

How Well Are Your Dairy Cows Performing When It Comes to Milk Quality?

Part 1: Fresh Cows



College of Agriculture,
Food and Environment
Cooperative Extension Service

By Donna M. Amaral-Phillips and Kas Ingawa, DRMS

Dairy bulk tank somatic cell counts (SCC) are used to assess overall milk quality of a herd since a relationship exists between somatic cell counts and mammary health. However, bulk tank SCC do not help detect individual cases of subclinical mastitis (no visible signs of mastitis) that contribute to elevated herd somatic cell counts. Routine sampling of milk from individual cows, testing these milk samples to determine SCC (or another measure to assess milk quality), and summarizing these data for a herd helps determine how well prevention programs are working and allows one to target and change management practices within groups or sets of individual cows to correct issues.

Assimilating data related to a mastitis prevention program starts when managers review somatic cell counts for individual cows (i.e. Lab Hot Sheet after DHI test) and determine the cows currently with the highest somatic cell counts. Cows with a SCC greater than 200,000 are considered to have subclinical mastitis even though they may or may not show visible signs of an infection. Reviewing these data does help identify cows that have recently increased in somatic cell count or remain high, but does not help identify areas of concern within management protocols. To achieve this management goal, data need to be summarized for groups of cows and over time, such as that achieved on DHI summary reports or reports from software associated with milk meters or robotic milking systems.

For herds processed through DRMS, managers can select either DHI-202 (Herd summary report) or DHI-302 (Consultant report) herd summaries or both for an additional small fee. (In KY, for an additional \$2.50/test one can receive a printed copy of both reports.) The DHI-302 report summarizes data allowing one to review fresh cow and mastitis prevention protocols at a glance. For this discussion, data provided in reports available through DRMS will be used, specifically the DHI-302.

Evaluating Milk Quality of Fresh Cows

Health of dairy cows within the first 2 to 4 weeks after calving is a critical determinant of milk production and reproductive performance for the entire lactation and directly impacts survival within the dairy herd. Since a cow's immune system naturally is compromised just before and within the first 2 weeks after calving, these cows are more susceptible to mastitis within this time frame. Clinical, as well as subclinical, mastitis results in less milk production over a lactation as milk secreting cells are damaged. Studies have suggested that reproductive efficiency is negatively impacted in cows with both clinical and subclinical mastitis. Evaluating the prevalence of cows with mastitis (greater than 200,000 cells/mL SCC) within the first 30 days after calving, can help manage this group of cows and decrease the incidence of mastitis and its impacts on reproductive performance.

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Figure 1: The DHI-302 Herd Summary allows review at a glance whether mastitis prevention protocols are working.

Peak and Persistence										Highlighting Legend (Number of Cows in Herd/String must be Greater than 40)																													
Peak Milk Lact 1 is Yellow if Peak Ratio (1st/Others) is < .70 (Indicates under performance versus older cows)					Yearly SCC Summary Lact 1 DIM < 30 is Yellow if >= 34% (Ideally should be < 20%)					Changes in SCC Status Cures >= 20% are Green if at least 8% higher than New Infections New Infections >= 15% are Yellow if at least 8% higher than Cures (New Infections ideally should be < 8%)					Dry Period Summary																								
Peak Milk Lact 2/3 are Yellow if Peak Ratio (1st/Others) is > .85 (Indicates under performance versus younger cows)					Current SCC Evaluation Yellow if % Infected >= 25 for Lact 1, >= 35 for Lact 2, >= 45 for Lact 3+ Yellow if % Cows by Linear Score 7,8,9 >= 5 for Lact 1, >= 10 for Lact 2, >= 15 for Lact 3+					Production Averages MLM is Green if 10+% increase from previous test and is Yellow if 10+% decrease from previous test. Fresh Infections are Yellow if >= 30% of Fresh Cows (Min. 10 Fresh Cows. Fresh infections should be < 20%)					Avg Cows by Days Dry Days < 40 40 - 70 > 70 63 3 69 10 4% 84% 12% Based on 82 Cows																								
305 ME										Current SCC Evaluation																													
Peak and Persistence										% Cows by Linear Score																													
Milk	\$ Value	Prod Index	Lact	Cows	DIM	Peak DIM	Milk	Current	C-L	Cows	SCC LS	% Infected	Lact	0,1	2,3	4,5,6	7,8,9																						
25,829	4,407	96	1	40	194	82	77	83	+8.0	36	2.1	17	1	42	36	19	3																						
27,365	4,716	103	2	35	179	58	103	85	-0.9	30	1.5	10	2	67	17	17																							
27,713	4,648	101	3+	47	203	76	113	82	+5.0	39	1.9	18	3+	54	28	15	3																						
26,950	4,581	100	All	122	193	74	95	83	+4.6	105	1.8	15	All	53	28	17	2																						
Peak Ratio (1st/Others) is 0.71										Monthly SCC Production Loss is 0 Lbs with a \$ Loss of 0																													
Management Level Milk										Yearly SCC Summary																													
Annual Summary					Current Test					% Infected by DIM					Changes in SCC Status (Distribution of Cows Sampled)																								
Days in Milk					Cows					Lact					Annual Fresh vs Dry Off (%)					Current vs Last Test (%)																			
< 100	100 - 200	> 200	All Cows	Lact	< 100	100 - 200	> 200	All Cows	Lact	< 30	30 - 220	> 220	Cures	Chronics	Cures	Chronics																							
74	80	83	80	1	83	71	84	88	88	1	33	21	19	20	6	6	2																						
84	86	86	86	2	85	85	87	85	85	2	29	13	21																										
80	89	89	85	3+	82	70	87	94	94	3+	24	13	21																										
79	85	85	83	All	83	76	86	89	89	All	28	16	20																										
Based on 11 Tests										Based on 1215 Samples										Based on 71 Cows Sampled										Based on 90 Cows Sampled									
Rolling Herd										Production Averages																													
Milk			Fat			Pro			All Cows			% in Milk			% Shipped			Date			Quantity			Quality															
Milk	Fat	Pro	All Cows	% in Milk	Milk	% Shipped	Date	Milk Cows	Fresh Cows	DIM	Milk	MLM	% Fat	% Pro	Raw SCC	LS SCC	Number Infections	Fresh Infections	New Infections Number	%																			
24,987	970	806	122	88	66	94	08-07-x1	107	16	193	75	83	3.2	3.1	111	1.9	16	4	10	10																			
25,598	1005	824	124	89	66	95	06-15-x1	110	6	194	75	82	3.3	3.1	120	1.6	10		6	5																			
25,672	1008	826	126	92	67	100	05-11-x1	116	17	182	73	79	3.8	3.2	186	2.5	21	4	10	9																			
25,690	1009	826	124	86	66	97	04-20-x1	107	7	197	77	82	3.9	3.2	135	2.4	15	1	8	8																			
25,678	1010	823	123	86	67	100	03-23-x1	106	9	196	77	83	3.9	3.3	88	2.1	13		3	3																			
25,739	1007	822	123	92	70	99	02-16-x1	113	16	191	76	82	4.4	3.4	105	2.2	18	3	7	6																			
25,863	1002	823	125	87	65	102	01-11-x1	109	7	187	75	80	4.2	3.3	226	2.4	18	1	4	4																			
25,893	1001	825	127	91	66	102	12-10-xx	115	10	186	73	79	4.3	3.3	206	2.7	24	2	5	4																			
25,963	1005	827	131	91	67	103	11-17-xx	119	12	197	74	83	3.9	3.3	223	2.9	33	3	10	8																			
26,052	1012	829	129	86	70	103	10-13-xx	111	7	189	82	90	3.9	3.3	233	2.5	25	3	7	6																			
25,958	1007	825	129	94	80	116	09-15-xx	121	13	193	85	94	3.9	3.2	243	2.5	31	5	8	7																			
Averages >			126	89	68	101		112	11	191	76	83	3.9	3.2	171	2.3	20	2	7	6																			

Percentage of fresh cows with SCC greater than 200,000 for each test date (See Figure 2)

For each test, this report summarizes the number of fresh cows with a higher than 200,000 cells/mL SCC.

One can calculate the percentage of fresh cows that have a SCC greater than or equal to 200,000 by

Figure 2. Production Averages													
Date	Quantity							Quality					
	Milk Cows	Fresh Cows	DIM	Milk	MLM	Fat	Pro	Raw SCC	LS SCC	Number Infections	Fresh Infections	New Infections number	%
08-07-x1	107	16	193	75	83	3.2	3.1	111	1.9	16	4	10	10
06-15-x1	110	6	194	75	82	3.3	3.1	120	1.6	10		6	5
05-11-x1	116	17	182	73	79	3.8	3.2	186	2.5	21	4	10	9
04-20-x1	107	7	197	77	82	3.9	3.2	135	2.4	15	1	8	8
03-23-x1	106	9	196	77	83	3.9	3.3	88	2.1	13		3	3
02-16-x1	113	16	191	76	82	4.4	3.4	105	2.2	18	3	7	6
01-11-x1	109	7	187	75	80	4.2	3.3	226	2.4	18	1	4	4
12-10-xx	115	10	186	73	79	4.3	3.3	206	2.7	24	2	5	4
11-17-xx	119	12	197	74	83	3.9	3.3	223	2.9	33	3	10	8
10-13-xx	111	7	189	82	90	3.9	3.3	233	2.5	25	3	7	6
09-15-xx	121	13	193	85	94	3.9	3.2	243	2.5	31	5	8	7
Averages	112	11	191	76	83	3.9	3.2	171	2.3	20	2	7	6

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dividing the number of fresh infections by the number of fresh cows. In this example report, 25% of the fresh cows (4 cows with fresh infections out of 16 fresh cows) have a SCC greater than 200,000 on the first test day after calving for the test dated 8-07-x1. Ideally, one would like to see less than 20% of fresh cows with a high SCC on the first test after calving. When more than 30% of the fresh cows are flagged as having a SCC over 200,000, the number of fresh infections is highlighted in yellow. On this report, the 9-15-xx test date had greater than the 30% of cows freshening with an elevated SCC. This part of the report allows one to detect a problem with either dry cow or just-fresh cow management programs within the last test period and to make corrections when necessary. One would then evaluate the environment around the time of calving as well as dry cow, mastitis prevention protocols, i.e effectiveness of dry cow treatments.

Yearly SCC summary showing the percentage of cows by lactation number infected within the first 30 days in milk: (See Figure 3)

For the current year, the percentage of first, second, or third+ cows within the first 30 DIM with an elevated SCC is calculated. These values reflect all cows who have completed their first test after calving within the past year. Ideally, less than 20% of cows should be infected for any of the categories reflecting the defined ranges for number of DIM. First-lactation heifers should be lower in SCC and in percentage infected than mature cows. In this example, 33% of the first calf heifers are coming fresh with an elevated SCC and this percentage drops after the first test. Similar trends are seen with the mature cows SCC over the past year. This allows one to consider if fly control in heifers and environment pre-calving is optimum as well as if the best feeding program for optimum immunity against mastitis organisms is provided to name just a few areas to evaluate in this example herd.

Figure 3.
Yearly SCC Summary

Lact	% Infected by DIM		
	< 30	30-220	> 220
1	33	21	19
2	29	13	21
3+	24	13	21
All	28	16	20

Based on 1215 samples

Changes in SCC status from dry off to the first test after calving: (See Figure 4)

These data illustrate over the past year how well mastitis prevention protocols at dry off (dry cow therapy and procedures at dry off) and around the time of calving (environment around time of calving) are preventing mastitis. The percentage of cures should be greater than the percentage of chronic cows. The percentage of negatives or consistently clean cows should ideally be greater than 75% and the percentage of cows with new infections less than 8%. This report can also be generated in PCDART where the cows in each grouping can be identified and their individual SCC data reviewed. In this example, the percentage of cows negative for subclinical mastitis is lower than ideal with the number of new infections higher than ideal. These data again point to re-evaluating management of second lactation and mature cows at dry off and around the time of calving.

Figure 4.
**Changes in SCC Status
(Distribution of Cows Sampled)**

Annual Fresh vs Dry Off (%)	
Cures	Chronics
20	6
Negatives	New Infections
56	18

Based on 71 Cows Sampled

Next month, we will look at how to use this report to evaluate mastitis prevention programs for the milking herd.