Advanced Interherd Course

Advanced Interherd Training Course

The aim of this course it to work through health event analysis and interpretation for **your** farm. The following are a set of notes to accompany the course and provide you with a resource to refer back to.

Mastitis

Examining mastitis events in Interherd can be frustrating, in order to tease out potential trends events (both clinical and subclinical) data should be examined in a variety of methods. These include:

- By month.
- By days in milk.

Seasonal trends in clinical mastitis

Mastitis if often influenced seasonally (e.g. by housing or grazing). Useful information can be obtained by examining mastitis by month.
To examine mastitis by month go to:

Lists and reports > Performance analysis and reports > Health and fertility event incidence > Analysis of event incidence.

Then complete the form as per Figure 1.

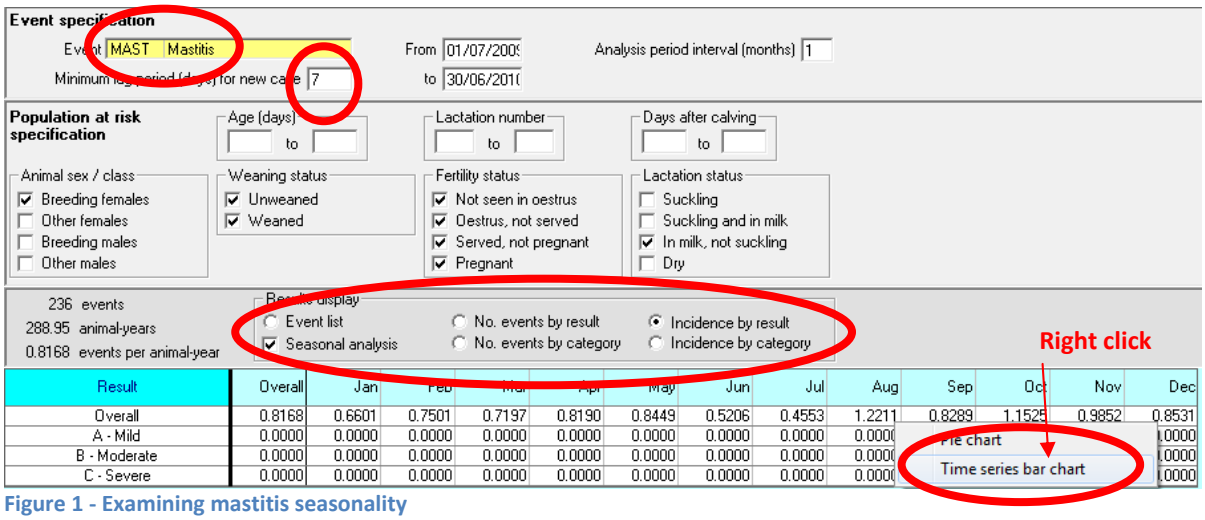


Figure 1 - Examining mastitis seasonality

From the table above you should be able to generate a graph as per Figure 2.

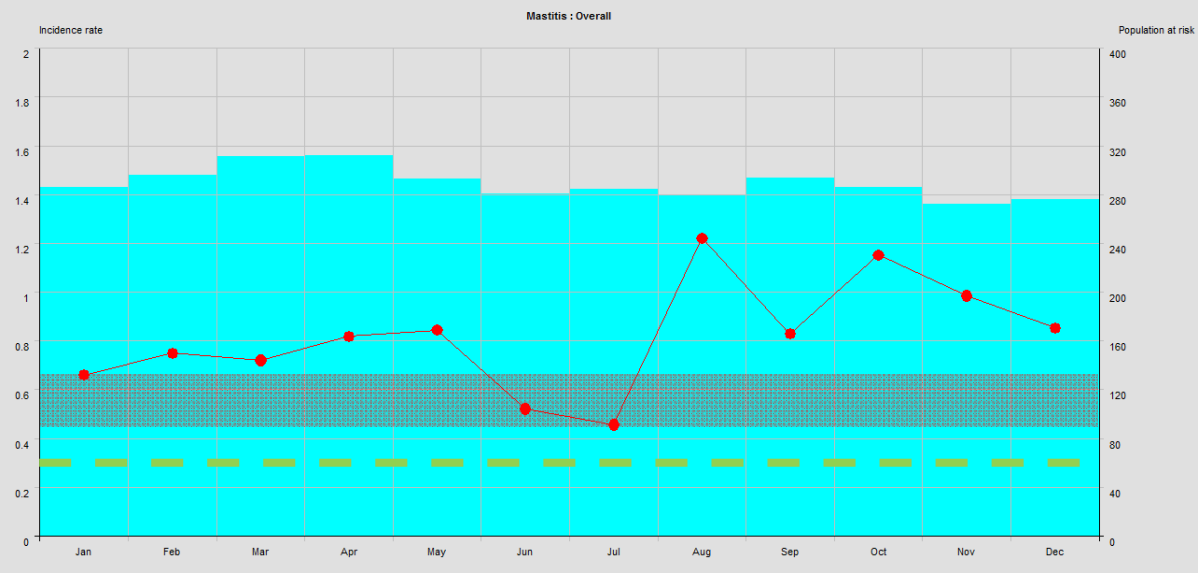


Figure 2 - Graph of mastitis incidence seasonality

Interpretation

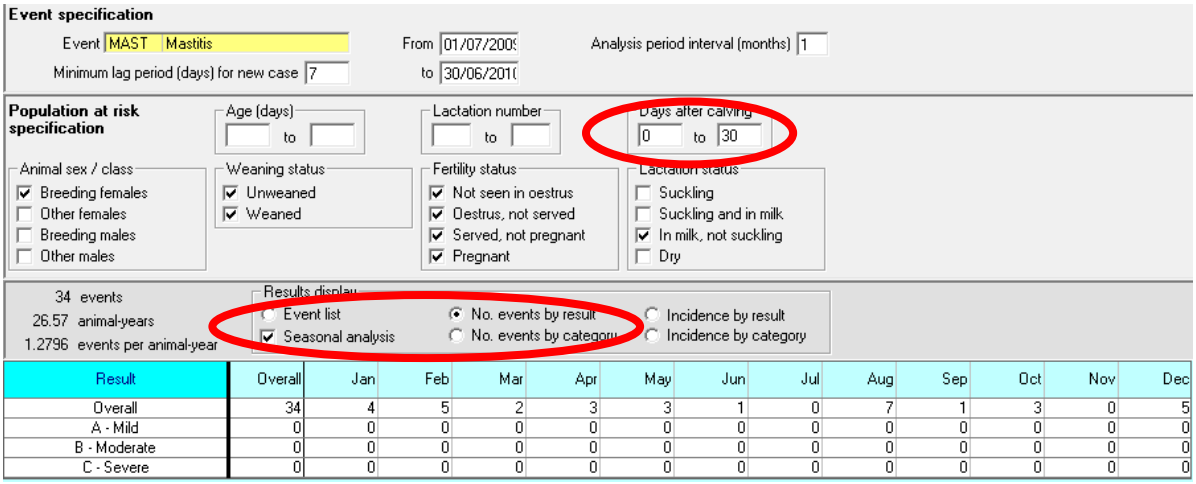
The "incidence rate" on the right hand side of Figure 2 expresses the mastitis rate 'per cow'. More commonly mastitis incidence rates are expressed per 100cows per year, so for Figure 2 in August the incidence rate was 120cases/100cows/year (=1.2 x 100).
An exact UK average is difficult to establish but is believed to be between 47-65cases/100cows/year (Bradley, Leach et al. 2007). Targets for mastitis incidence are <30cases/100cows/yr.

Examining clinical mastitis origins

The dry period has recently been demonstrated as being a high risk period for the acquisition of new infections (the udder during the dry period is 10 times more likely to acquire a new infection than milking (Green, Huxley et al. 2002)) with most dry period infections presenting as clinical within the first 30d of lactation (Bradley and Green 2000; Green, Green et al. 2002)).
So if we examine the significance of dry period infections by examining the clinical mastitis incidence during the first 30d of lactation:

Lists and reports > Performance analysis and reports > Health and fertility event incidence > Analysis of event incidence.

Then complete the form as per Figure 3.



Result	Overall	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Overall	34	4	5	2	3	3	1	0	7	1	3	0	5
A - Mild	0	0	0	0	0	0	0	0	0	0	0	0	0
B - Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0
C - Severe	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 3 - Mastitis originating from the dry period

From the table above you should be able to generate a graph as per Figure 4.

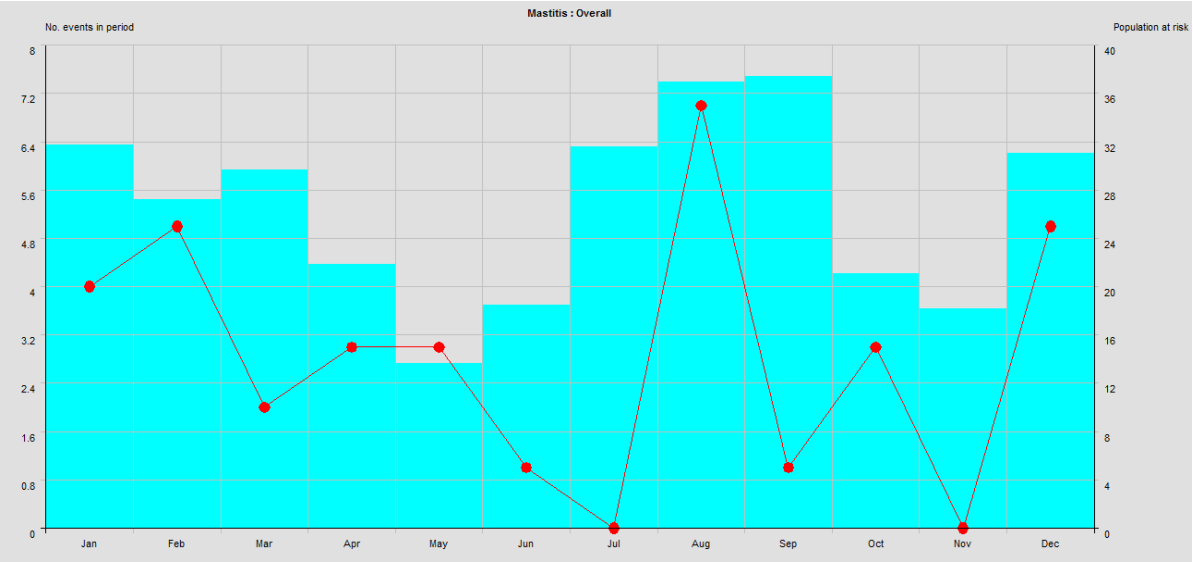


Figure 4 - Graph of mastitis originating from the dry period

Interpretation

Work from the DairyCo mastitis control project suggests that mastitis originating from the dry period should occur at a maximum rate of 1 case per 12 cows calving (Green, Bradley et al. 2010).
So for the example in Figure 4 in August 7 cases of mastitis occurred for 37 cows at risk (i.e. 37 cows <30DIM) which means 1 case per 5 cows calving – i.e. much more than 1/12 – suggesting that mastitis originating from the dry period during August was significant.

Examining dry period performance using Herd Companion

Login into Herd Companion (www.herdcompanion.co.uk). Select “Report Writer” followed by “View Graphs”.

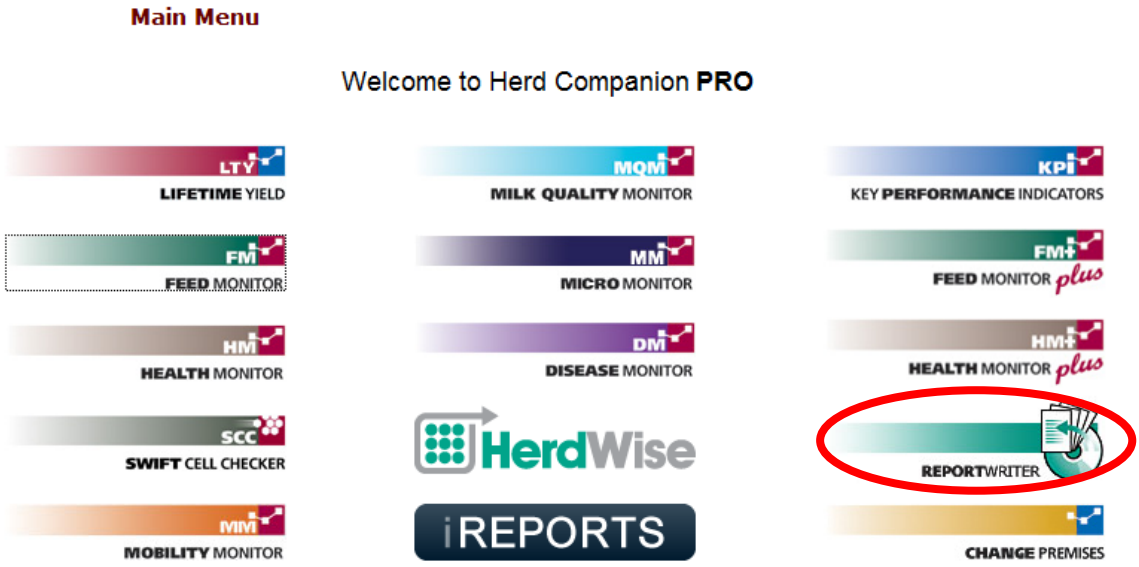


Figure 5 - 'Report writer' in Herd Companion

One of the graphs should then be the 'Dry period performance' (Figure 6) which uses SCC before drying off and after calving to quantify whether dry period performance (both cure rates and new infection rates) as summarised in Table 1.

Table 1 - Dry period performance as quantified by SCC

Low to low	Dry period success, no new infection
High to low	Dry period success, infection eliminated
Low to high	Dry period failure, new infection acquired
High to high	Dry period failure, existing infection not cleared (or potentially cured and new infection acquired)

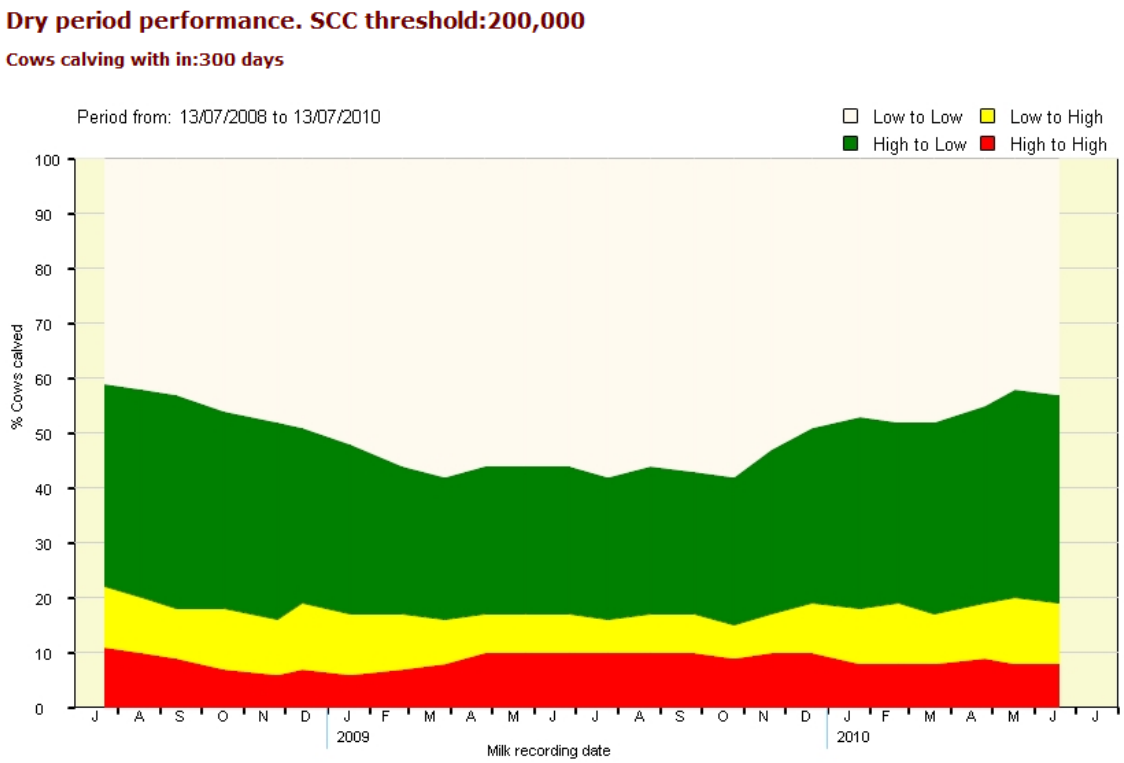


Figure 6 - Dry period SCC performance graph

Interpretation

Targets for SCC performance over the dry period are summarised in Table 2.

Table 2 - Interpretation of SCC over the dry period

	Target	Comments
Low to low	As high as possible	
Low to high	<5% (Bradley and Green 2005)	Over 5% suggests that too many new infections are being acquired
High to low	As low as possible	Too high suggests that despite good cure rates too many cows are being dried off infeted
High to high	<10% (Bradley and Green 2005)	

How are cell counts made up?

Using Herd Companion again we can examine cell counts are made up. Use the "Report Writer" followed by "View Graphs" as before.

This time we're looking for the 'SCC Status Summary Graph' as per Figure 7. Definitions of the terms used are defined in Table 3.

Table 3 - Definitions used in the Herd Companion's 'SSC status summary graph'

Clear	Cell count below <200K (uninfected)
1st uninfected	Cows who calve in with a cell count <200K
Recovered	Last recording at >200K, now <200K
New	Cow posting her first cell count at >200K, not including cows at first recording with elevated SCC (see 'First')
1st infected	Cows who calve in and at their first recording record >200K (dry period failure)
Repeat	Cow posts a cell count of >200K having had a cell count in between of <200K
Chronic	Cows post two or more consecutive cell counts of >200K

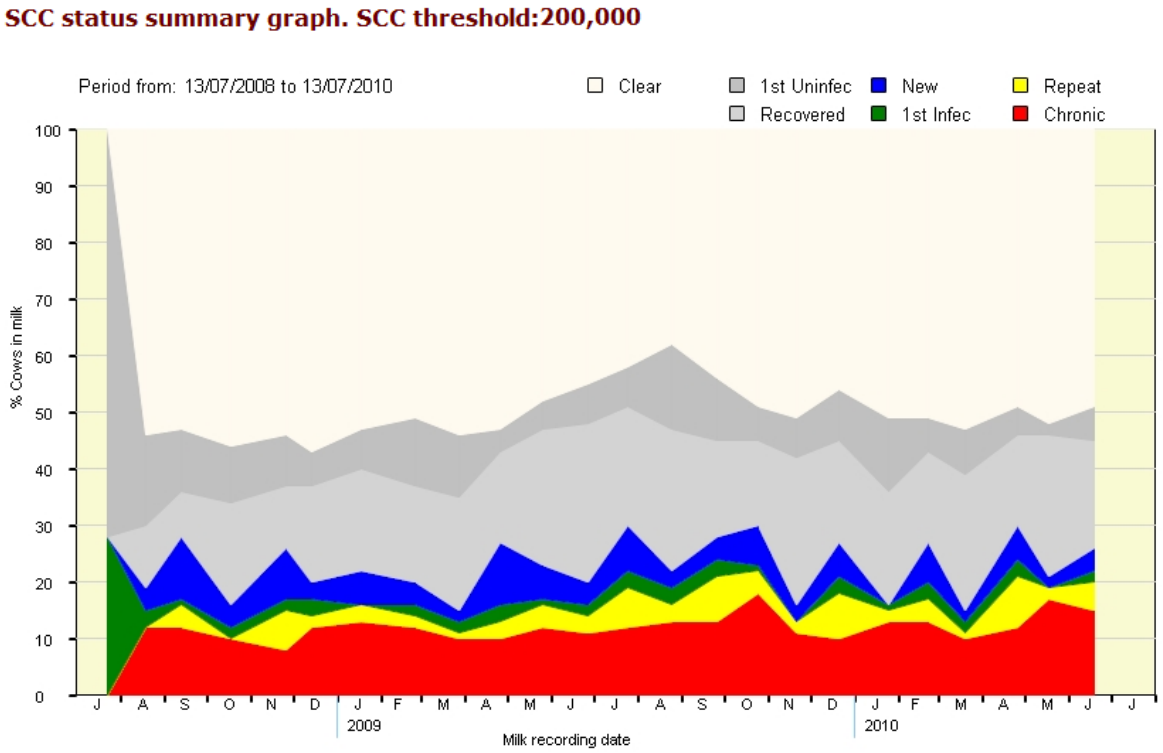


Figure 7 - SCC status summary graph

Interpretation

Interpretation of the SCC summary graph definitions are given in Table 4.

Table 4 - Interpretation for SCC summary graph (Bradley and Green 2005)

New	<2.5%
Chronic	<5%
New + Chronic + 1st + Repeat	<10%

Fertility

Key components of a conception include:

- Normal cyclicity.
- Ovulation.
- Accurate detection of oestrus (if present).
- Service at the appropriate time.
- Appropriate uterine conditions.
- Hormonal environment conducive to pregnancy.
- The ability to carry a calf to term.

The aim of this section is to demonstrate methods of quantifying some of the above.

Fundamentally we have limited control over conception/pregnancy rates so this section is going to focus on heat detection.

1st service submission rates

Getting cows served in a timely fashion after calving is essential to maximise reproductive efficiency. Conception rates before 42DIM begin to suffer, but from 42d onwards are comparable to later in lactation (Figure 8).

1st service submission rates are a factor of the voluntary waiting period, heat detection and return to cyclicity following calving. It is worth checking what Interherd is set to before beginning; *Data entry & handling > Herd records > Fertility Standards Tab along the top* (Figure 9).

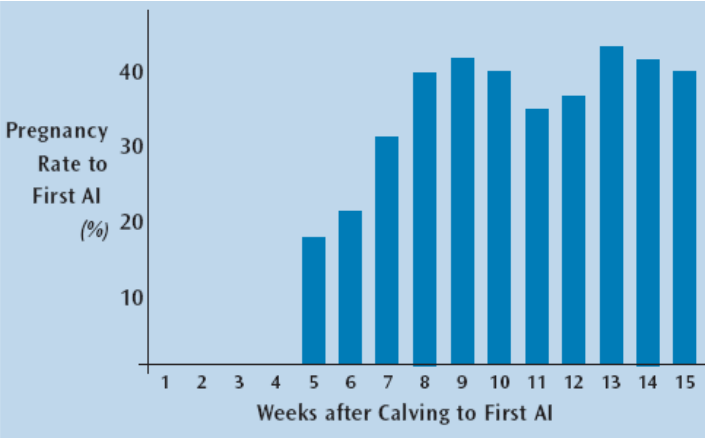


Figure 8 - Conception rates vs weeks after calving (DairyCo 2005)

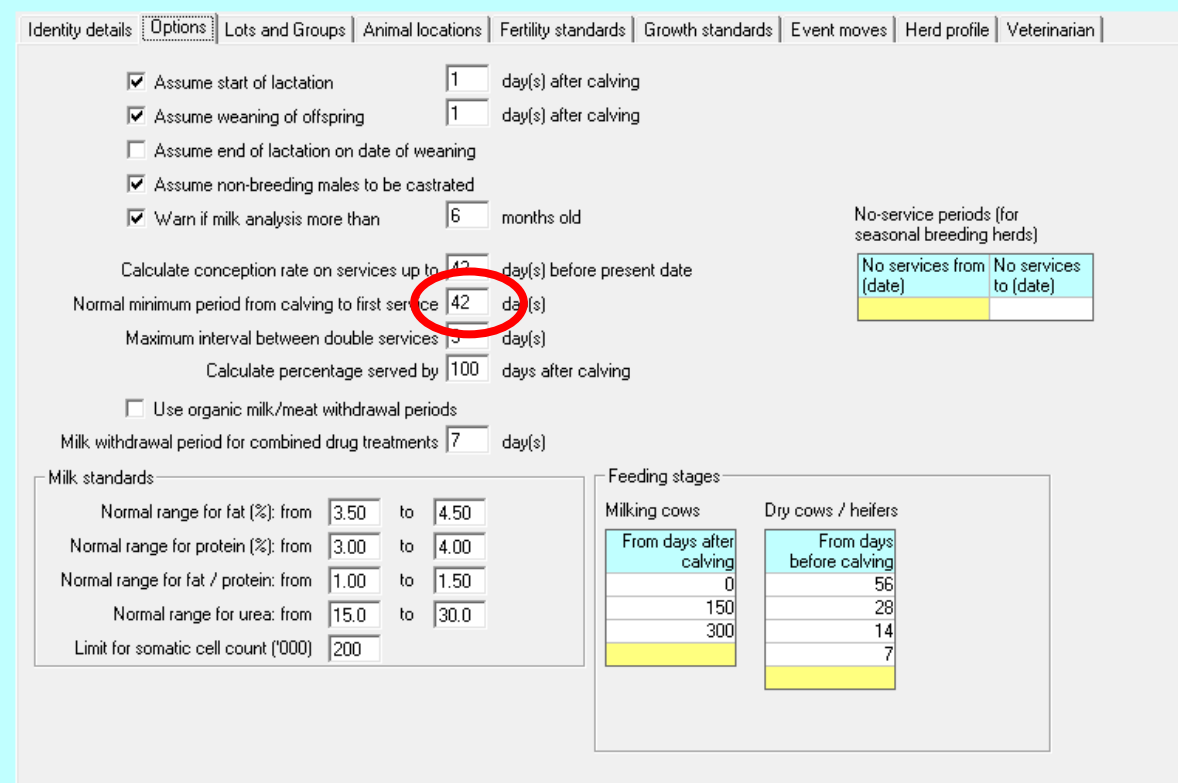


Figure 9 - VWP standard in Interherd

1st service submission rates quantifies the proportion of eligible cows served within one cycle (24d) of completing their voluntary waiting period, therefore cows are counted if they are served between 42 and 66DIM (depending on how your VWP is defined) and assumed missed if they are not.

The first service submission rate can be found at:
Lists & Reports > Performance analysis & reports > Fertility analysis > Fertility analysis (cows) (Figure 10).

Note; it is worth using a median rather than a mean when reviewing 1st service submission rate as this data will not be normally distributed (as we're selectively not serving cows until the end of their VWP), making the median (the 'middle' value) more appropriate than the mean.

Begin | Cows calving between 01/07/2009 and 30/06/2010 | PD available for services before 02/06/2010 | Analysis period interval (months) 1 | Analysis by: Lactation no. / Calving period | Statistic: Mean / Median

Parameter	Standard value	Overall	Jul 2009	Aug 2009	Sep 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	Mar 2010	Apr 2010	May 2010	Jun 2010
No. cows calved		322	31	44	30	22	14	47	30	25	28	20	19	12
% seen in oestrus	95%	76%	90%	89%	87%	95%	86%	87%	90%	88%	71%	40%	0%	0%
% served	90%	76%	90%	89%	87%	95%	86%	87%	90%	88%	71%	40%	0%	0%
% conceived	80%	44%	77%	77%	67%	59%	57%	53%	43%	16%	0%	0%	0%	0%
% re-calved	78%	2%	16%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
% culled	22%	3%	3%	5%	7%	0%	7%	0%	0%	0%	4%	10%	0%	0%
% died		3%	3%	5%	3%	5%	7%	2%	0%	0%	4%	0%	0%	8%
% not calved, culled or died		93%	77%	91%	90%	95%	86%	98%	100%	100%	93%	90%	100%	92%
% of served conceived	90%	58%	86%	87%	77%	62%	67%	61%	48%	18%	0%	0%		
Days calving - 1st. oestrus	42	67	61	58	54	70	61	74	76	72	78	47		
Days calving - 1st. service	53	67	61	58	54	70	61	74	76	72	78	47		
Days calving - conception	80	86	80	90	92	77	96	90	78	67				
Days 1st. service - conception	27	22	22	23	21	0	44	0	0	0				
Calving interval (days)	365	322	322											
Gestation period (days)	282	274	274											
Days breed - 1st. oestrus	11	25	19	16	12	28	19	32	34	30	36	5		
Days breed - 1st. service	11	25	19	16	12	28	19	32	34	30	36	5		
Days breed - conception	32	44	38	48	50	35	54	48	36	25				
% 1st.S.within 24 d from breed	50%	31%	52%	33%	37%	32%	46%	35%	27%	28%	19%	37%	0%	0%
Service interval (days)	21	27	25	30	32	41	25	30	28	25	23			
Oestrus interval (days)	21	27	25	30	32	41	25	30	28	25	23			
% oestrus intervals OK	75%	31%	27%	31%	27%	26%	43%	29%	33%	27%	50%			
Services / Conception	2.0	3.4	2.5	3.1	3.4	3.3	4.1	3.1	3.3	7.5				
Conception rate (%)	50%	30%	41%	32%	29%	30%	24%	32%	30%	13%	0%	0%		
Lactation length (days)	320	305	312	311	305	305	305	305	305	305	305	305	305	305
Lactation milk (kg)	8500	5561	7449	7550	7406	6957	7078	5493	4440	3682	2537	1983	982	
305-day milk (kg)	8000	5561	7268	7550	7406	6957	7078	5493	4440	3682	2537	1983	982	
Mean weight weaned (kg)	100	36	36	36	36	36	36	36	36	36		36		

Figure 10 - 1st serve within 24d from breeding

Interpretation

Target values for 1st service submission rates are 70% for all year round calving herds and 90% for block calving, but most herds are achieving around 40% (DairyCo 2005).
If you're serving cows at 41d or 67d then they will fall outside the analysis and potentially 1st service submission rates will be negatively affected (despite 100d in calf rate appearing adequate). Care should also be taken to ensure that cows too recently calved are not included in the analysis; for example in Figure 10 the green circle indicates cows that have calved too recently to have been served, they are however included in the 'Overall' calculation and will be skewing the results.

Calving-1st service

The calving to first service interval gives an idea of the return to cyclicity in combination with heat detection, it will however again be influenced by the VWP.
The calving to first service can be found on the same table as the 1st service submission rate:
Lists & Reports > Performance analysis & reports > Fertility analysis > Fertility analysis (cows) (see Figure 11).

Note; it is again worth using a median rather than a mean when reviewing 1st service submission rate as this data will not be normally distributed (as we're selectively not serving cows until the end of their VWP), making the median (the 'middle' value) more appropriate than the mean.

Interpretation

Conception rates to first service will again (as for 1st service submission rate) influenced by DIM (too short and conception rates will be compromised) as seen in Figure 8.
A target figure for this period is 65d (Noakes, Parkinson et al. 2001). Calving to first service periods of >85d make it impossible to achieve a 365d calving index (86+280=366d) even with 100% conception rates and heat detection!

Begin | Cows calving between 01/07/2009 and 30/06/2010 | PD available for services before 02/06/2010 | Analysis period interval (months) 1 | Analysis by: Lactation no. / Calving period | Statistic: Mean / Median

Parameter	Standard value	Overall	Jul 2009	Aug 2009	Sep 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	Mar 2010	Apr 2010	May 2010	Jun 2010
No. cows calved		322	31	44	30	22	14	47	30	25	28	20	19	12
% seen in oestrus	95%	76%	90%	89%	87%	95%	86%	87%	90%	88%	71%	40%	0%	0%
% served	90%	76%	90%	89%	87%	95%	86%	87%	90%	88%	71%	40%	0%	0%
% conceived	80%	44%	77%	77%	67%	59%	57%	53%	43%	16%	0%	0%	0%	0%
% re-calved	78%	2%	16%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
% culled	22%	3%	3%	5%	7%	0%	7%	0%	0%	0%	4%	10%	0%	0%
% died		3%	3%	5%	3%	5%	7%	2%	0%	0%	4%	0%	0%	8%
% not calved, culled or died		93%	77%	91%	90%	95%	86%	98%	100%	100%	93%	90%	100%	92%
% of served conceived	90%	58%	86%	87%	77%	62%	67%	61%	48%	18%	0%	0%		
[illegible]	42	67	61	58	54	70	61	74	76	72	78	47		
Days calving - 1st. service	53	67	61	58	54	70	61	74	76	72	78	47		
[illegible]	80	86	80	90	92	77	96	90	78	67				
Days 1st. service - conception	27	22	22	23	21	0	44	0	0	0				
Calving interval (days)	365	322	322											
Gestation period (days)	282	274	274											
Days breed - 1st. oestrus	11	25	19	16	12	28	19	32	34	30	36	5		
Days breed - 1st. service	11	25	19	16	12	28	19	32	34	30	36	5		
Days breed - conception	32	44	38	48	50	35	54	48	36	25				
% 1st.S.within 24 d from breed	50%	31%	52%	33%	37%	32%	46%	35%	27%	28%	19%	37%	0%	0%
Service interval (days)	21	27	25	30	32	41	25	30	28	25	23			
Oestrus interval (days)	21	27	25	30	32	41	25	30	28	25	23			
% oestrus intervals OK	75%	31%	27%	31%	27%	26%	43%	29%	33%	27%	50%			
Services / Conception	2.0	3.4	2.5	3.1	3.4	3.3	4.1	3.1	3.3	7.5				
Conception rate (%)	50%	30%	41%	32%	29%	30%	24%	32%	30%	13%	0%	0%		
Lactation length (days)	320	305	312	311	305	305	305	305	305	305	305	305	305	305
Lactation milk (kg)	8500	5561	7449	7550	7406	6957	7078	5493	4440	3682	2537	1983	982	
305-day milk (kg)	8000	5561	7268	7550	7406	6957	7078	5493	4440	3682	2537	1983	982	
Mean weight weaned (kg)	100	36	36	36	36	36	36	36	36	36		36		

Figure 11 - Calving to 1st service in Interherd

Heat detection

Heat detection is the one area in fertility where a difference can be made tomorrow. Improving heat detection or heat detection *accuracy* will directly result in more cows being served which hopefully (provided heat detection accuracy is good) results in more pregnancies.

Detection of repeats

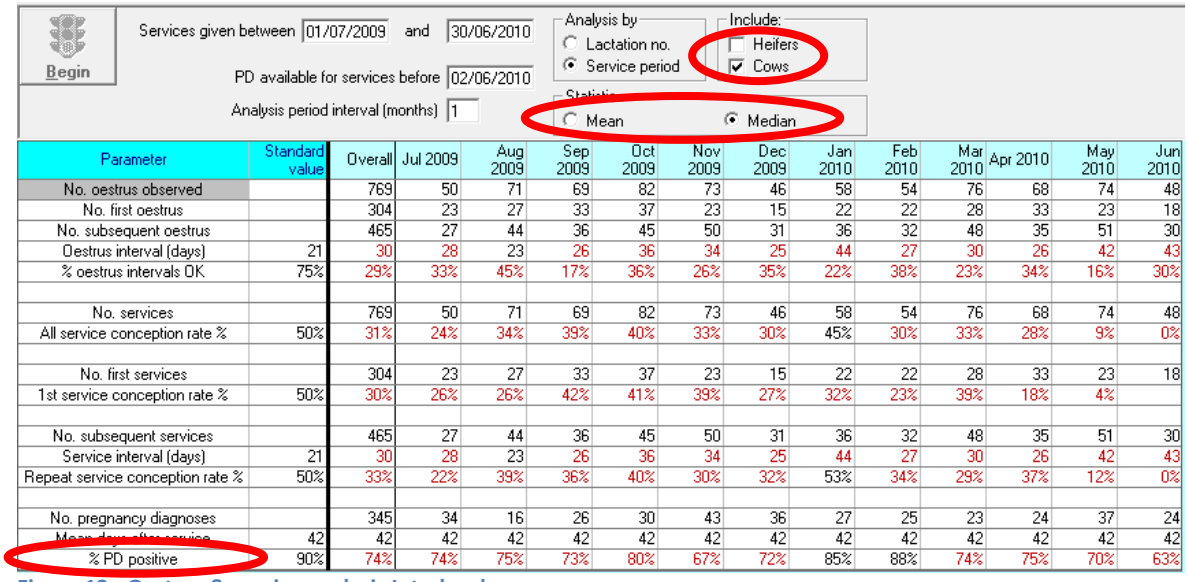
Whether a cow is in-calf or not at a routine is not entirely a factor of conception rate and insemination technique, but is also a function of whether repeats are detected. If repeats are not well detected (or cows are not displaying oestrus) then the proportion of cows PD +ve will be low, whereas if repeats are well detected then the proportion PD +ve will be high.
As a result will provide information regarding heat detection.

The proportion of cows PD+ve can be found at:
Lists & Reports > Performance analysis & reports > Fertility analysis > Oestrus & service analysis (Figure 12).

Note; Heifers should be excluded from the analysis (see Figure 12) and a using a median would be more appropriate than mean.

Interpretation

For example Figure 12 is achieving an overall PD+ve of 74% meaning that one in four repeats are not detected. Ultimately this is a crude method of quantifying heat detection, however target values for % PD+ve will be as high as possible! In reality herds achieving values of ~80% are doing well.



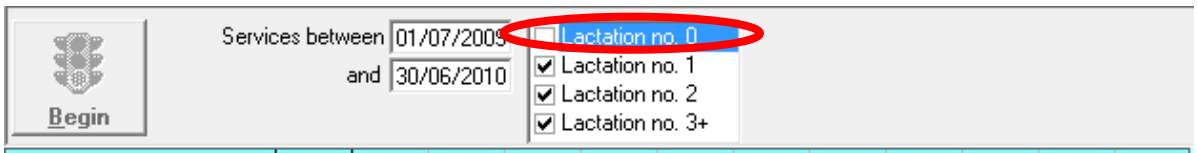
Parameter	Standard value	Overall	Jul 2009	Aug 2009	Sep 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	Mar 2010	Apr 2010	May 2010	Jun 2010
No. oestrus observed		769	50	71	69	82	73	46	58	54	76	68	74	48
No. first oestrus		304	23	27	33	37	23	15	22	22	28	33	23	18
No. subsequent oestrus		465	27	44	36	45	50	31	36	32	48	35	51	30
Oestrus interval (days)	21	30	28	23	26	36	34	25	44	27	30	26	42	43
% oestrus intervals OK	75%	29%	33%	45%	17%	36%	26%	35%	22%	38%	23%	34%	16%	30%
No. services		769	50	71	69	82	73	46	58	54	76	68	74	48
All service conception rate %	50%	31%	24%	34%	39%	40%	33%	30%	45%	30%	33%	28%	9%	0%
No. first services		304	23	27	33	37	23	15	22	22	28	33	23	18
1st service conception rate %	50%	30%	26%	26%	42%	41%	39%	27%	32%	23%	39%	18%	4%	
No. subsequent services		465	27	44	36	45	50	31	36	32	48	35	51	30
Service interval (days)	21	30	28	23	26	36	34	25	44	27	30	26	42	43
Repeat service conception rate %	50%	33%	22%	39%	36%	40%	30%	32%	53%	34%	29%	37%	12%	0%
No. pregnancy diagnoses		345	34	16	26	30	43	36	27	25	23	24	37	24
[illegible]	42	42	42	42	42	42	42	42	42	42	42	42	42	42
% PD positive	90%	74%	74%	75%	73%	80%	67%	72%	85%	88%	74%	75%	70%	63%

Figure 12 - Oestrus & service analysis Interherd

Inter-service intervals

Further information regarding heat detection can be obtained by examining inter-service intervals (i.e. the period between detected oestruses).
Analysis of the inter-service intervals can be found:
Lists & reports > Performance analysis & reports > Fertility analyses > Heat detection analysis (Figure 13)

This displays a table as per Figure 13, heifers should be excluded from the analysis (see red circle Figure 13).



Days after previous service or heat	Total	0-5	6-11	12-17	18-25	26-32	33-36	37-48	49-54	55-72	73-96	97+
No. serves with interval	436	9	10	11	149	47	14	77	30	37	27	25
%	100%	2%	2%	3%	34%	11%	3%	18%	7%	8%	6%	6%
No return within 35 days	65%	44%	40%	36%	68%	66%	71%	68%	67%	54%	78%	68%
PD positive	33%	22%	30%	9%	36%	36%	36%	30%	27%	27%	41%	36%
Calved	6%	11%	10%	0%	7%	9%	0%	4%	3%	0%	7%	4%

Figure 13 - Table of inter-service intervals

The data in the table can be further presented as a graph:
Lists & reports > Performance analysis & reports > Fertility analyses > Heat detection analysis > Graph button, top left

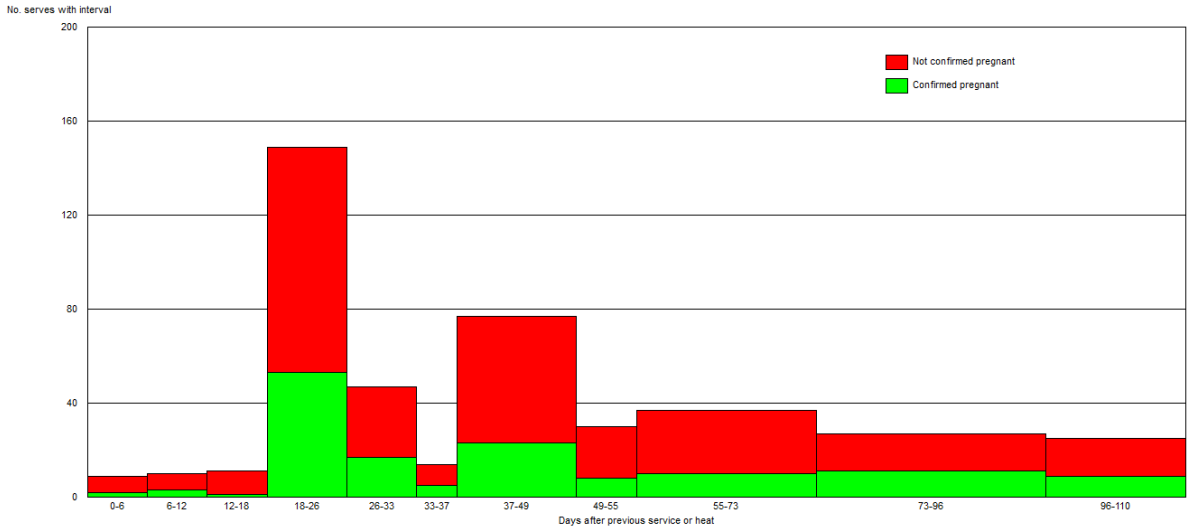


Figure 14 - Graph of inter-service intervals

Interpretation

Oestrus intervals can be categorised as correct, i.e. a cow repeats at 21-24d post-service (or a multiple of) or incorrect (not 21-24d or a multiple). If incorrect potentially this could be inaccurate detection of oestrus before (i.e. service when the cow was not in oestrus) and therefore the service was inappropriate and all the following oestruses are out of the accepted intervals, it could also potentially be the result of late embryonic loss (loss of pregnancy following maternal recognition of pregnancy resulting in a return to service outside the normal intervals).

Targets for the table of inter-service intervals (Figure 13) are shown below in Table 5, therefore for the example in Figure 13 the detection of repeats is very poor (34% detected at 18-25d) the detection of cows at the second repeat is also poor (18%) with complete detection of repeats taking a long time (6% of cows served 97d+ after service).

Table 5 - Targets for inter-service intervals (Parkinson and Noakes 2001)

Days between services	Typical Spread	Target Detection
1-17	5%	<12%
18-24	<50%	>50%
25-35	5-10%	<15%
36-48	15%	<10%
>48	20%	<10%

Using the graph (Figure 14) can be simpler where the peak at 18-25d should be three to four times that of 37-48d (White 2006).

Nutrition

A large proportion of the fertility problems we are asked it investigate are in part related to inadequate or inappropriate nutrition during the transition period (either pre- or post-calving). Milk solids can be used as a method of examining energy levels (and potentially physically effective neutral detergent fibre) in the post-calving period. Both fats and proteins can be used, but there is better evidence surrounding the use of milk proteins than fats.
This section aims to discuss some of the methods Herd Companion and Interherd can be used to examine subclinical ketosis in the post-calving period.

3.2% Milk Protein Intercept (3.2% MPI)

The 3.2% MPI is available through Herd Companion (www.herdcompanion.co.uk), see Figure 15.

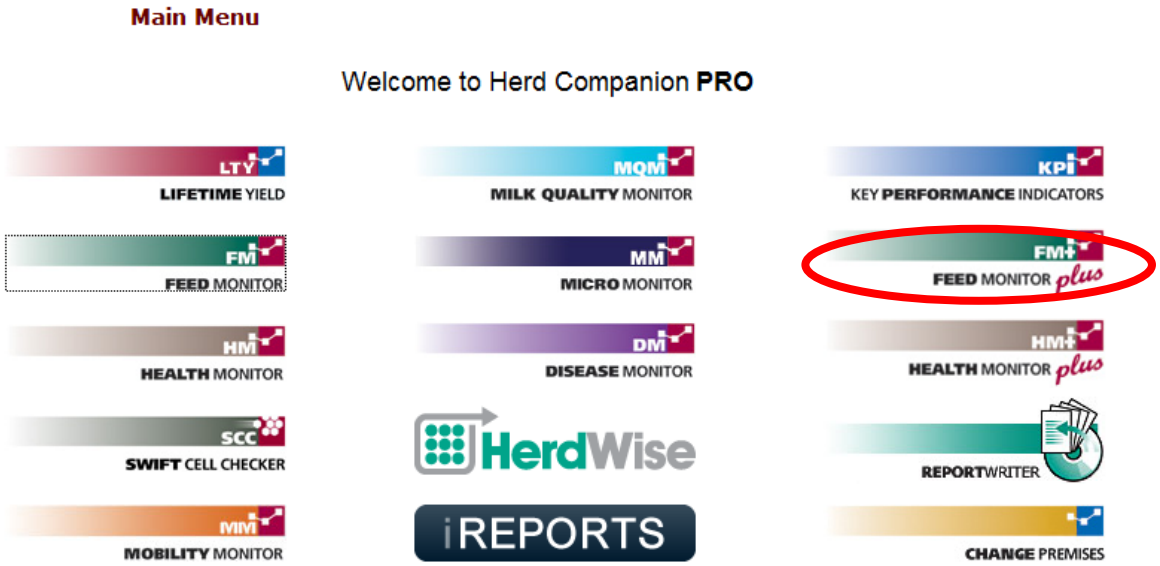


Figure 15 - 3.2% MPI on Herd Companion

The Feed Monitor will produce a graph as per Figure 16 below, with each red bar representing the average yield of the cows. The blue line is calculated by plotting yield against milk protein for all of the cows in milk, regression analysis is then used to calculate the 3.2% intercept.
Functionally the 3.2% intercept describes the amount of energy being fed to the cows (using milk protein as a proxy for energy (Grieve, Korver et al. 1986)), i.e. the volume of milk which is capable of being produced at a milk protein of 3.2% (3.2% being deemed 'energy neutral').

The gap between the actual yields of the cows (red bars) and the 3.2% intercept (blue line) can be used to infer information regarding the energy status of the cows. See 'Interpretation' below.

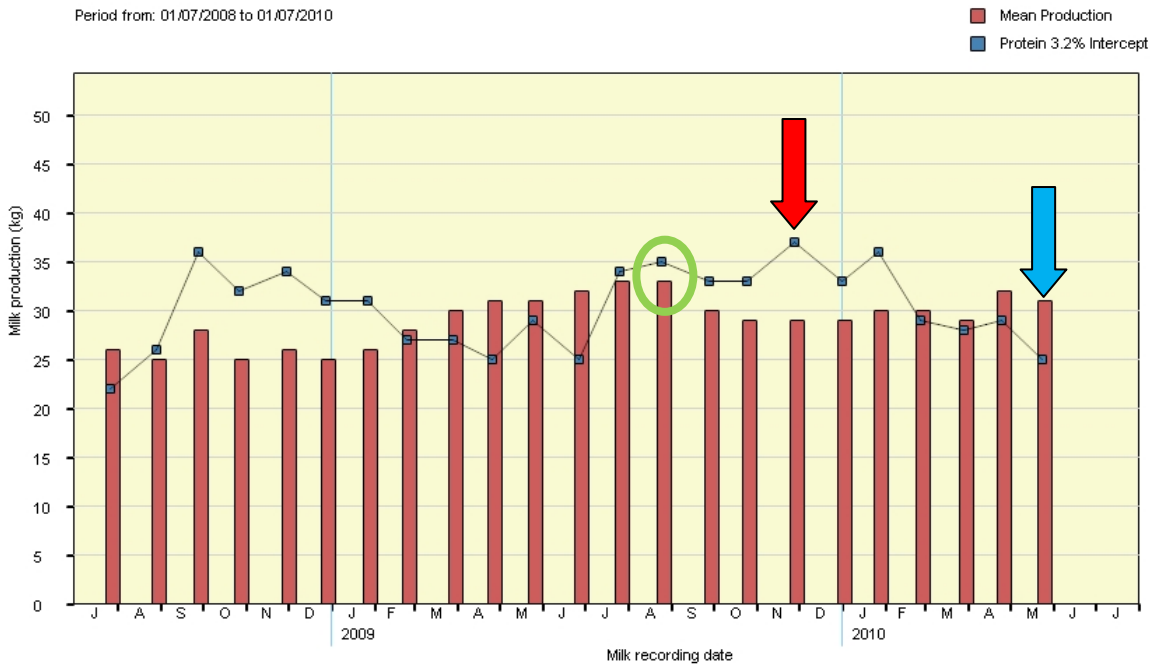


Figure 16 - 3.2% MPI

Clicking on a red bar drills down into the data for the individual milk recording, as per Figure 17.

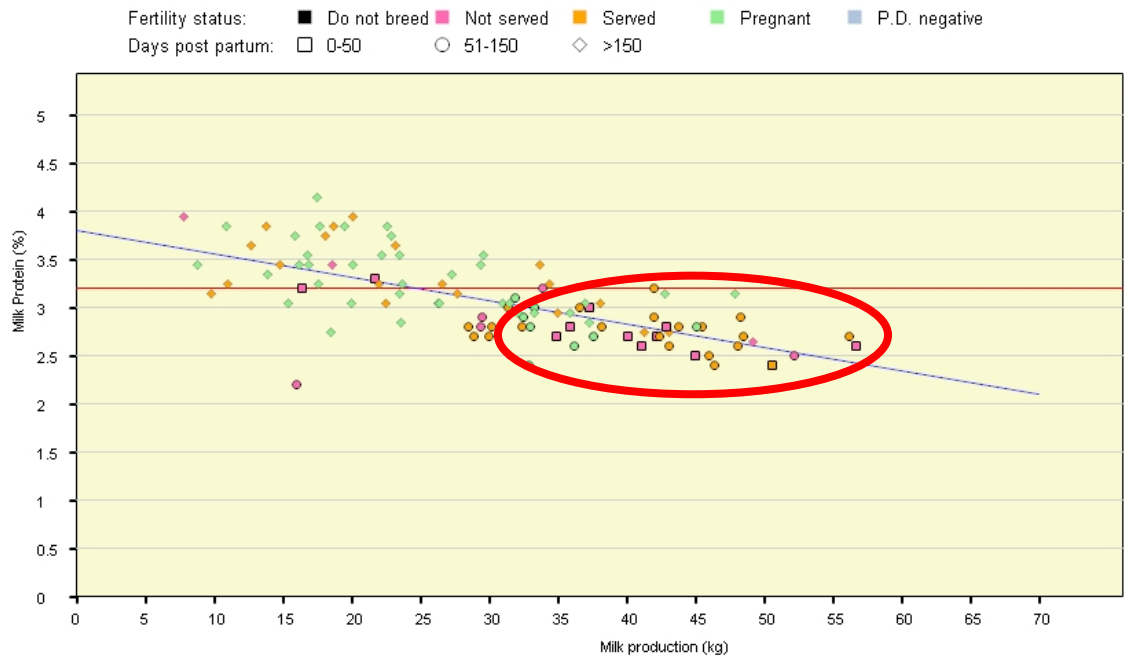


Figure 17 - Individual milk recording data from 3.2% MPI

Interpretation

At the red arrow we would be concerned that energy we're feeding isn't being efficiently converted to milk (i.e. a low feed conversion efficiency, FCE) whereas at the blue arrow we're concerned that we're not providing our cows with sufficient energy (i.e. an unhealthily high FCE).
In an ideal situation a small gap would be present between the red bar and blue lines (ensuring the cows have sufficient spare energy for bulling etc!) as per the green circle in Figure 16.
If we drill down into individual month's milk quality data (as per Figure 17) we can see the milk protein vs. yield for all cows present at that recording. In the example it is clear that cows producing larger volumes of milk are failing to maintain their milk proteins.

Milk Proteins

As mentioned above milk proteins can be used as a proxy for net energy status. Milk protein data can be examined in Interherd:
Data entry and editing > Batch data > Milk recordings > 'List recordings since' > Double click on the most recent recording > Select the graph button (as per Figure 18*) > Select 'Prot %' on the y-axis and 'Days' on the x*

This produces the graph as per Figure 19.

Close | Number | Enter new or existing recording date 21/06/2010 | List recordings since... 15/07/2008

Group	ID	Days	Day kg	Fat %	Prot %	Lac %	SCC '000	Pred. yld kg	Pred. fat %	Pred. prot.%	Cum. total yield (kg)	Cum. Fat%	Cum. Prot%	Cum. SCC'000	% exp. yield	% exp. protein	% exp. fat	Fat/ protein
	1	377	10.0	4.82	3.77	4.50	185				10	4.82	3.77	185				1.28
	2	232	40.6	3.79	3.42	4.41					51	3.99	3.49	185				1.11
	3	202									51	3.99	3.49	185				
	5	185	28.6	2.84	2.74	4.50	26				79	3.58	3.22	67				1.04
	6	199	39.4	3.41	3.00	4.50	111				119	3.52	3.15	89				1.14
	9	143	31.6	2.75	2.95	4.50	45				150	3.36	3.10	77				0.93
	10	190	37.0	4.50	3.06	4.50	300				187	3.58	3.10	133				1.47
	11	205	22.4	3.54	3.02	4.50	247				210	3.58	3.09	148				1.17
	13	20	36.0	3.63	2.86	4.50	71				246	3.59	3.05	135				1.27
	14	166	24.4	4.59	2.73	4.50	68				270	3.68	3.03	127				1.68
	15	127									270	3.68	3.03	127				
	16	5	22.4	3.78	3.71	4.50	206				292	3.69	3.08	134				1.02
	18	378	20.6	3.69	3.92	4.50	187				313	3.69	3.13	138				0.94
	19	259	19.4	4.36	3.38	4.50	221				332	3.73	3.15	144				1.29
	20	607	17.4	4.27	3.84	4.50	100				350	3.75	3.18	141				1.11
	22	271	22.8	4.09	3.42	4.50	159				373	3.77	3.20	143				1.20
	23	186	21.2	4.16	3.12	4.50	71				394	3.79	3.19	138				1.33
	24	136	40.2	3.13	2.96	4.50	420				434	3.73	3.17	167				1.06
	25	270	26.2	3.61	2.97	4.50	94				460	3.73	3.16	163				1.22
	26	195	24.6	2.97	2.95	4.50	1153				485	3.69	3.15	217				1.01
	27	375	14.6	3.95	3.64	4.50	100				499	3.69	3.16	214				1.09
	28	424	18.8	3.56	3.30	4.50	335				518	3.69	3.17	218				1.08
	30	223	15.6	4.07	3.55	4.50	51				534	3.70	3.18	213				1.15
	31	4									534	3.70	3.18	213				
	32	142									534	3.70	3.18	213				
	33	353	20.8	4.77	3.48	4.50	359				555	3.74	3.19	219				1.37
	34	118	44.0	3.10	3.03	4.50	21				599	3.69	3.18	203				1.02
	35	28	38.6	3.44	2.75	4.50	19				637	3.68	3.15	192				1.25
	38	268	20.6	4.62	3.38	4.50	218				658	3.71	3.16	192				1.37
	39	146	39.0	3.36	3.15	4.50	15				697	3.69	3.16	182				1.07
	40	22	29.2	3.94	3.17	4.50	13				726	3.70	3.16	175				1.24
	42	48	35.8	3.33	2.93	4.50	31				762	3.68	3.15	168				1.14
	44	237	17.6	4.53	3.49	4.50	156				779	3.70	3.16	167				1.30
	45	187	30.6	4.67	3.01	4.50	75				810	3.74	3.15	164				1.55
	46	285									810	3.74	3.15	164				
	47	425	15.2	4.29	3.29	4.50	763				825	3.75	3.15	175				1.30
	48	60	35.2	3.86	2.82	4.50	117				860	3.75	3.14	173				1.37
	MEAN	241	28.25	3.82	3.07	4.5	152											

Figure 18 - Batch recording milk protein data in Interherd

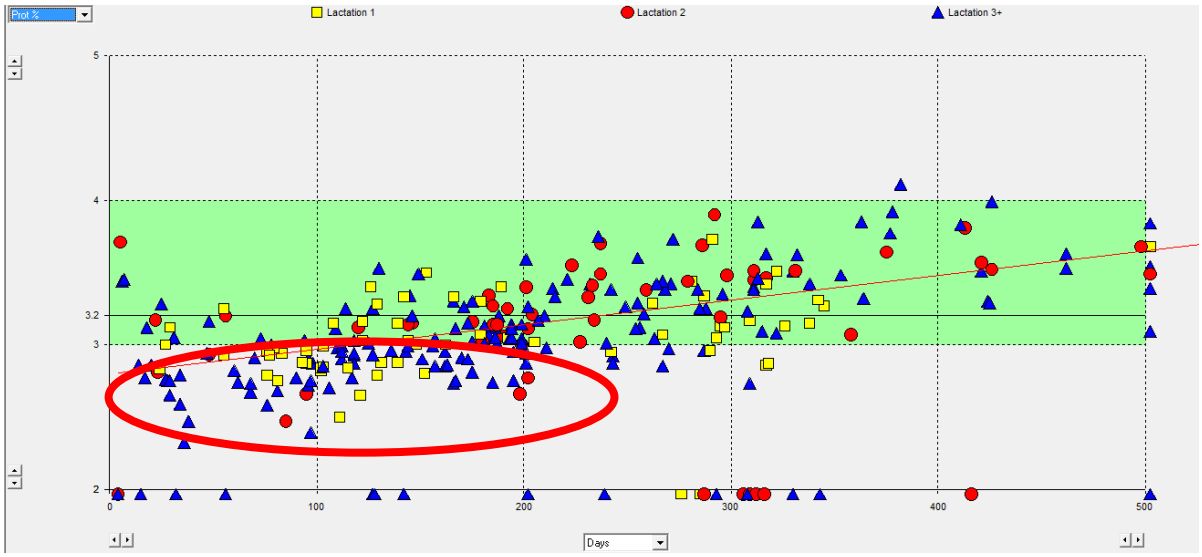


Figure 19 - Batch data milk protein vs. Yield

The milk protein for a larger time frame can be viewed in Interherd as below, however we find this to be less useful:

Lists & reports > Animal management lists > Milk production > Milk production trends > Summarise by "Days in Milk" > Begin > On the table at the top, select "All cows" or the period of days in milk you want > RIGHT click > Lactation Graph > Select "Mean Milk %" (top left) – can then view the cows that calved by month on the right

Interpretation

Low milk proteins in the first 50d of lactation are suggestive of insufficient net energy balance; empirically Figure 19 cows in the red circle are failing to maintain milk proteins.

Fat to protein ratios

In cows struggling with net energy milk proteins will be low (as discussed above), to combat this these cows will mobilise body fat to meet the demands. Often this can be detected as increase milk fat in early lactation – this is however less reliable than milk proteins.
Due to the potentially depressed milk proteins and elevated fats fat to protein ratios can become elevated.

Fat to protein ratios can be viewed in Herd Companion (www.herdcompanion.co.uk) and Interherd. Using Herd Companion can be simpler and easier and we'll look at that here.
Login into Herd Companion and select 'Feed Monitor Plus' as per Figure 15, then select 'Fat:Protein' as per Figure 20.

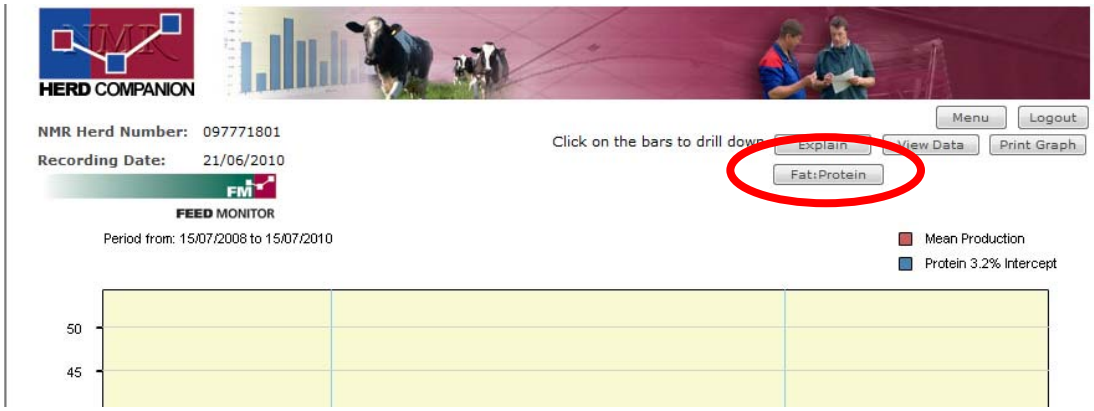


Figure 20 - Fat:Protein in Herd Companion

Due to the limited evidence regarding fat to protein ratios it is important that specific groups of cows are examined, the changes required are shown in Figure 21 by the red circles.

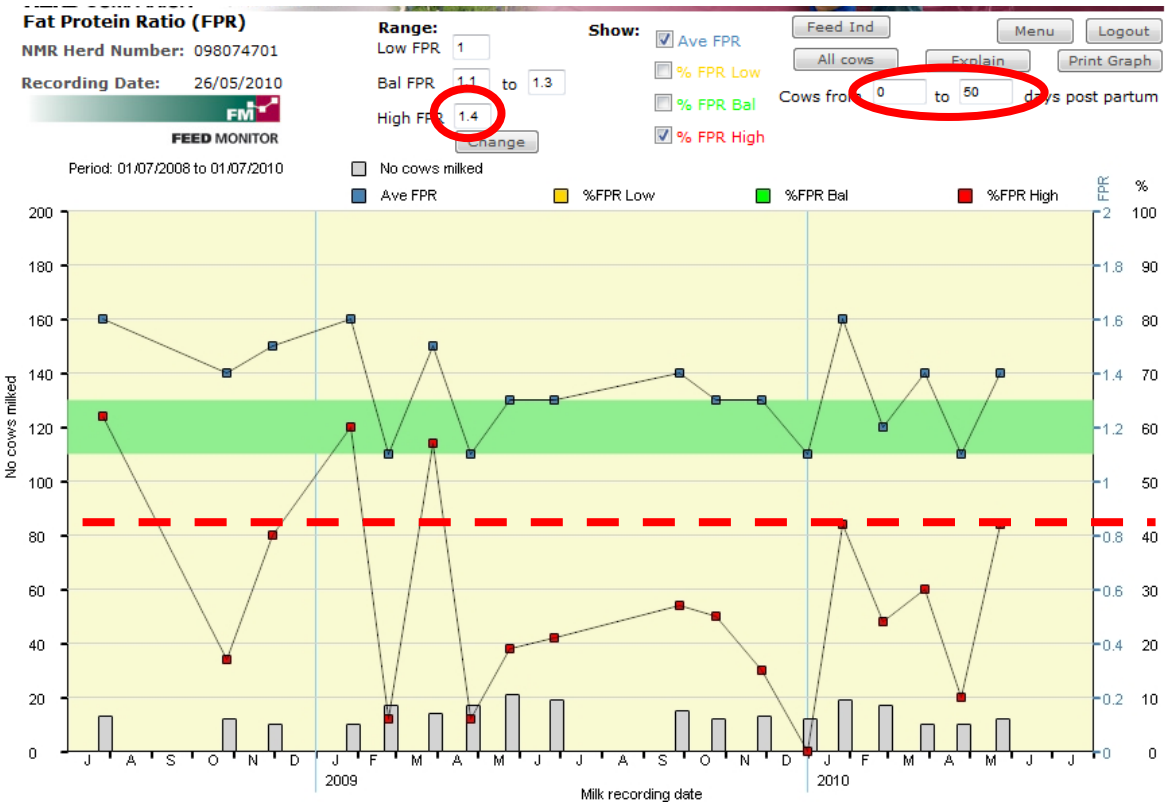


Figure 21 - Fat:Protein in Herd Companion

Interpretation

The evidence surround milk fat to protein ratios is less well established. However as a rule more than 40% of cows with a ratio of 1.4 suggests that at a herd level subclinical ketosis is a problem (Duffield and Bagg 2002). If we look at the example in Figure 21 the red data points are cows with a fat:protein ratio of >1.4, of which in May there were slightly over 40% - suggesting that in May cows <50DIM were struggling to maintain net energy balance.

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