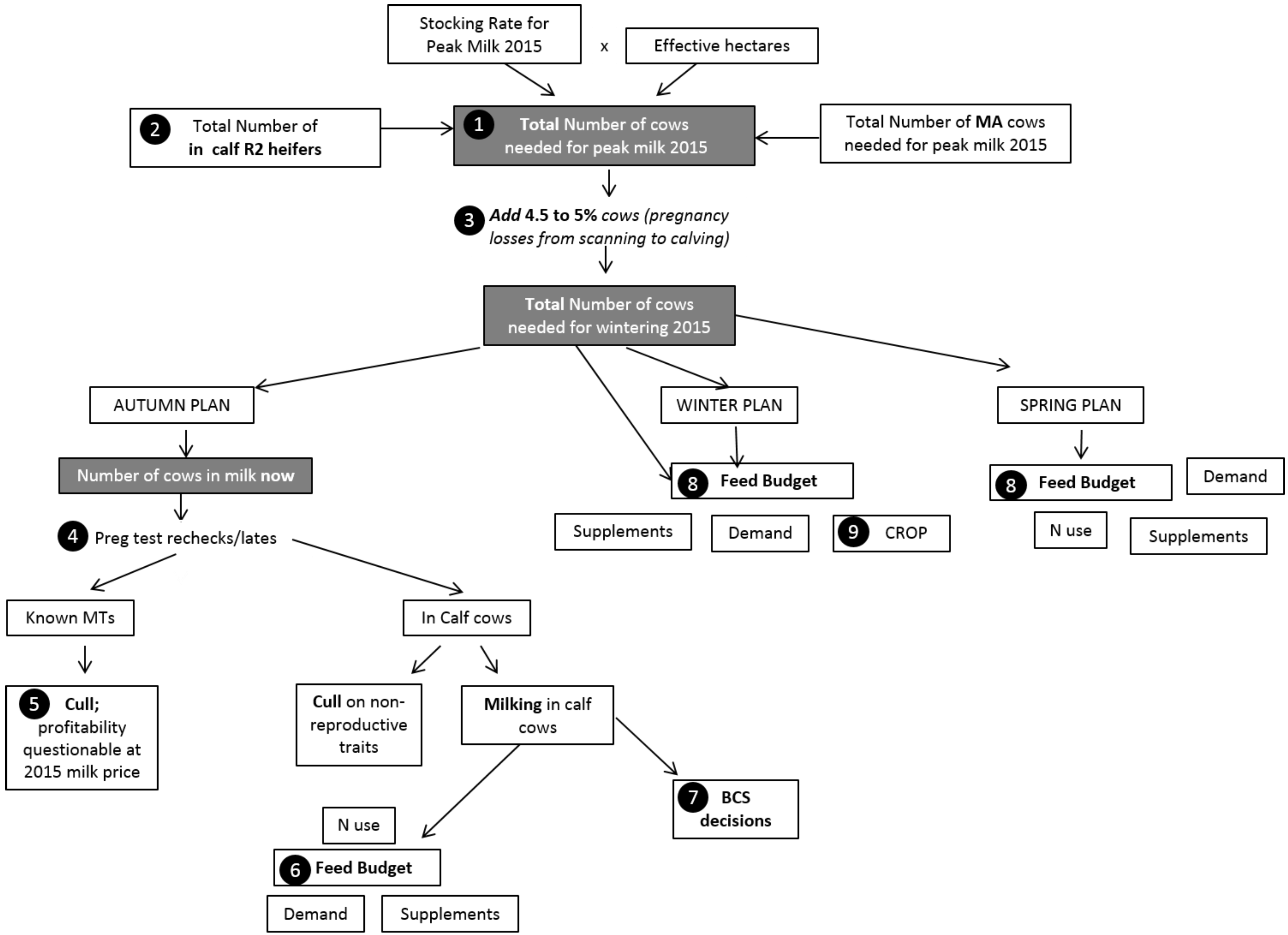
Current cow BCS		Days that cows need to be dry before calving	
Cow	**R 3 year old**	**Autumn pasture**	**Autumn pasture and high quality supplement**
3.0	3.5	160	120
3.5	4.0	130	100
4.0	4.5	100	80
4.5	5.0	70	60

We've only got 150 days, including the autumn, to get an early August calving cow to target BCS at calving

- If feeding **only pasture** in late lactation, cows currently at or less than BCS 3.5, should be dried off
- If feeding **only pasture**, MA cows at BCS 4.0 now should be monitored very closely with options to OAD milk considered over the next month
- In milk heifers (R3s) 4.0 or less may also need OAD or dry off decisions made very soon.
- Availability of high quality supplements mean you have another few weeks before OAD milking or dry off decisions are made for lighter (cows at or less than BCS 4.0).

❾ Winter crop

- Review the winter crop or wintering arrangements with your grazier, or at your runoff
- View the crop and seek professional opinion on potential DM yield from crops. PLANT POPULATIONS AND THEREFORE DM YIELDS ARE OF CONCERN IN MANY DRYLAND AREAS. Resowing of winter crops with rape, winter cereals or Annual or Italian ryegrasses may be required.
- Revise your winter feed budget if you have concerns about crop yields and/or availability of suitable supplement to feed to wintering cows.
- Book for crops to be DM yielded and nitrate tested before cows go to winter grazing.


Stocking Rate for Peak Milk 2015
x
Effective hectares
1 Total Number of cows needed for peak milk 2015
2 Total Number of in calf R2 heifers
Total Number of MA cows needed for peak milk 2015
3 Add 4.5 to 5% cows (pregnancy losses from scanning to calving)
Total Number of cows needed for wintering 2015
AUTUMN PLAN
WINTER PLAN
SPRING PLAN
Number of cows in milk now
4 Preg test rechecks/lates
Known MTs
5 Cull; profitability questionable at 2015 milk price
In Calf cows
Cull on non-reproductive traits
Milking in calf cows
7 BCS decisions
N use
6 Feed Budget
Demand
Supplements
8 Feed Budget
Supplements
Demand
9 CROP
8 Feed Budget
Demand
N use
Supplements

Simple analysis – breakeven point for keeping known culls into the autumn
(assuming some silage will be required to get through the autumn)

Intake	Silage Cost	Daily Feed Cost	Milk Income	Breakeven milk Production per day	Breakeven Production + 20%
16 kgDM/cow/day	$0.43 /kgDM	$6.88	$5.00 /kgMS	1.4 kgMS/cow/day	1.7 kgMS/cow/day
18 kgDM/cow/day	$0.43 /kgDM	$7.74	$5.00 /kgMS	1.5 kgMS/cow/day	1.9 kgMS/cow/day

Other Costs to consider
Shed / Electricity costs
Risk declining meat schedule
Risk not achieving CS targets remaining herd
Generating more income but no more profit

Scenario:

Number Cows	Intake	Production	Gross Income	Feed Cost	Gross Margin	Daily Increase
50	18 kgDM/cow/day	1.9 kgMS/cow/day	$9.29	$7.74	$1.55	$77.40
If feeding for additional 30 days			$2,322.00	Total Gross Margin		
			$14.51	Total Gross Margin per hectare		

Pasture renewal – why continue in low payout?

Graham Kerr (Agriseeds) and Matt Smith (Agriseeds)

Pasture remains the cornerstone to feeding cows in the New Zealand dairy Industry, and the amount of "pasture eaten/ha" a key profit indicator. With the lower payout, what does that mean in terms of return on investment in pasture renewal?

An example 3 things you could do with $1000

1. Do nothing, save the $1000.
2. Spend $1000 on sowing 1ha of new perennial pasture.
3. Spend $1000 on 4 t of PKE.

Example	Do nothing	Sow 1ha new pasture	Buy 4 t PKE
Extra feed	**0**	**20 t DM/ha** (say grow at extra 4 t DM/ha for 5 years)	**3.6 t DM/ha** (PKE 90% DM)
Utilisation	-	80%	90%
Extra DM eaten		**16 t**	**3.2 t**
Conversion to MS	-	15 kgDM/kgMS	15 kgDM/kgMS
Milk produced	-	**1067 kgMS**	**216 kgMS**
Income @ $4.70/kgMS		**$5015**	**$1015**
Less $ spent	$0	-$1000	-$1000
Gross return*	**$0**	**+$4015**	**+$15**

Note: This is an example and figures will vary between situations. *Gross return does not include any variable costs associated with extra milk production, which could possibly be 10-20% of income. May also be extra benefits in higher ME and utilisation (if replace weedy or older pastures).

Take home messages

- Doing nothing

Good cost control is very important, but doing nothing isn't the best option.

- Pasture renewal

Can be highly profitable, but there are some qualifiers in this. You need to identify under-performing paddocks, rectify reasons for underperformance, undertake a good renewal programme and manage pasture well to capture the benefits.

- Feeding supplements

To increase milk production is difficult to justify at the current MS price. However, they still can have an important short-term role to fill pasture deficits.

Historical pasture renewal on LUDF

LUDF measures pasture performance of individual paddocks, and renews about 15% of the farm area per year, with the aim of maximising profitable MS production. So how well has this gone?

Improvements in Pasture Production at LUDF – as shown through grazing records

Reviewing the annual pasture production records per paddock at LUDF shows the gain from regrassing has averaged over 3 tonne DM/ha/year. Actual results vary from paddock to paddock, with the smallest yield 1.2tDM/ha/year, up to 5.0 TDM/ha/year. LUDF's data suggests some regrassed paddocks have outperformed their peers for 5 years, suggesting identification of high potential paddocks, and correction of limiting factors contributing to poor yields can be extremely profitable, and persistent.

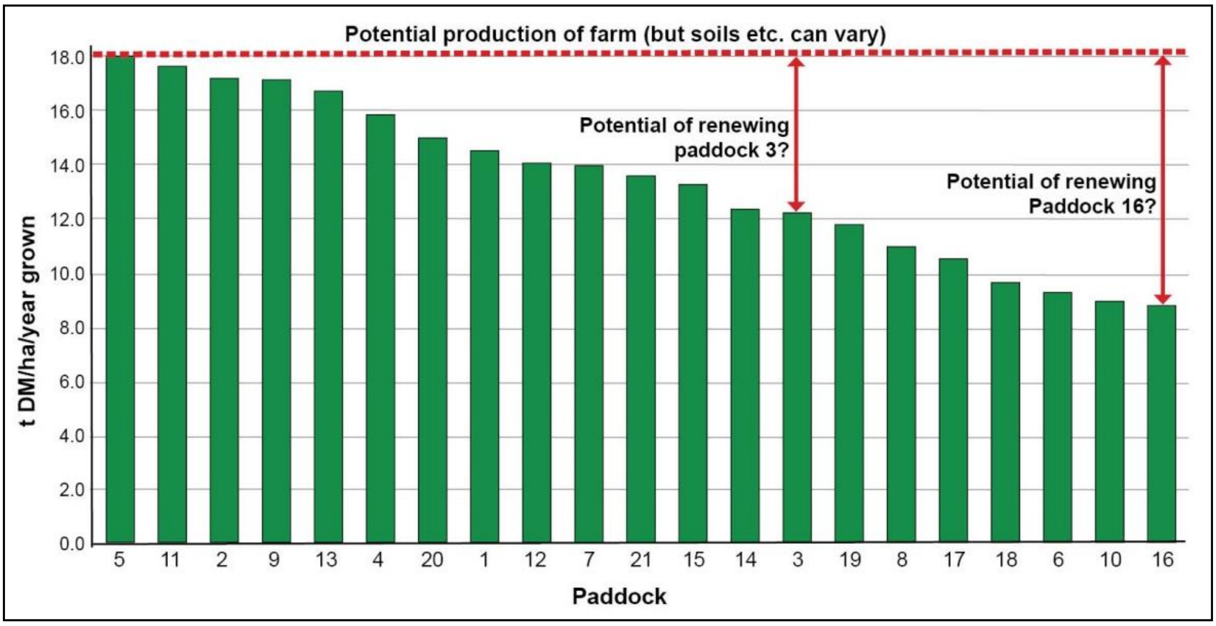
LUDF	Average	Lowest	Highest
Extra eaten/year	**3.1 t DM/ha/year**	1.2 t DM/ha/year	5.0 t DM/ha/year
Gross return*		**+$600/ha/year**	**+$2,500/ha/year**

* Gross return does not include any variable costs associated with extra milk production. Return is based on 12kgDM/kgMS and $6/kgMS (long term average milk price).

Keys to making it pay

1. Analyse paddock growth & identify under-producers

At LUDF the best returns have been from renewing paddocks with the ***greatest potential benefits.*** E.g. renewing paddocks at 12-13 t DM/ha/year eaten given bigger returns from15-16 t DM/ha.



Example of choosing correct paddock (e.g. 16) rather than another paddock (e.g. 3).

2. Undertake good renewal – don't cut corners

Save this checklist. Good renewal is a process like a chain, in that it is only as strong as its weakest link.

☑	**Pasture renewal checklist**
	Identify under-performing paddocks.
	Rectify reasons for poor performance.
	Soil test (6-12 months in advance) & correct soil fertility.
	Choose appropriate sowing date.
	If relying on a contractor, book them in early.
	Check for pests (e.g. grass grub, slugs & ASW).
	Choose appropriate renewal method.
	Spray out paddock prior to cultivation or direct drilling.
	If cultivating, prepare a good seed bed (firm, fine & level).
	Choose correct cultivar and seed mix for the farm system.
	Pest control - use treated seed and insecticide if required.
	Choose correct sowing rate and technique.
	Check seed certificate for germination, purity and endophyte.
	Add slug bait if needed.
	Control weeds in early establishment.
	Graze early to promote tillering, use 'pluck test' to see when pasture ready to graze.
	Avoid pugging and over-grazing new pasture.

Lincoln University Dairy Farm - Farm Walk notes

Tuesday 17-February 2015

LUDF – focus for 2014/15 Season: Nil-Infrastructure, low input, low N-loss, high profit.

Farm system comprises 3.5 cows/ha, 150kgN/ha, 300kgDM/cow imported supplement, plus winter most cows off farm. FWE of less than $1.12million and Target production of 500kgMS/cow.

Critical issues for the short term

1. **Achieve target grazing residuals and cow intakes while managing average pasture cover, shape of the wedge and maintaining pasture quality (especially in paddocks at the top of the wedge).**
2. **Use back-fences on all herds whenever paddock grazing takes more than 36 hours.**
3. **Residual management remains critical.**
4. **Start thinking around autumn management (culls, nitrogen use, winter feed and BCS)**

Key Numbers - week ending Tuesday 10th February 2015

Ave Past Cover	2346 kgDM/ha	Past Growth Rate	48 kgDM/ha/day
Ave Milk Production	1.81 kgMS/cow*	No Cows In Milk	548
Round length	20.9 days	Supplement used	5.7 kgDM/cow/day for the week
SCC	159,000	6-week InCalf	72%

(* milk to factory from current cows milking)

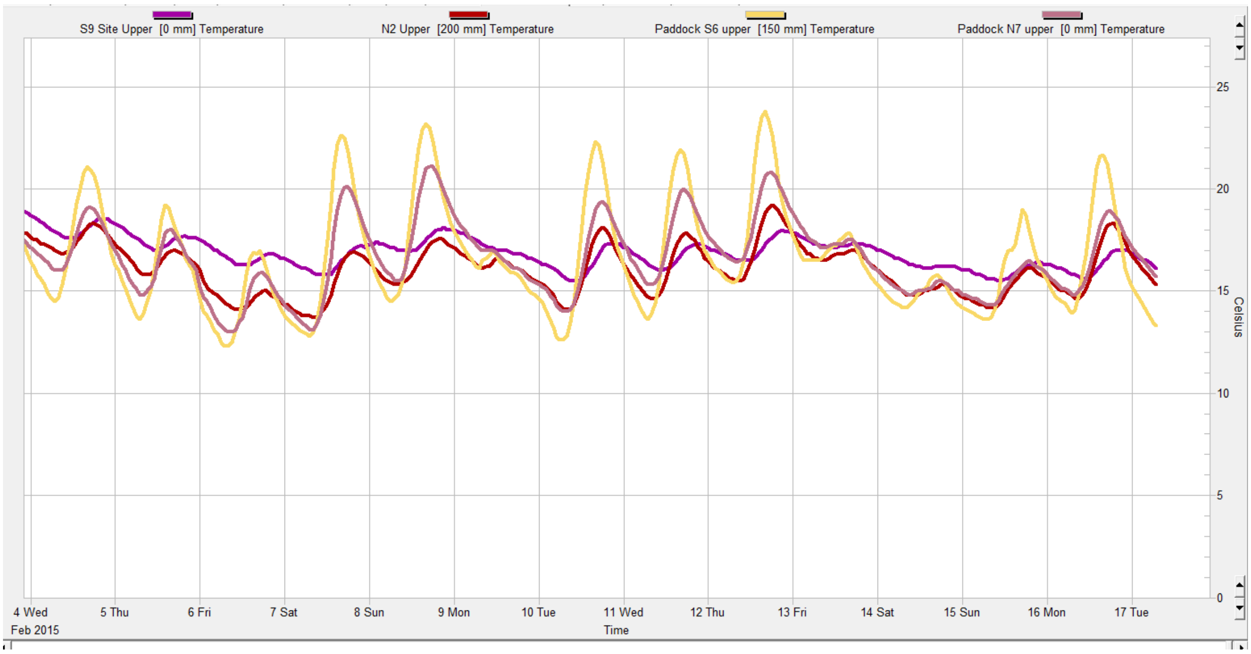
Herd Management

5. We are managing 3 milking herds,
    a. The small milking herd now consists of next seasons early calving cows (184 animals)
    b. The main herd with mixed aged cows (351 animals).
    c. 13 cows on OAD (lame).
6. Milk production has increased slightly this week.
7. BCS will be done again tomorrow. Cows seem to be putting on weight.
8. Herd test and PD was done again and we have a list of empty and low producing cows ready to go when decisions are made to reduce feed demand by culling these cows.
9. No new mastitis and 2 new lameness cases this week

Growing Conditions

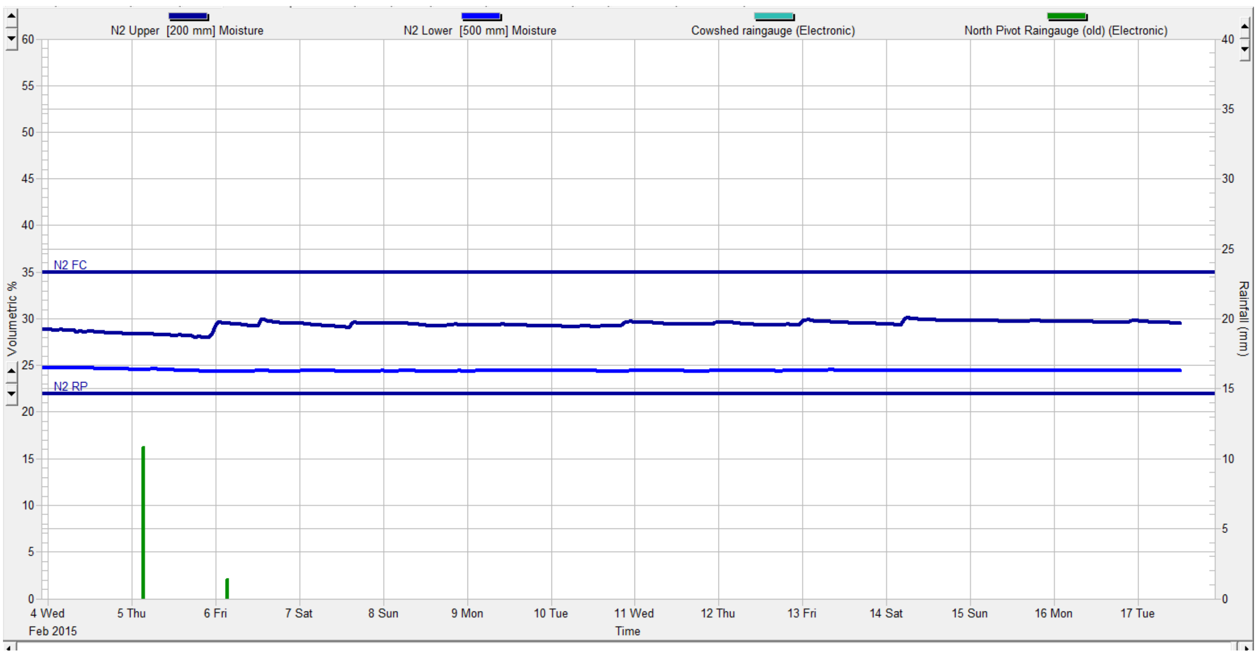
10. 9 am average soil temperature for the week was 15.4 degrees (same as last week).

Figure 1: Soil temperature history for the last 2 weeks



11. Rain fall: 1.4 ml for the week.
12. Irrigation: 5 days North Block and 3 days South Block.
13. The rain last week and the overcast days with lower temperatures have allowed the soil moisture levels to stop dropping.

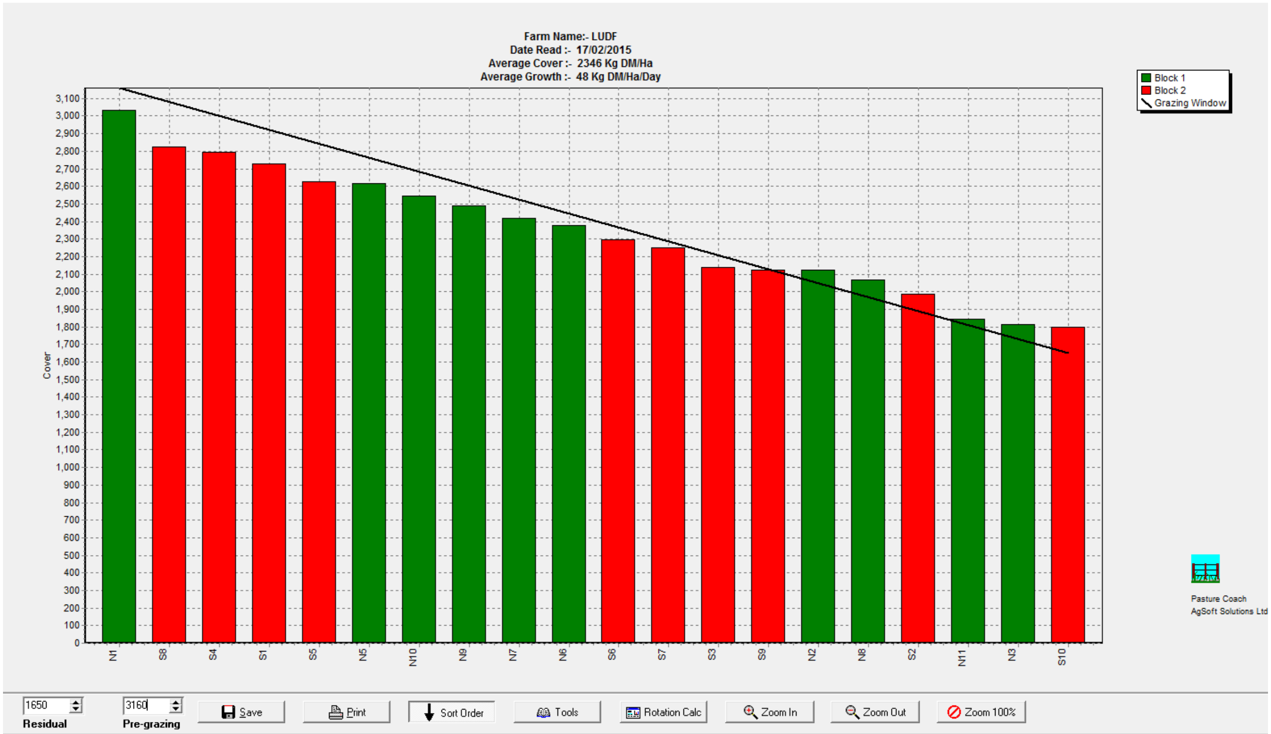
Figure 2: Soil moisture history for the last 2 weeks (Paddock N2)



Pasture Management

14. Area grazed this week was 48.99 ha total, giving a 21.9 day round.
15. 21.8 tonnes of silage was fed this week (5.7 kgDM/cow/day average). This was used to keep the round at 21 days as grass growth did not seem to keep up with demand.
16. Our current stocking rate is 3.6 cows/ha, with Pdk N4 out for re grassing (7.2 ha). This paddocks was sown 1.5 weeks ago after cultivation with a mixture of Base and Trojan with clover, Chicory and plantain in the mix. We don't expect this paddock to be back in the round until mid-March
17. We've pre-graze mown 3 hectares as part of weed control in the newly established pasture in S6 (due to the Chicory and Plantain we can't use broadleaf herbicides).
18. Nitrogen fertilizer was applied on 38.9 ha (25 kgN/ha as urea, except of effluent areas which receive none).
19. The post-grazing residuals are now typically plating at about 1650 kgDM compared to previous weeks when it was 1750 kgDM/ha.
20. If nothing was to change this week, the feed wedge below targets dry matter intakes of 19kgDM/cow/day giving a demand of 69 kgDM/ha/day. This requires a pre-grazing target of 3160 kgDM/ha (548 cows eating 19 kgDM/day, a 22 day round and a post-grazing cover of 1650 kgDM/ha).

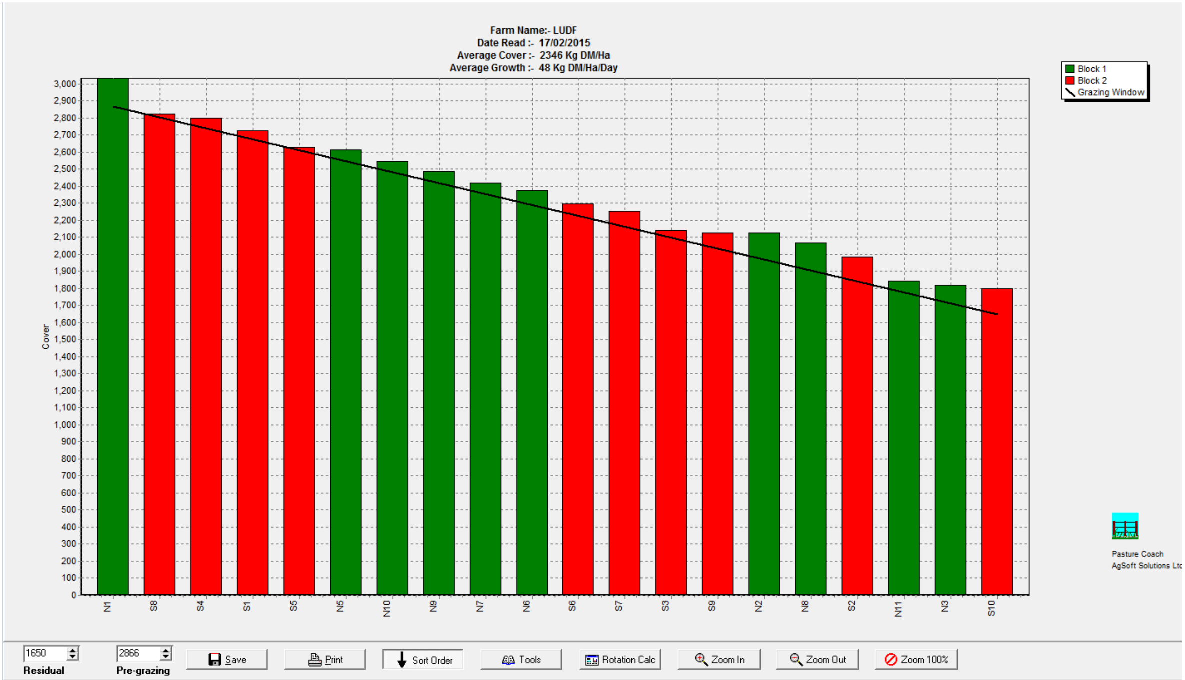
Figure 3: This week's feed wedge:



Feeding Management for the coming week

21. Pasture growth this week was estimated as 48 kgDM/day. This is below demand (69 kgDM/day). The feed wedge above would indicate a feed deficit of 9 tonnes DM for the week. Even with the use of supplement to keep the round at 22 days last week, the average pasture cover on the farm dropped by 100 kgDM/ha. The current APC is at least 200 kgDM/ha below where the farm is comfortable with (2500kgDM/ha)

22. Pasture quality: on observation, all paddocks continue have good quality pasture, with no dead matter at the bottom.
23. Nitrogen fertilizer: we will continue applying Nitrogen fertilizer (urea) @ a rate of 25 kgN/ha at this stage.
24. We have done partial budgets and feed budget scenarios between keeping all stock on farm and bring in further silage to cope with feed demand OR cull empty and low producing cows by the end of February (taking into account the impact this would have in production and the saving to be made in supplement costs).
25. We have also evaluated our winter feed situation to see if we needed to change our autumn management or increase BCS at dry-off due to low winter feed availability. In our case, the farm has secured good quality winter grazing on a grass and silage diet, allowing for 0.5 BCS gain during winter.
26. Due to all of the above this week's decisions are:
    a. Extend our rotation to a 26 day round (5.8 ha/day) over our currently available 152.8 ha.
    b. Feed silage @ a rate of up to 6 kgDM silage/cow/day based on pre-graze covers and actual rotation length. The silage will be split between both grazing to assist maximum utilization. By doing this, our daily grass requirement will drop from 19 kgDM/cow/day to 13 kg DM/cow/day, which equals 47 kgDM/ha (same as growth)
    c. We are also making arrangements to destock the farm by sending our empty cows and a few very low producing cows to the works. This will possibly be scheduled for next week.
    d. Monitor growing conditions during the week and respond accordingly (drop the amount of silage if pasture growth improves)
27. The feed wedge below shows the extension of the round length to 26 days, the drop in grass requirement due to the silage fed (from 19 kgDM/cow/day down to 13 kgDM/cow/day) and the drop in post-grazing covers to 1650 kgDM/ha.



Data sheet

LUDF Weekly report	20-Jan-15	27-Jan-15	3-Feb-15	10-Feb-15	17-Feb-15
Farm grazing ha (available to milkers)	160	160	160	160	160
Dry Cows on farm / East blk /Jackies/other	1/0/0	0/2/0	0/3/0	0/2/0	0/2/0
Culls (Includes culls put down & empties)	2	0	0	0	0
Culls total to date	19	19	19	19	19
Deaths (Includes cows put down)	0	0	0	1	0
Deaths total to date	5	5	5	6	6
Calved Cows available (Peak Number 560)	551	557	550	548	548
Treatment / Sick mob total	2	2	0	1	0
Mastitis clinical treatment	2	2	0	1	0
Mastitis clinical YTD (tgt below 64 yr end)	46	48	48	49	49
Bulk milk SCC (tgt Avg below 150)	183	181	155	153	159
Lame new cases	4	4	0	3	2
Lame ytd	78	82	82	85	87
Lame days YTD (Tgt below 1000 yr end)	760	788	816	858	900
Other/Colostrum	0	0	0	0	0
Milking twice a day into vat	543	543	545	541	541
Milking once a day into vat	6	6	4	6	6
Small herd	182	181	181	179	179
Main Herd	362	362	363	362	362
MS/cow/day (Actual kg / Cows into vat only)	1.81	1.70	1.68	1.75	1.81
MS/cow to date (total kgs / Peak Cows	313	323	336	349	360
MS/ha/day (total kgs / ha used	6.22	5.84	5.77	5.97	6.19
Herd Average Cond'n Score		4.20		4.09	0.00
Monitor group LW kg WOW early MA calvers	489	491	493	493	496
Soil Temp Avg Aquaflex	17.5	17.5	19.0	15.4	15.4
Growth Rate (kgDM/ha/day)	79	68	88	55	48
Plate meter height - ave half-cms	14.4	13.2	14.4	13.7	13.2
Ave Pasture Cover (x140 + 500)	2510	2345	2515	2413	2346
Surplus/[deficit] on feed wedge- tonnes	4			16	0
Pre Grazing cover (ave for week)	3375	3239	3225	3267	3000
Post Grazing cover (ave for week)	1700	1650	1650	1700	1650
Highest pregrazing cover	3500	3500	3388	3544	3200
Area grazed / day (ave for week)	8.10	7.80	6.45	7.28	6.99
Grazing Interval	19	20	24	21	22
Milkers Offered/grazed kg DM pasture	19	19	13	17	13
Estimated intake pasture MJME					
Milkers offered kg DM Grass silage			6	2.1	5.7
Silage MJME/cow offered					
Estimated intake Silage MJME					
Estimated total intake MJME					
Target MJME Offered/eaten (includes 6% waste)					
Pasture ME (pre grazing sample)	11.0	11.5	11.6	n/a	0.0
Pasture % Protein	19.0	19.7	23.6	n/a	0.0

Pasture % DM - Concern below 16%	12.2	12.8	13.7	n/a	0.0
Pasture % NDF Concern < 33	45.3	40.7	38.1	n/a	0.0
Mowed pre or post grazing YTD	190.9	229.9	233.6	233.6	236.6
Total area mowed YTD	205.3	244.3	248.0	248.0	251.0
Supplements fed to date kg per cow (630 peak)	120.6	120.6	162.0	176.3	215.4
Supplements Made Kg DM / ha cumulative	139.4	139.4	139.4	139.4	139.4
Units N applied/ha and % of farm	0	0	25units / 8.8%	25units / 18.6%	25units / 24.3%
Kgs N to Date (whole farm)	95	98	102	107	113
Rainfall (mm)	2	2.6	2.6	9.4	1.4
Aquaflex topsoil relative to fill point target 60 - 80%	80	40-60	40-60	40-60	30-50

Farm walks occur every Tuesday morning. 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 and gumboots. Phone SIDDC – 03 423 0022.

Peter Hancox, Farm Manager, Natalia Benquet, Charlotte Westwood.

LUDF-FEB15