

Lincoln University Dairy Farm - Farm Walk notes

Tuesday 20th December 2016

LUDF – focus for 2016/17 Season: Nil-Infrastructure, low input, low N-loss, maximise profit.
Farm system comprises 3.5 cows/ha (peak milked), Target up to 170kgN/ha, 300kgDM/cow imported supplement, plus winter most cows off farm. FWE of less than \$1 million and Target production of over 500kgMS/cow (>100% liveweight in milk production).

Critical issues for the short term

1. **Hold the rotation length to 25 days to enable higher pasture growth**
2. **APC, pregraze covers and growth rates continue to be overestimated by the plate meter – challenging interpretation and management of the available feed supply. Growth rates are estimated to be approximately meeting demand.**
3. **Ensure enough good quality pasture is offered daily to ensure good production and reproductive results.**
4. **Monitor cow BCS changes through lactation.**
5. **Continue to monitor mating performance**

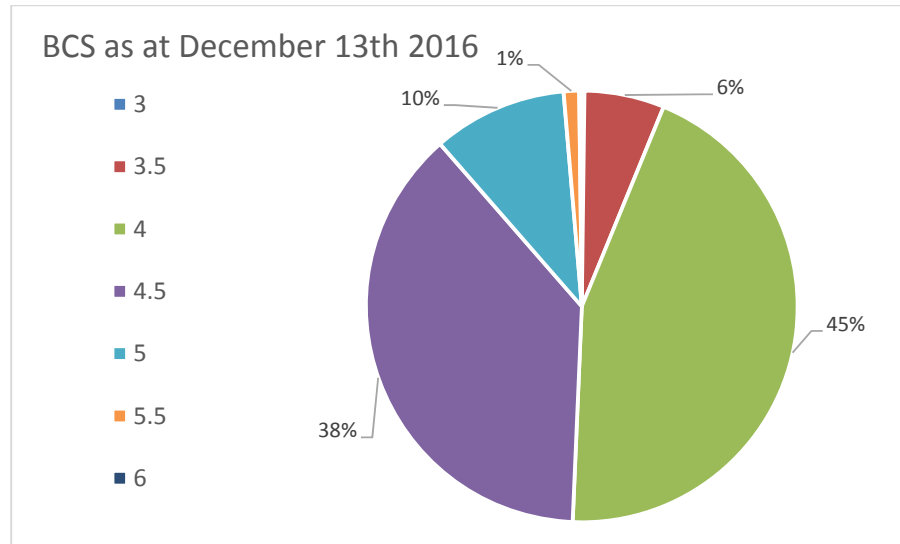
Key Numbers - week ending Tuesday 20th December 2016

Ave Pasture Cover	2,765kgDM/ha	Pasture Growth Rate (as per Pasture Coach)	102 kgDM/ha/day – - See below
Round length	22 days (160 ha)	Ave Supplement used	none
No Cows on farm	549	Ave Soil Temp (week)	15.7°C
Kg MS/cow (549 cows)	2	SCC	155,000
Milk Protein : Fat ratio	0.81	Protein: 4.02%	Fat: 4.95%

Herd Management

6. A total of 549 calved cows are on farm as of today, though one is about to be dried off leaving 548. There are 2 milking herds on farm, a small herd of 157 first calvers and low BCS cows and a large herd with 371 mixed age cows. Slight preferential grazing continues for the small herd as per usual management for LUDF.
7. There are 549 cows going into the vat, with 528 cows on twice a day milking, 21 once a day.
8. There has been 1 new case of mastitis over the past week (47 clinical cases season to date vs 86 cases at the same time last season).
9. There have been 6 new lame cows over the last week. This brings us to 72 cases season to date (slightly ahead of the same time last year when we'd recorded 69 lame cows season to date).
10. Trace minerals and magnesium chloride are running through the stock water to all cows on the milking platform.
11. The respiratory problem (particularly evident in the first calvers) appears to be continually improving. Blood tests indicate the primary cause of infection may have been IBR (Infectious bovine rhinotracheitis), though this was followed with secondary infection including pneumonia.
12. Average herd liveweight has slightly increased this week. The monitor group (281 early calving MA cows) this week averages 483 kg liveweight/cow (4 kg higher than last week).
13. 152 heifer replacement calves have been tagged, and all calves are now outside on East Block. 18 light heifer calves remain on calf meal. All calves are being offered good quality pasture.

14. The herd was BCS on the 13th December. The average BCS of the whole herd was 4.3 (down 0.1 from mid November). Approximately 45% of cows are now at BC 4.0, 38% at 4.5 and 11% at 5 or above. In late October, the average was 4.5, and in mid-July, an average of 5.3.



Mating progress

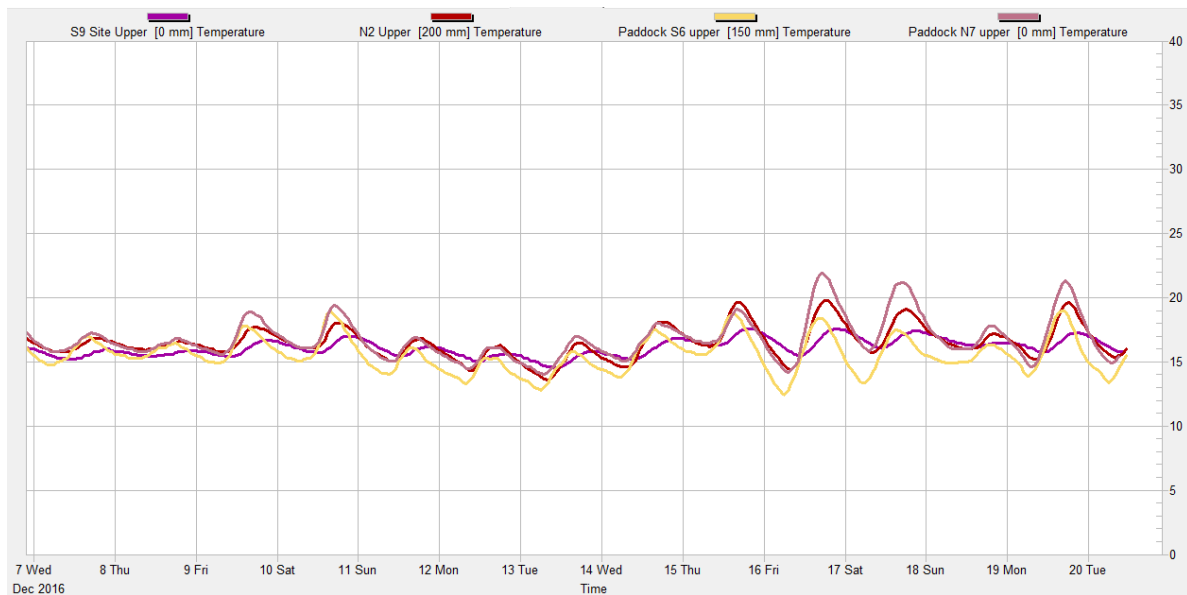
15. All cows were Metrichecked 5 weeks post calving.
16. Mating started on 25 October (7 weeks ago) with 457 cows mated by day 21. This gave an average of 21.7 cows per day or 82% in the first three weeks, compared to the target of 90%.
17. Our vet palpated all 97 cows that had not been mated in the first 21 days of mating. 15 of these had cysts and received a prostaglandin (PG) treatment.
18. A total of 503 cows (91%) had been submitted up to the end of the fifth week of mating, but more returns were seen than desired during weeks 4-6, with initial Non-Return-Rates in the low 50's.
19. In response to the high number of returning cows in weeks 4-6, a decision was made to put bulls out 5 days earlier than initially planned (Wednesday 30th November - 20 days ago).
20. "Bull power" (ratio of bulls to cows not in calf) was increased by purchasing an additional 6 BVD vaccinated bulls to better manage the potential number of cows coming back on heat, and all bulls were initially put out, rather than splitting the team and rotating them as has occurred in the past. A total of 19 bulls remain running across both herds this week. Bulls will be split and rotated.
21. The initial breeding bulls were purchased almost 3 months ago and were blood tested for BVD. They were vaccinated with a 7 in 1 vaccine, a BVD booster, selenium and copper injections and a pour on drench, all in preparedness for mating.
22. Bulls will remain with the herd they were initially placed with to lessen the potential risk of the respiratory disease passing across the herd – via the bulls.
23. Some of the low Non Return Rate is suspected to be related to the presence of respiratory disease noted above, particularly in the first calving cows. Non-return rates were at their lowest in this group.
24. The farm had previously determined it would begin scanning on a weekly basis, at the beginning of week 6. All cows mated in week one and not subsequently re-mated can be scanned at this point as they are 35 days or more since mating. This has been repeated weekly for cows mated in week 2 and again in week 3.
25. The initial three weeks of data suggests the farm has 35% of peak cows in calf at this point. Theoretically the farm is therefore heading for a 6 week InCalf rate of between 60-70%, compared to the target of 78%. Incalf rates for the first three weeks mating are similar across all ages, whereas historically the heifers have shown better incalf rates than older cows.
26. A further scan will be conducted in mid January to determine the 6 week InCalf rate.

27. AB mating started for R2 2015 born heifers on 11th October 2016. Heifers were AB mated daily on observed standing heats for 6 days. All heifers that had not shown heats within this period (by Sunday 16th October 2016) received a single PG injection and continued to be mated to standing heats. A total of 154 heifers were AI mated and the bulls (Jersey) went out with all heifers on 20th October 2016. Bulls remained out until 12th December 2016 – giving us a total of 9 weeks mating for the heifers.
28. Our AB mated maiden heifers were pregnancy tested with preliminary results showing 98 of the 155 heifers in calf to either the AI straw or a bull mating a day later. (63% in calf). Unfortunately 5 free martins were detected (3%)

Growing Conditions

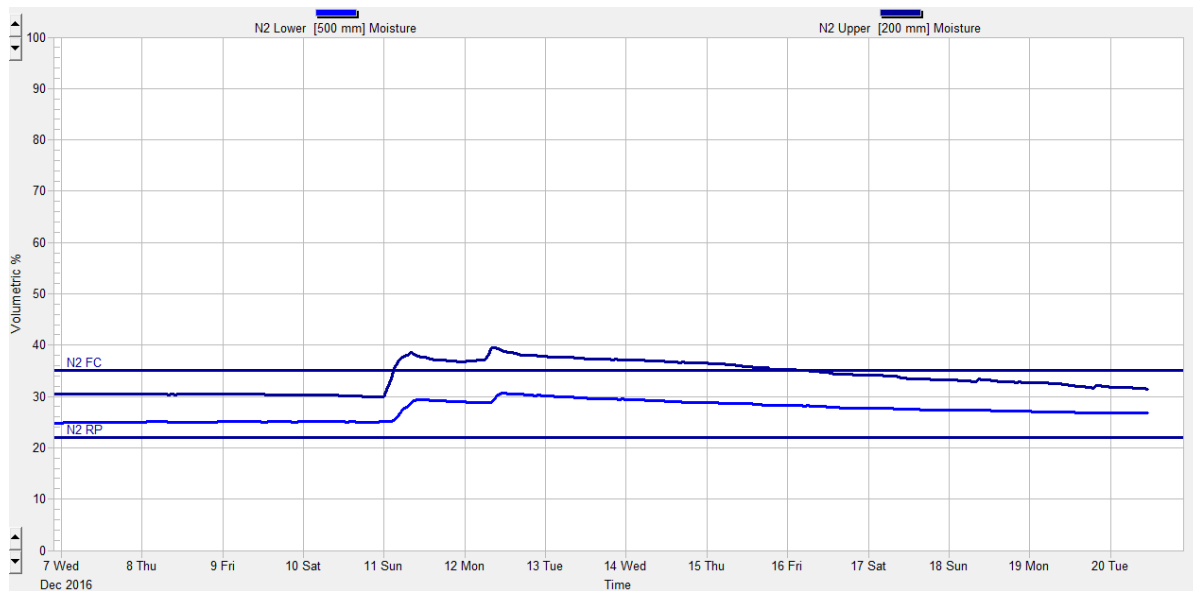
29. The average 9 am soil temperature for the past week was 15.7°C, 0.4°C above last week’s temperature (and 0.9°C higher than this same week last year).

Figure 1: Soil temperature history for the last 2 weeks



30. The farm received 1.6 mm of rain over the past week. Our average evapotranspiration (ET) rate increased this week to 35.1 mm for the week (5 mm/day).
31. We irrigated a total of 3 days for the North and 1 day for the South pivot. Soil moisture measures are shown below. We are applying nearly 6 mm/day through the pivots, with the aim to meet daily evaporation rates.

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

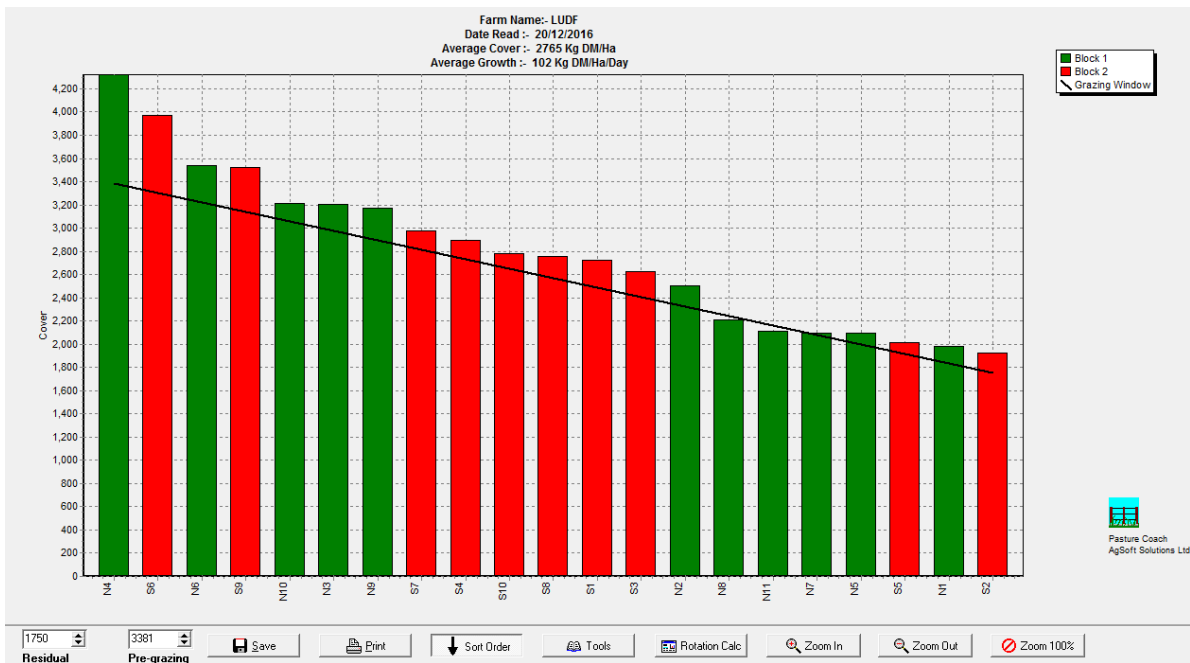


32. N Fertilizer: 36.4 ha have received nitrogen at a rate of 25 kgN/ha as urea, over the past week. Season to date, 114 kgN/ha has been applied on average across the 160 ha of the farm. At this stage we have enough N left to apply on the non-effluent portion of the farm for another 100 days (roughly end of March, which is our target).

Pasture and Feed Management

33. Paddock S5 has had it's first grazing (24 hrs) during this past week.
34. The plan was a 24 day grazing round for the past week; we achieved an average 22 day round over the week over the whole area of the farm (including S5 now back in the round). Silage was not required through the week.
35. The ongoing challenge of the rising plate meter appearing to overestimate both pregrazing covers and post grazing residuals continues. Earlier in the season this was in part due to the low DM% of the pasture, but more recently the stem and seedhead present in paddocks is holding up the plate meter and probably over estimating available feed in the paddock.
36. With the slightly longer round, seedhead has become more evident in pre-grazing covers in all paddocks. The previously pre-graze or post-graze mown areas coming back are of very good quality on observation, yet the stemminess of the grass remains evident.
37. Clovers appear to be less predominant than we'd expect this close to Christmas. Even in paddocks where clovers are present, they are not as upright as we might expect, possibly reflecting the recent dull, overcast weather.
38. This week there has been 38.34 ha pre-graze mown (around 75% of the weekly grazing round).
39. The focus remains on offering a high daily intake of high quality pasture, while achieving a low and consistent residual so that high quality pasture is available again at the next round.
40. Pasture quality from samples collected on 14th December showed an average of 16.1% DM, back to similar levels of 2 weeks ago (and higher than last week).
 - a. Energy content was a little lower at 11.6 (compared to 11.8 MJME/kgDM).
 - b. Protein levels have increased further – from 19.4% to 22.1%.
 - c. NDF - 44%.

Figure 3: This week's feed wedge



41. The demand line on the pasture wedge graph is calculated as follows:

- a. 548 cows on 160 ha: 3.4 cows/ha.
- b. Planned minimum round length for the coming week is 25 days over 160 ha or 6.4 ha/day
- c. The dry matter intake for the current level of milksolids production is around 18.5 kgDM/cow/day (slight drop on calculations this time last week when we were using 19kgDM/cow/day for calculations)
- d. Total demand: 18.5 kgDM/cow/day x 548 average cows for the week = 10,138 kgDM/day PLUS 19 bulls x 15kgDM/head/day = 285kgDM/day. Total demand cows & bulls = 10,423kgDM/day (65 kgDM/ha/day over the 160ha milking platform)
- e. Demand of 10,423 kgDM/day from 6.4 ha /day requires 1,629 kgDM/ha available.
- f. As the target residual has lifted from last week to 1750kgDM/ha, target pregraze covers are as follows: 1,750 kgDM/ha + 1,629 kgDM/ha = 3,378 kgDM/ha pregraze covers required.
- g. Target APC would therefore be (3379+1750)/2 = 2,564 kgDM/ha
- h. The Pasture Coach feed wedge above shows a surplus of 35 tonnes DM total. This is roughly 3 days worth of feed (demand: 10,423 kgDM/day).

42. Average pasture cover this week is calculated at 2,765 kgDM/ha, a decrease of 101 kgDM/ha over the week or potentially a growth rate of about 14 kg/day below total demand (65 kgDM/ha/day). Growth rates via Pasture Coach are estimated at 102 kgDM/ha/day for the past week, or 37kgDM/ha/day above demand.

43. The comments above support the ongoing observation that the pasture measured is not matching cow behaviour during grazing in the paddocks (which would suggest we are either growing at demand level or slightly below)

Feeding Management for the coming week:

44. The key objective for the coming week is to target a 25 day rotation - to achieve the farms target of feeding cows as much high quality pasture as they can effectively eat, every day - while holding cow condition, milk production and achieving low and consistent grazing residuals.
45. Silage will be fed if and as required, though this is not anticipated to be required. It would be adjusted on a daily basis to maintain low and consistent residuals and total intakes of around 18.5-19kgDM/cow/day grazing 1/25 of the farm per day.

46. Pre-graze mowing is targeted for 4-5 paddocks in the feed wedge due to seed head coming through or weed challenges in these particular paddocks.
47. Grazing decisions will continue to be influenced by cow behaviour and pasture growing conditions, taking particular note of area grazed per day.
48. The farm will continue to apply Nitrogen fertilizer following grazing, applying Urea at 25kgN/ha to the non-effluent areas of the farm.

LUDF Weekly report	22-Nov-16	29-Nov-16	6-Dec-16	13-Dec-16	20-Dec-16
Farm grazing ha (available to milkers)	152	152	152	152	160
Dry Cows on farm / East blk /Jackies/other	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
Culls (Includes culls put down & empties)	0	1	0	0	0
Culls total to date	17	18	18	18	18
Deaths (Includes cows put down)	0	0	0	1	2
Deaths total to date	10	10	10	11	13
Calved Cows available (Peak Number 560...)	553	552	552	551	549
Treatment / Sick mob total	6	1	2	2	1
Mastitis clinical treatment	0	2	1	1	1
Mastitis clinical YTD (tgt below 64 yr end)	42	44	45	46	47
Bulk milk SCC (tgt Avg below 150)	147	153	150	174	155
Lame new cases	3	1	1	12	6
Lame ytd	52	53	54	66	72
Lame days YTD (Tgt below 1000 yr end)	1216	1314	1426	1552	1692
Other/Colostrum	0	0	0	0	0
Milking twice a day into vat	533	537	534	531	528
Milking once a day into vat	14	14	16	18	20
Small herd	151	157	157	157	157
Main Herd	382	380	377	374	371
MS/cow/day (Actual kg / Cows into vat only)	2.19	2.13	2.09	1.99	2.00
Milk Protein/Fat ratio	0.79	0.82	0.78	0.81	0.81
Milk Fat %	4.96	4.81	4.99	4.90	4.95
Milk Protein %	3.91	3.96	3.91	3.94	4.02
MS/cow to date (total kgs / Peak Cows 560	202	216	231	245	258
MS/ha/day (total kgs / ha used	7.48	7.32	7.18	6.83	6.87
Herd Average Cond'n Score	4.40				4.30
Monitor group LW kg WOW 281 early calvers	471	473	477	479	483
Soil Temp Avg Aquaflex	14.1	14.6	14.6	15.3	15.7
Growth Rate (kgDM/ha/day)	102	91	105	92	102
Plate meter height - ave half-cms	15.1	15.4	15.9	16.9	16.2
Ave Pasture Cover (x140 + 500)	2612	2650	2728	2866	2765
Surplus/[deficit] on feed wedge- tonnes	21	28	36	45	35
Pre Grazing cover (ave for week)	3580	3334	3631	3494	3690
Post Grazing cover (ave for week)	1650	1600	1600	1750	1750
Highest pregrazing cover	3986	3426	4098	3597	3902
Area grazed / day (ave for week)	7.00	8.36	6.44	6.42	7.30
Grazing Interval	22	18	24	24	22
Milkers Offered/grazed kg DM pasture	18.8	17.2	16.2	18.8	20.0
Estimated intake pasture MJME	224	205	194	224	238
Milkers offered kg DM Grass silage		2	4		
Silage MJME/cow offered		11	11		
Estimated intake Silage MJME		20	49		
Estimated total intake MJME	224	225	243	224	238
Target total MJME Offered/eaten (includes 6% waste)					

Pasture ME (pre grazing sample)	11.8		12.0	11.8	
Pasture % Protein	18.8		19.4	22.1	
Pasture % DM - Concern below 16%	15.2		15.3	11.4	
Pasture % NDF Concern < 33	40.0		38.8	40.0	
Mowed pre or post grazing YTD	142.1	142.1	151.7	163.3	203.2
Total area mowed YTD	159.3	159.3	169.0	180.6	220.4
Supplements fed to date kg per cow (555peak)	10.8	23.6	54.3	55.2	55.2
Supplements Made Kg DM / ha cumulative	150.25	150.25	150.25	150.25	150.25
Units N applied/ha and % of farm	25units/ 37.5%	25units/ 37.5%	25units/ 17.5%	25units/ 22%	25units/ 22.7%
Kgs N to Date (whole farm)	84	95	100	107	114
Rainfall (mm)	14.4	3	3.2	37.2	1.6
Aquaflex topsoil relative to fill point target 60 - 80%	70-80	60-70	70-80	90-100	80-90

Next farm walk: **Tuesday 17th January 2017** at 9am. 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.

SIDDC thanks you for your interest and comments over the past year. Data and Farm walk notes will continue to be collected weekly but will not be available until 17th January.

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

To view the weekly updates from the DairyNZ grazing / mowing trial at the Lincoln University Research dairy farm:

<http://www.dairynz.co.nz/about-us/research/key-projects/pre-grazing-and-mowing-trial/?cldee=cm9uLnBlbGxvd0BzaWRkYy5vcmcubno%3d&recipientid=contact-548dfc0e4e29e2119d66005056ba000b-549bf4cfc165401b871710bc4f8eff8b&esid=be6dfe97-f3a5-e611-bd66-005056ba000b&urlid=0>

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Critical issues for the short term

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2. **Monitor average pasture cover and pasture quality to ensure enough good quality pasture is offered daily to ensure good production and reproductive results.**
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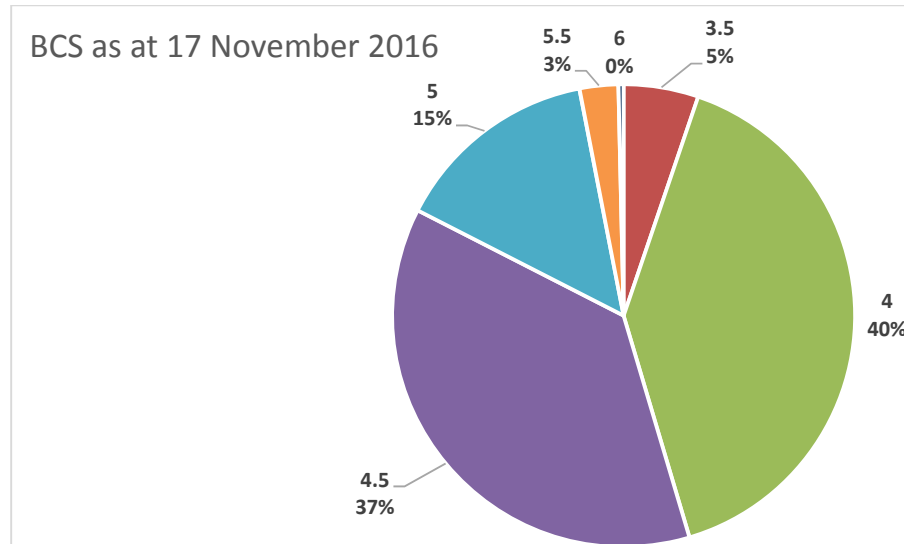
Key Numbers - week ending Tuesday 13th December 2016

Ave Pasture Cover	2,866kgDM/ha	Pasture Growth Rate (as per Pasture Coach)	92 kgDM/ha/day
Round length	23.7 days (152 ha)	Ave Supplement used	NEGLIBLE
No Cows on farm	551	Ave Soil Temp (week)	15.3°C
Kg MS/cow (549 cows)	1.99	SCC	174,000
Milk Protein : Fat ratio	0.81	Protein: 3.94%	Fat: 4.90%

Herd Management

5. A total of 551 calved cows are on farm as of today. There are 2 milking herds on farm, a small herd of 157 first calvers and low BCS cows and a large herd with 374 mixed age cows. Slight preferential grazing continues for the small herd as per usual management for LUDF.
6. There are 549 cows going into the vat, with 531 cows on twice a day milking, 18 once a day.
7. There has been 1 new case of mastitis over the past week (46 clinical cases season to date vs 79 cases at the same time last season).
8. There have been 12 new lame cows over the last week due to the recent wet weather with most cows showing evidence of soft feet and stone bruising. This recent spike in lame cow numbers brings us to 66 cases season to date (slightly ahead of the same time last year when we'd recorded 61 lame cows season to date).
9. Trace minerals and magnesium chloride are running through the stock water to all cows on the milking platform.
10. The respiratory problem that presented in our first calvers appears to be gradually continuing to improve with time in terms of the number of animals affected but has still not yet entirely disappeared from this group of animals. Breathing rate at rest by some of the first calving heifers still remains elevated compared to unaffected cows. A final diagnosis is still being determined with the assistance of the farms veterinarian.
11. Average herd liveweight has slightly increased this week. The monitor group (281 early calving MA cows) this week averages 479 kg liveweight/cow (2 kg higher than last week).
12. 152 heifer replacement calves have been tagged, and all calves are now outside on East Block. 18 light heifer calves remain on calf meal. All calves are being offered good quality pasture
13. The herd was BCS on the 17th November. The average BCS of the whole herd was 4.4 (down 0.1 from late October). Approximately 40% of cows are now at BC 4.0, with 37% at 4.5 and 18% at 5 or above. In late

October, the average was 4.5, and in mid-July, an average of 5.3. The whole herd will be body conditioned scored again before Christmas.



Mating progress

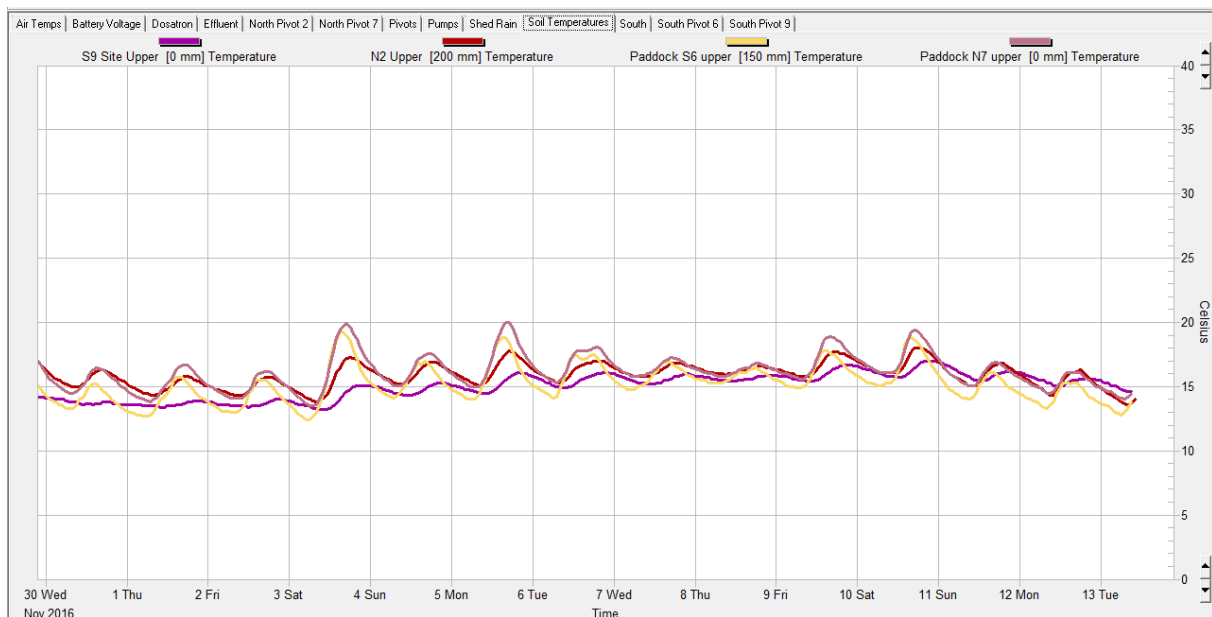
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15. Mating started on 25 October (7 weeks ago) with 457 cows mated by day 21. This gave an average of 21.7 cows per day or 82% in the first three weeks, compared to the target of 90%.
16. Our vet palpated all 97 cows that had not been mated in the first 21 days of mating. 15 of these had cysts and received a prostaglandin (PG) treatment.
17. A total of 503 cows (91%) had been submitted up to the end of the fifth week of mating, but more returns were seen than desired during weeks 4-6, with initial Non-Return-Rates in the low 50's.
18. In response to the high number of returning cows in weeks 4-6, a decision was made to put bulls out 5 days earlier than initially planned (Wednesday 30th November - 13 days ago).
19. "Bull power" (ratio of bulls to cows not in calf) was increased by purchasing an additional 6 BVD vaccinated bulls to better manage the potential number of cows coming back on heat, and all bulls were initially put out, rather than splitting the team and rotating them as has occurred in the past. A total of 21 bulls remain running across both herds this week. Once returning numbers of cows slow, the bulls will be split and rotated.
20. The initial breeding bulls were purchased almost 3 months ago and were blood tested for BVD. They were vaccinated with a 7 in 1 vaccine, a BVD booster, selenium and copper injections and a pour on drench, all in preparedness for mating.
21. Bulls will remain with the herd they were initially placed with to lessen the potential risk of the respiratory disease passing across the herd – via the bulls.
22. Some of the low Non Return Rate is suspected to be related to the presence of respiratory disease noted particularly in the first calving cows during AB mating. Non-return rates were at their lowest in this group.
23. The farm had previously determined it would begin scanning on a weekly basis, at the beginning of week 6. All cows mated in week one and not subsequently remated can be scanned at this point as they are 35 days or more since mating. This is then repeated weekly for cows mated in week 2 and so forth. The initial two weeks of data suggests the farm is heading for a 6 week InCalf rate of between 60-70%, compared to the target of 78%. Conversely to the Non-return-rate comment above, incalf rates for the first two weeks mating are similar across all ages.
24. AB mating started for R2 2015 born heifers on 11th October 2016. Heifers were AB mated daily on observed standing heats for 6 days. All heifers that had not shown heats within this period (by Sunday

- 16th October 2016) received a single PG injection and continued to be mated to standing heats. A total of 154 heifers were AI mated and the bulls (Jersey) went gone out with them on 20th October 2016. Bulls will remain out until today 12th December 2016 – giving us a total of 9 weeks mating for the heifers.
25. Our AB mated maiden heifers were pregnancy tested with preliminary results showing 98 of the 155 heifers in calf to either the AI straw or a bull mating a day later. (63% in calf). Unfortunately 5 free martins were detected (3%)

Growing Conditions

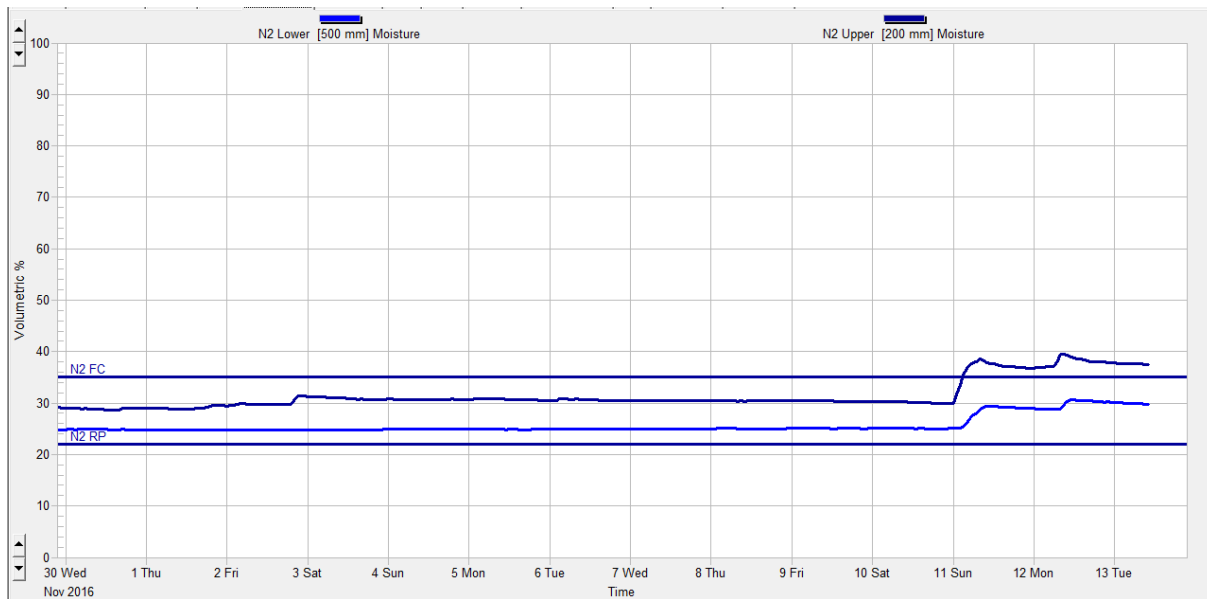
26. The average 9 am soil temperature for the past week was 15.3°C, 0.7°C above last week's temperature (and 0.4°C higher than this same week last year).

Figure 1: Soil temperature history for the last 2 weeks



27. The farm received 37.2 mm of rain over the past week. Our average evapotranspiration (ET) rate increased this week to 30.6 mm for the week (4.4 mm/day).
28. We irrigated a total of 1 day for the North and 1 day for the South pivot. Soil moisture measures are shown below. We were applying nearly 6 mm/day through the pivots, with the aim to meet daily evaporation rates.

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



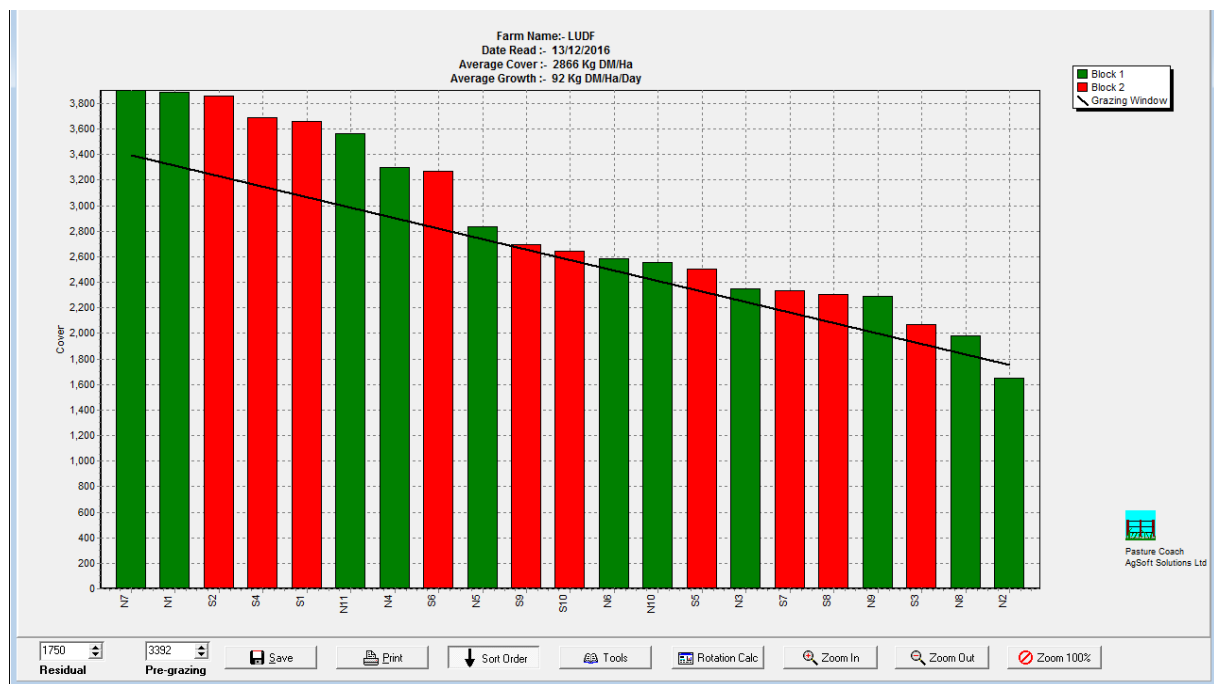
29. N Fertilizer: 35.2 ha have received nitrogen at a rate of 25 kgN/ha as urea, over the past week. Season to date, 107 kgN/ha has been applied on average across the 160 ha of the farm.

Pasture and Feed Management

30. Paddock S5 was sprayed out for regrassing on Tuesday 3rd October. The paddock has been cultivated and resown on Wednesday 2nd November. It was planted in a hybrid / diploid mix of Shogun and Trojan with Kotare and Weka clover, and Tonic Plantain. Whilst there is no Forage Value Index for 'Hybrid' Cultivars, we considered the traits of significance for the paddock / farm and the available data in the FVI for 'Perennials' and '12 Month' forage types.
31. While paddock S5 appears now ready for grazing, due to a high weed burden (primarily docks), the paddock has been sprayed on 9th December with 2.5L/ha of Dictate and 3L/ha of Thistrol. With a one week grazing withholding period, we will aim to graze this area for the first time next week.
32. The plan was a 24 day grazing round for the past week; we achieved an average 23.7 day round over the week. Silage was only required by cows in one paddock, when 1.9kgDM of high quality pasture silage was offered per cow on one occasion.
33. The ongoing challenge of the rising plate meter appearing to overestimate both pregrazing covers and post grazing residuals continues. Earlier in the season this was in part due to the low DM% of the pasture, but more recently the stem and seedhead present in paddocks is holding up the plate meter and probably over estimating available feed in the paddock.
34. With the slightly longer round, seedhead has become more evident in pre-grazing covers in all paddocks. The previously pre-graze or post-graze mown areas coming back are of very good quality on observation, yet the stemminess of the grass remains evident.
35. Clovers appear to be less predominant than we'd expect this close to Christmas. Even in paddocks where clovers are present, they are not as upright as we might expect, possibly reflecting the recent dull, overcast weather. The reduced contribution of clover to the diet may be contributing to the ongoing drop in milksolids production off peak.
36. This week there has been 11.6 ha pre-graze mown (around 24% of the weekly grazing round).
37. The focus remains on offering a high daily intake of high quality pasture, while achieving a low and consistent residual so that high quality pasture is available again at the next round.
38. Pasture quality from samples collected on 7th December showed an average of 11.4% DM, much lower than the 15.3% average a week earlier.

- a. Energy content was a little lower at 11.8 (compared to 12MJME/kgDM).
- b. Protein levels have increased further – from 19.4% to 22.1%.
- c. NDF was 40%.

Figure 3: This week's feed wedge



39. The demand line on the pasture wedge graph is calculated as follows:

- a. 551 cows on 160 ha (changed from last week, this week's wedge now includes recently regressed paddock S5 back into the grazing round).
 - b. Planned minimum round length for the coming week is 25 days over 160 ha or 6.4 ha/day
 - c. The dry matter intake for the current level of milksolids production is around 18.5 kgDM/cow/day (slight drop on calculations this time last week when we were using 19kgDM/cow/day for calculations)
 - d. Total demand: 18.5 kgDM/cow/day x 551 average cows for the week = 10,194 kgDM/day PLUS 21 bulls x 15kgDM/head/day = 315kgDM/day. Total demand cows & bulls = 10,509kgDM/day (65.7 kgDM/ha/day over the 160ha milking platform)
 - e. Demand of 10,509 kgDM/day from 6.4 ha /day requires 1,642 kgDM/ha available.
 - f. As the target residual has lifted from last week to 1750kgDM/ha, target pregraze covers are as follows: 1,750 kgDM/ha + 1,642 kgDM/ha = 3,392 kgDM/ha pregraze covers required.
 - g. Target APC would therefore be $(3392+1750)/2 = 2,571$ kgDM/ha
 - h. The Pasture Coach feed wedge above shows a surplus of 45,125 tonnes DM total. This is roughly 4.5 days worth of feed (demand: 10,509kgDM/day).
40. Average pasture cover this week is calculated at 2,866 kgDM/ha, an increase of 138 kgDM/ha over the week or potentially a growth rate of about 19.7 kg/day above total demand (86 kgDM/ha/day).
41. Growth rates via Pasture Coach are estimated at 92 kgDM/ha/day for the past week, or 26kgDM/ha/day above demand. If growth was this high, APC would have increased by approximately 182 kgDM/ha for the week, not 139kgDM/ha.
42. On top of this, paddock S5 has been re-entered into the grazing round this week, effectively decreasing demand per hectare by approximately 3.5 kgDM/ha/day.

Feeding Management for the coming week:

43. The key objective for the coming week is to target a 25 day rotation - to achieve the farms target of feeding cows as much high quality pasture as they can effectively eat, every day - while holding cow condition, milk production and achieving low and consistent grazing residuals.
44. Silage will be fed if and as required, though this is not anticipated to be required. It would be adjusted on a daily basis to maintain low and consistent residuals and total intakes of around 18.5-19kgDM/cow/day grazing 1/25 of the farm per day.
45. Pre-graze mowing may be used if required on individual paddocks.
46. Grazing decisions and silage allocation will continue to be influenced by cow behaviour and pasture growing conditions, taking particular note of area grazed per day.
47. The farm will continue to apply Nitrogen fertilizer following grazing, applying Urea at 25kgN/ha to the non-effluent areas of the farm.

LUDF Weekly report	15-Nov-16	22-Nov-16	29-Nov-16	6-Dec-16	13-Dec-16
Farm grazing ha (available to milkers)	152	152	152	152	152
Dry Cows on farm / East blk /Jackies/other	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
Culls (Includes culls put down & empties)	0	0	1	0	0
Culls total to date	17	17	18	18	18
Deaths (Includes cows put down)	1	0	0	0	1
Deaths total to date	10	10	10	10	11
Calved Cows available (Peak Number 560...)	553	553	552	552	551
Treatment / Sick mob total	7	6	1	2	2
Mastitis clinical treatment	3	0	2	1	1
Mastitis clinical YTD (tgt below 64 yr end)	42	42	44	45	46
Bulk milk SCC (tgt Avg below 150)	168	147	153	150	174
Lame new cases	4	3	1	1	12
Lame ytd	49	52	53	54	66
Lame days YTD (Tgt below 1000 yr end)	1118	1216	1314	1426	1552
Other/Colostrum	0	0	0	0	0
Milking twice a day into vat	534	533	537	534	531
Milking once a day into vat	12	14	14	16	18
Small herd	154	151	157	157	157
Main Herd	392	382	380	377	374
MS/cow/day (Actual kg / Cows into vat only)	2.18	2.19	2.13	2.09	1.99
Milk Protein/Fat ratio	0.77	0.79	0.82	0.78	0.81
Milk Fat %	4.91	4.96	4.81	4.99	4.90
Milk Protein %	3.87	3.91	3.96	3.91	3.94
MS/cow to date (total kgs / Peak Cows 560	185	202	216	231	245
MS/ha/day (total kgs / ha used	7.45	7.48	7.32	7.18	6.83
Herd Average Cond'n Score		4.40			
Monitor group LW kg WOW 281 early calvers	475	471	473	477	479
Soil Temp Avg Aquaflex	13.5	14.1	14.6	14.6	15.3
Growth Rate (kgDM/ha/day)	95	102	91	105	92
Plate meter height - ave half-cms	14.9	15.1	15.4	15.9	16.9
Ave Pasture Cover (x140 + 500)	2584	2612	2650	2728	2866
Surplus/[deficit] on feed wedge- tonnes	26.4	21	28	36	45
Pre Grazing cover (ave for week)	3520	3580	3334	3631	3494
Post Grazing cover (ave for week)	1650	1650	1600	1600	1750
Highest pregrazing cover	3650	3986	3426	4098	3597
Area grazed / day (ave for week)	7.60	7.00	8.36	6.44	6.42
Grazing Interval	20	22	18	24	24
Milkers Offered/grazed kg DM pasture	18.7	18.8	17.2	16.2	18.8

Estimated intake pasture MJME	223	224	205	194	224
Milkers offered kg DM Grass silage	0	0	2	4	0
Silage MJME/cow offered	0	0	11	11	0
Estimated intake Silage MJME	0	0	20	49	0
Estimated total intake MJME	223	224	225	243	224
Target total MJME Offered/eaten (includes 6% waste)					0
Pasture ME (pre grazing sample)	11.8	11.8		12.0	0.0
Pasture % Protein	21.9	18.8		19.4	0.0
Pasture % DM - Concern below 16%	13.2	15.2		15.3	0.0
Pasture % NDF Concern < 33	37.1	40.0		38.8	0.0
Mowed pre or post grazing YTD	121.9	142.1	142.1	151.7	163.3
Total area mowed YTD	137.3	159.3	159.3	169.0	180.6
Supplements fed to date kg per cow (555peak)	10.8	10.8	23.6	54.3	55.2
Supplements Made Kg DM / ha cumulative	138	150.25	150.25	150.25	150.25
Units N applied/ha and % of farm	25units/ 17.8%	25units/ 37.5%	25units/ 37.5%	25units/ 17.5%	25units/22%
Kgs N to Date (whole farm)	73	84	95	100	107
Rainfall (mm)	6.4	14.4	3	3.2	37.2
Aquaflex topsoil relative to fill point target 60 - 80%	70-80	70-80	60-70	70-80	90-100

Next farm walk: Tuesday 20th December 2016 at 9am. 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.

To view the weekly updates from the DairyNZ grazing / mowing trial at the Lincoln University Research dairy farm:

http://www.dairynz.co.nz/about-us/research/key-projects/pre-grazing-and-mowing-trial/?_cldee=cm9uLnBlbGxvd0BzaWRkYy5vcmcubno%3d&recipientid=contact-548dfc0e4e29e2119d66005056ba000b-549bf4cfc165401b871710bc4f8eff8b&esid=be6dfe97-f3a5-e611-bd66-005056ba000b&urlid=0

Lincoln University Dairy Farm - Farm Walk notes

Tuesday 6th December 2016

LUDF – focus for 2016/17 Season: Nil-Infrastructure, low input, low N-loss, maximise profit.
Farm system comprises 3.5 cows/ha (peak milked), Target up to 170kgN/ha, 300kgDM/cow imported supplement, plus winter most cows off farm. FWE of less than \$1 million and Target production of over 500kgMS/cow (>100% liveweight in milk production).

Critical issues for the short term

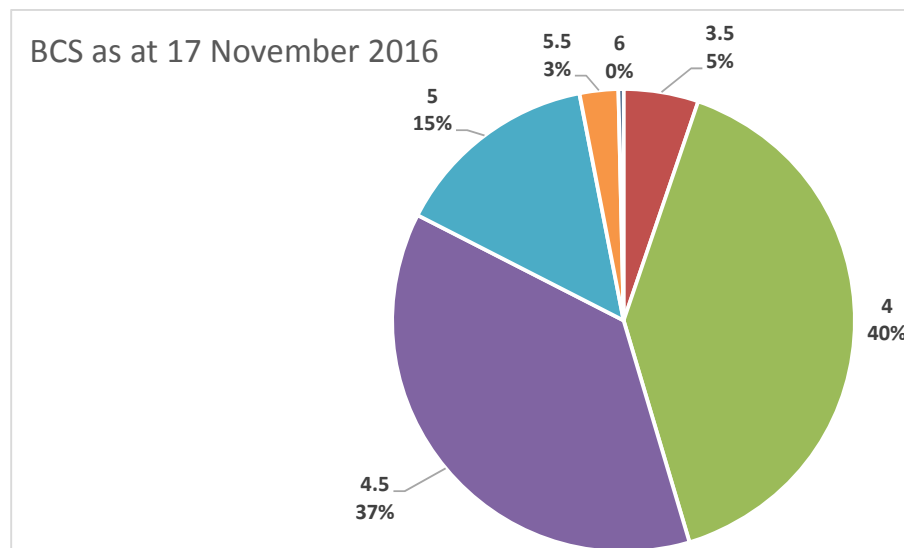
1. **Hold the rotation length to 24 days to enable higher pasture growth**
2. **Monitor average pasture cover and pasture quality to ensure enough good quality pasture is offered daily to ensure good production and reproductive results.**
3. **Monitor cow BCS changes through lactation.**
4. **Continue to monitor mating performance**

Key Numbers - week ending Tuesday 6th December 2016

Ave Pasture Cover	2,728 kgDM/ha	Pasture Growth Rate (as per Pasture Coach)	105 kgDM/ha/day
Round length	23.6 days (152 ha)	Ave Supplement used	4.41 kgDM/cow/day
No Cows on farm	552	Ave Soil Temp (week)	14.6°C
Kg MS/cow (549 cows)	2.09	SCC	150,000
Milk Protein : Fat ratio	0.78	Protein: 3.91%	Fat: 4.99%

Herd Management

5. A total of 552 calved cows are on farm as of today. There are 2 milking herds on farm, a small herd of 157 first calvers and low BCS cows and a large herd with 377 mixed age cows. Slight preferential grazing continues for the small herd as per usual management for LUDF.
6. There are 550 cows going into the vat, with 534 cows on twice a day milking, 16 once a day.
7. There has been 1 new case of mastitis over the past week (45 clinical cases to date vs 75 cases at the same time last season). There has been 1 new lame cow over the last week, leaving us at 54 cases, season to date (same as this time last season).
8. Trace minerals and magnesium chloride are running through the stock water to all cows on the milking platform.
9. The respiratory problem presented in our first calvers seems to have decreased in terms of the number of animals affected but has not entirely disappeared from this group of animals. Some of the first calving heifers still show symptoms of breathing distress and coughing. A final diagnosis is still being determined.
10. Average herd liveweight has increased a bit this week. The monitor group (281 early calving MA cows) this week averages 477 kg/cow (4 kg higher than last week).
11. 152 heifer replacement calves have been tagged, and all calves are now outside on East Block. 20 light heifer calves remain on calf milk replacer to-date. All calves are offered good quality pasture plus calf meal.
12. The herd was BCS on the 17th November. The average BCS of the whole herd was 4.4 (down 0.1 from late October). Given the overcast, dull drizzly conditions and the slight drop in pasture quality through October, this was not unexpected. Approximately 40% of cows are now at BC 4.0, with 37% at 4.5 and 18% at 5 or above. In late October, the average was 4.5, and in mid July, an average of 5.3.



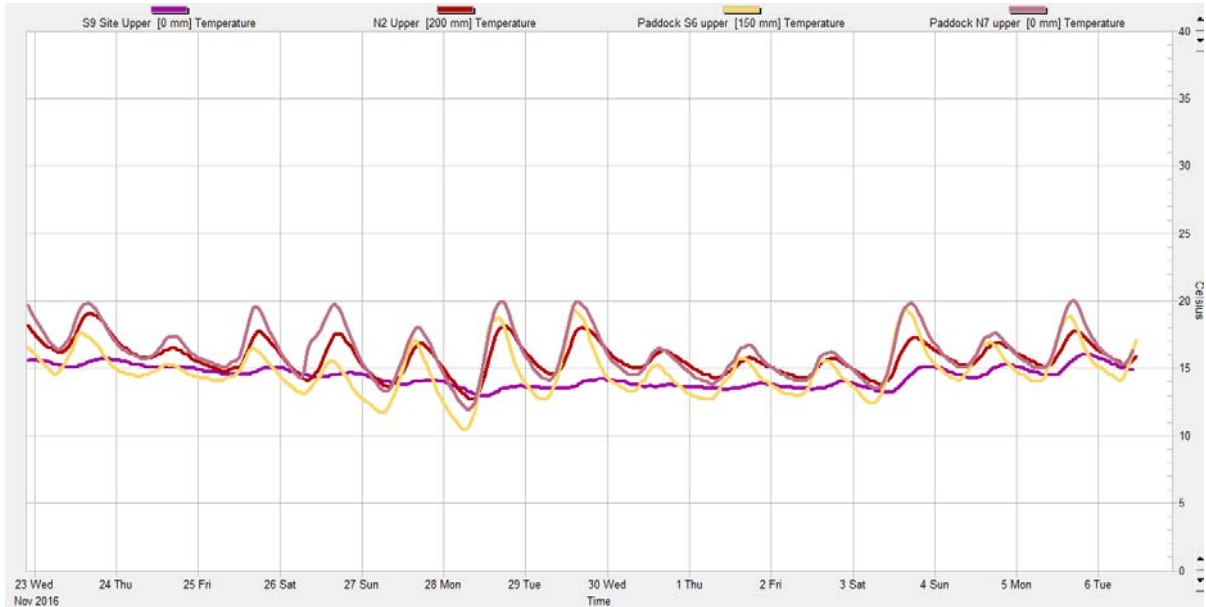
Mating progress

13. All cows were Metrichchecked 5 weeks post calving.
14. Mating started on 25 October (5 weeks ago) with 457 cows mated by day 21. This gave an average of 21.7 cows per day or 82% in the first three weeks, compared to the target of 90%.
15. A total of 503 cows (91%) have been submitted to date since start of mating (5 weeks).
16. Non-return rates at present are around 59%. Given this very low non-return rate, the decision was made to put the bulls out on Wednesday 30th November. Bull power was increased to cope with the higher-than expected number of cows potentially coming back in heat. A total of 19 bulls are running with the whole herd. All bulls were initialled put out while the highest number of cows are potentially cycling; the bulls will be split and rotated (rested) after a week.
17. Some of the low (and unacceptable) Non Return Rate is likely to be related to the respiratory disease noted particularly in the first calving cows. Non-return rates were at their lowest in this group.
18. Our vet palpated all 97 cows that had not been mated in the first 21 days of mating. 15 of these had cysts and have now had a PG. 50 of these cows have subsequently shown a heat and been mated, leaving 47 (8%) having not cycled.
19. 16 predominantly later calving cows that were not part of the Ketosis trial and cycled in the last week prior to mating received PG on Sunday 30th October and were then mated.
20. Breeding bulls were initially purchased over two months ago and were blood tested for BVD. They have also been vaccinated with a 7 in 1 vaccine, a BVD booster, selenium and copper injections and a pour on drench, all in preparedness for mating.
21. A further 6 BVD vaccinated bulls were purchased last week to increase the bull-power in the herd.
22. Bulls will remain with the herd they were initially placed with to lessen the potential risk of the respiratory disease passing across the herd – via the bulls.
23. AB mating started for R2 2015 born heifers on 11th October 2016. Heifers were AB mated daily on observed standing heats for 6 days. All heifers that had not shown heats within this period (by Sunday 16th October 2016) received a single prostaglandin injection and continued to be mated to standing heats. A total of 154 heifers have been AI mated and the bulls (Jersey) have gone out with them on 20th October 2016. Bulls will remain out until 12th December 2016 to give us a total of 9 weeks mating for the heifers.
24. These Heifers were pregnancy tested with preliminary results showing 98 of the 155 heifers in calf to either the AI straw or a bull mating a day later. (63% in calf). Unfortunately 5 free martins were detected (3%)

Growing Conditions

25. The average 9 am soil temperature for the past week was 14.6°C, 0.6°C above last week's temperature (and 0.7°C higher than this same week last year).

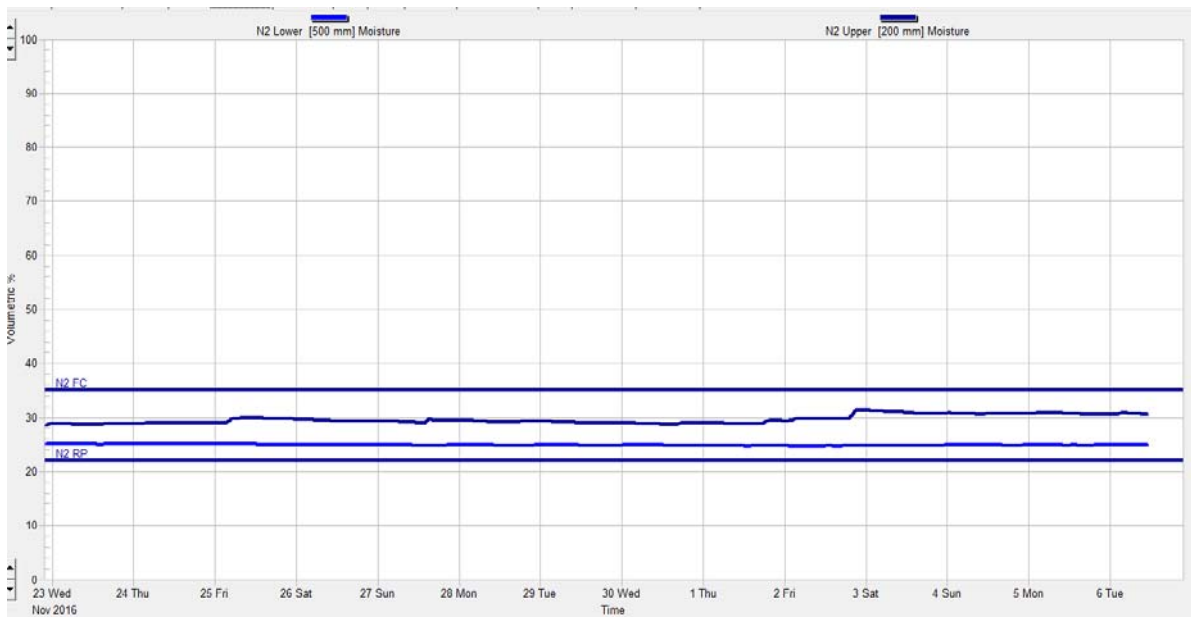
Figure 1: Soil temperature history for the last 2 weeks



26. The farm received 3.2 mm of rain over the past week. Our average evapotranspiration (ET) rate increased this week to 28.3 mm for the week (4 mm/day).

27. We irrigated a total of 7 days North and 4 days South pivots. Soil moisture measures are shown below. We are applying nearly 6 mm/day through the pivots, hence irrigation is slightly more than daily average ET and soil moisture is gaining a little.

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

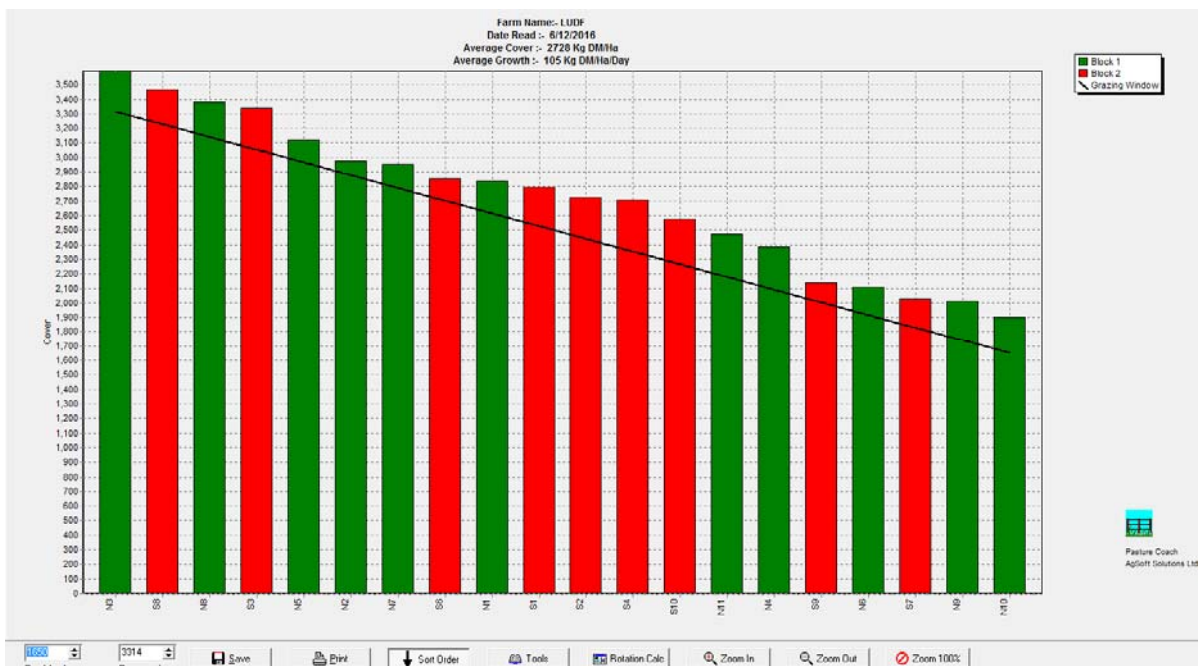


28. N Fertilizer: 28 ha have received nitrogen at a rate of 25 kgN/ha as urea, over the past week.

Pasture and Feed Management

29. Paddock S5 was sprayed out for regrassing on Tuesday 3rd October. The paddock has been cultivated and resown on Wednesday the 2nd November. It has been planted in a hybrid / diploid mix of Shogun and Trojan with Kotare and Weka clover, and Tonic Plantain. Whilst there is no Forage Value Index for 'Hybrid' Cultivars, we considered the traits of significance for the paddock / farm and the available data in the FVI for 'Perennials' and '12 Month' forage types.
30. It looks like it will be ready for its first quick grazing in another 2 weeks
31. The plan was a 24 day grazing round for the past week; we achieved an average 23.6 day round over the week, by feeding on average 4.4 kgDM/cow/day of high quality silage.
32. The last 2 months have been challenging in terms of pasture management, with the rising plate meter appearing to overestimate both pregrazing covers and post grazing residuals so that available feed and growth rates don't make sense.
33. With the slightly longer round, seedhead has become more evident in pre-grazing covers in all paddocks. The previously pre-graze or post-graze mown areas coming back are of very good quality on observation, yet the stemminess of the grass remains evident.
34. This week there has been 6.9 ha pre-graze mown (small areas that had a weed challenge or had not been done before) and 2.75 ha tidied up as mowed behind the cows
35. We are continuing to monitor pasture quality and pasture covers closely as ryegrass reproductive development is well and truly here.
36. The focus remains on offering a high daily intake of high quality pasture, while achieving a low and consistent residual so that high quality pasture is available again at the next round.
37. Pasture quality from samples collected on 29th November showed an average of 15.3% DM (same as previous week and 1.5% below this time last year).
 - a. Energy content was 12MJME/kgDM (up 0.2 MJME/kgDM from previous weeks and, on par with this same time last season).
 - b. Protein levels have increased to 19.8% (lower than this same time last season: 24%).
 - c. NDF levels are now down to 38.8% (35% NDF this same time last season).

Figure 3: This week's feed wedge



38. The demand line on the pasture wedge graph is calculated as follows:
 - a. 552 cows on 152 ha as paddock S5 is still out of the round for regrassing.

- b. Planned minimum round length for the coming week is 24 days over 152 ha or 6.3 ha/day
 - c. The dry matter intake for the current level of milksolids production is around 19 kgDM/cow/day
 - d. Total demand: 19 kgDM/cow/day x 552 average cows for the week = 10,488 kgDM/day (69kgDM/ha/day over the 152ha milking platform)
 - e. Demand of 10,488 kgDM/day from 6.3 ha /day requires 1,664 kgDM/ha available.
 - f. As the target residual is 1650kgDM/ha, target pregraze covers are as follows: 1,650 kgDM/ha + 1,664 kgDM/ha = 3,314 kgDM/ha pregraze covers required.
 - g. Target APC would therefore be $(3314+1650)/2 = 2482$ kgDM/ha
 - h. The feed wedge above shows a surplus of 36 tonnes DM total. This is roughly 3 days' worth of feed (demand: 10,488kgDM/day).
39. Average pasture cover this week is 2,728 kgDM/ha, an increase of 78 kgDM/ha over the week or potentially a growth rate of about 8 kg/day above total demand.
40. Growth rates via Pasture Coach are estimated at 105 kgDM/ha/day for the past week, though are probably closer to 70 kgDM/ha given demand was partially met by silage over the week.
41. If growth was close to or over 100kgDM/ha/day, and demand of approximately 70, APC would have increased by approximately 30 kgDM/ha/day or 210 kgDM/ha for the week, before accounting for the silage fed. Clearly this has not occurred, reinforcing the view the plate meter must be overestimating pasture covers (and therefore Pasture Coach is overestimated growth rates).

Feeding Management for the coming week:

- 42. The key objective for the coming week is to remain at a 23-24 day rotation - to achieve the farms target of feeding cows as much high quality pasture as they can effectively eat, every day - while holding cow condition, milk production and achieving low and consistent grazing residuals.
- 43. Silage will be fed as required, adjusted on a daily basis to maintain low and consistent residuals and total intakes of around 19-20kgDM grazing 1/24 of the farm per day.
- 44. Pre-graze mowing may be used if required on individual paddocks.
- 45. Grazing decisions and silage allocation will continue to be influenced by cow behaviour and pasture growing conditions, taking particular note of area grazed per day.
- 46. Continue to apply fertilizer following grazing. Application rates will be as follows:
 - a. Apply Urea at 25kgN/ha (except in the effluent area) to paddocks already grazed

LUDF Weekly report	8-Nov-16	15-Nov-16	22-Nov-16	29-Nov-16	6-Dec-16
Farm grazing ha (available to milkers)	152	152	152	152	152
Dry Cows on farm / East blk /Jackies/other	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0
Culls (Includes culls put down & empties)	0	0	0	1	0
Culls total to date	17	17	17	18	18
Deaths (Includes cows put down)	0	1	0	0	0
Deaths total to date	9	10	10	10	10
Calved Cows available (Peak Number 560...)	554	553	553	552	552
Treatment / Sick mob total	5	7	6	1	2
Mastitis clinical treatment	4	3	0	2	1
Mastitis clinical YTD (tgt below 64 yr end)	39	42	42	44	45
Bulk milk SCC (tgt Avg below 150)	157	168	147	153	150
Lame new cases	4	4	3	1	1
Lame ytd	44	49	52	53	54
Lame days YTD (Tgt below 1000 yr end)	1034	1118	1216	1314	1426
Other/Colostrum	0	0	0	0	0
Milking twice a day into vat	537	534	533	537	534
Milking once a day into vat	12	12	14	14	16
Small herd	157	154	151	157	157
Main Herd	380	392	382	380	377

MS/cow/day (Actual kg / Cows into vat only)	2.20	2.18	2.19	2.13	2.09
Milk Protein/Fat ratio	0.76	0.77	0.79	0.82	0.78
Milk Fat %	5.05	4.91	4.96	4.81	4.99
Milk Protein %	3.82	3.87	3.91	3.96	3.91
MS/cow to date (total kgs / Peak Cows 560	170	185	202	216	231
MS/ha/day (total kgs / ha used	7.52	7.45	7.48	7.32	7.18
Herd Average Cond'n Score			4.40		
Monitor group LW kg WOW 281 early calvers	476	475	471	473	477
Soil Temp Avg Aquaflex	13.3	13.5	14.1	14.6	14.6
Growth Rate (kgDM/ha/day)	106	95	102	91	105
Plate meter height - ave half-cms	15.1	14.9	15.1	15.4	15.9
Ave Pasture Cover (x140 + 500)	2620	2584	2612	2650	2728
Surplus/[deficit] on feed wedge- tonnes	33 t	26.4	21	28	36
Pre Grazing cover (ave for week)	3505	3520	3580	3334	3631
Post Grazing cover (ave for week)	1650	1650	1650	1600	1600
Highest pregrazing cover	3626	3650	3986	3426	4098
Area grazed / day (ave for week)	6.97	7.60	7.00	8.36	6.44
Grazing Interval	22	20	22	18	24
Milkers Offered/grazed kg DM pasture	21.4	18.7	18.8	17.2	16.2
Estimated intake pasture MJME	253	223	224	205	194
Milkers offered kg DM Grass silage		0	0	2	4
Silage MJME/cow offered		0	0	11	11
Estimated intake Silage MJME		0	0	20	49
Estimated total intake MJME	253	223	224	225	243
Target total MJME Offered/eaten (includes 6% waste)					
Pasture ME (pre grazing sample)	11.8	11.8	11.8		12.0
Pasture % Protein	22.2	21.9	18.8		19.4
Pasture % DM - Concern below 16%	13.2	13.2	15.2		15.3
Pasture % NDF Concern < 33	39.9	37.1	40.0		38.8
Mowed pre or post grazing YTD	103.4	121.9	142.1	142.1	151.7
Total area mowed YTD	118.8	137.3	159.3	159.3	169.0
Supplements fed to date kg per cow (555peak)	10.8	10.8	10.8	23.6	54.3
Supplements Made Kg DM / ha cumulative	138	138	150.25	150.25	150.25
Units N applied/ha and % of farm	25units/ 17.8%	25units/ 17.8%	25units/ 37.5%	25units/ 37.5%	25units/ 17.5%
Kgs N to Date (whole farm)	67	73	84	95	100
Rainfall (mm)	5.8	6.4	14.4	3	3.2
Aquaflex topsoil relative to fill point target 60 - 80%	70-80	70-80	70-80	60-70	70-80

Next farm walk: Tuesday 29th November 2016 at 9am. 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.

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