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Dairy Update

SOMATIC CELL COUNT - AN EFFECTIVE TOOL IN MASTITIS CONTROL

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Mastitis is the most costly disease on the dairy farm today. Nearly 70% of this loss is a result of reduced milk production caused by subclinical mastitis.

Mastitis is largely a management disease. Therefore, to be successful in control of mastitis, we must be willing to admit that the cause of mastitis is probably due to our own management shortcomings.

The Minnesota DHI-SCC program is a management tool designed for use as an integral part of a mastitis control program. However, successful use of this tool depends on our knowledge and understanding of the SCC Reports. Proper use of this report will not only create an awareness of the level of mastitis in your herd, but also will give you some idea as to what the most likely causes of your mastitis problems are. The Minnesota DHI-SCC program is a herd mastitis prevention program, not an individual cow treatment program. The emphasis is on prevention, not treatment.

Herds Not On SCC Program

If you don't have your herd on the DHI-SCC program, you can get an idea of your situation by comparing your bulk tank WMT score to the standards shown in Table 1. Bulk tank WMT scores of less than 6 or bulk tank cell counts of less than 200,000, indicate there is not a serious mastitis problem. Your challenge is to maintain a clean herd. For you, the SCC program is a monitor enabling you to respond to potential problems before they become a major concern. Bulk tank WMT scores greater than 8 or bulk tank cell counts of greater than 300,000 are indicative of significant subclinical mastitis in your herd. In this case, the SCC program will be an aid in better improving mastitis control.

This archival publication may not reflect current scientific knowledge or recommendations.
Current information available from University of Minnesota Extension: <http://www.extension.umn.edu>.

Table 1. Comparison of Bulk Tank WMT Scores With Somatic Cell Counts.

WMT	SCC	Subclinical Mastitis Assessment of Herd
6 or below	Below 225,000	<u>Excellent.</u> Maintain control measures.
8 - 12	300,000 to 465,000	<u>Fair.</u> Check for chronic cows and control measures to improve situation.
14 - 16	565,000 to 675,000	<u>Unsatisfactory.</u> Subclinical mastitis may be widespread in your herd.
18 - 20	790,000 to 920,000	<u>Poor Situation.</u> High level of infection in herd. Large \$ loss due to mastitis.
22 or above.	1,000,000 or above.	<u>Very Poor Situation.</u> Immediate action called for. Obtain individual cow results. Cull or dry-off problem cows. DON'T WAIT. DO IT TODAY.

Interpretation Of Individual Cell Counts.

Before we discuss the interpretation of individual Somatic Cell Counts it might be wise to review some basics. The term somatic cell is a general term referring to the white blood cell. White blood cells are extremely important in combating mastitis. If the udder becomes infected or injured, large numbers of white blood cells migrate to the mammary gland to destroy and remove either the bacteria or the toxin it produces. Therefore, high somatic cell counts in the milk is a strong indication of the presence of an infection.

What is the "normal" cell count? Although this question still remains unanswered, it does seem clear that there is a linear relationship between cell count and milk yield.

Table 2. Individual Cow.

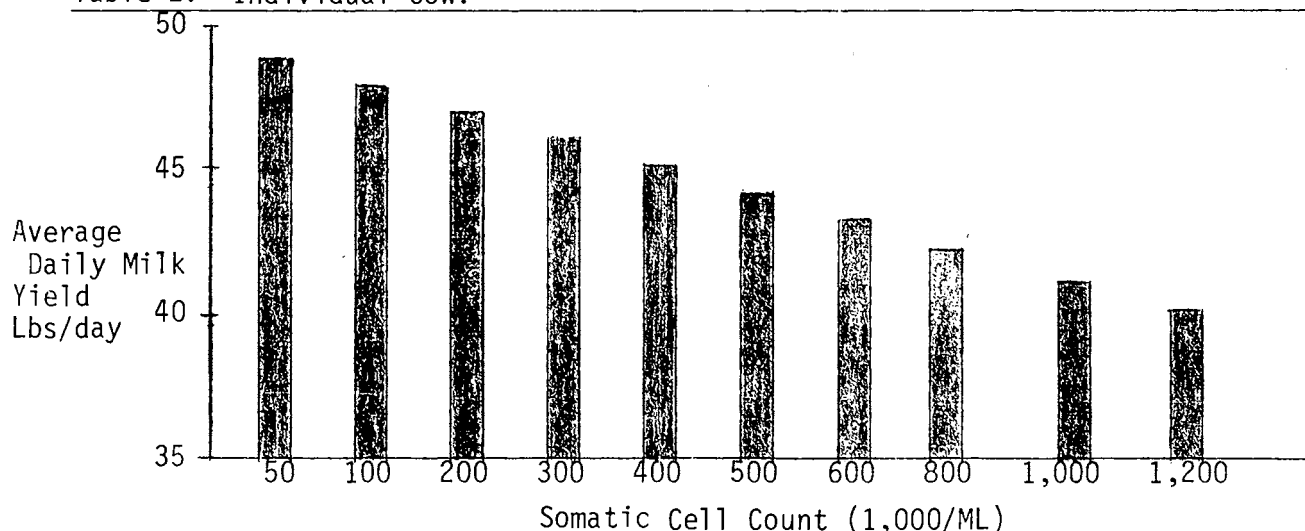
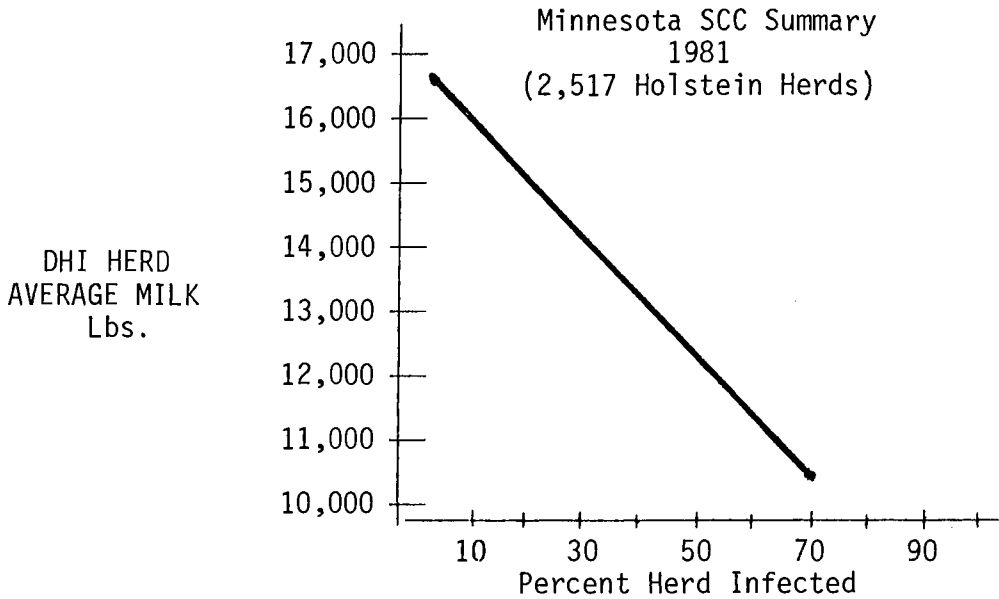


Table 3. Herd



Current evidence also indicates that the infiltration of white blood cells through the milk secretion tissue, whatever the cause (infection or other tissue irritation), will result in lowered milk yield by that mammary tissue. Each time the cell count is doubled, the expected decrease in milk production is approximately 1.4 lbs/day or 400 lb/lactation. Therefore, it appears that we should attempt to lower individual cow and herd cell counts as low as is practical to take advantage of more efficient production. At this time, current evidence suggests that an average herd SCC of 150,000 or less is a reasonable and desirable goal.

From the standpoint of mastitis research, approximately 80% of those cows with counts of less than 200,000 would be considered negative for mastitis. Of concern would be any cows with counts of 350,000 or greater. Of particular concern are those cows with counts greater than 350,000 cells for 2 or more consecutive months. These cows should be considered infected. Any cow with a single cell count of 500,000 or greater can be considered infected. As cell counts increase, production losses are generally more severe. It is generally thought that large production losses are experienced (10-30%) when counts are in the range of 800,000 and above.

Currently the DHI SCC Summary is using the following scale:

SOMATIC CELL COUNT SCALE	
NEGATIVE	LESS THAN 250,000
SUSPECT	250,000 - 550,000
POSITIVE	550,000 - 850,000
V STRONG	MORE THAN 850,000
HERD AVG SCC 570,000	

Heifers generally have lower counts than older cows. A reasonable explanation for this would be that since older cows have been in the herd longer and have been milked more times, they are more likely to have been subjected to manage-

ment induced mastitis. An ideal goal would be that 90% or more of the herd have counts less than 250,000 cells. A reasonable goal would be to have 10% or less of the cows positively infected.

Interpreting Herd Summaries

The Minnesota DHI-SCC report has two herd summaries: SCC Trends and Yearly SCC Summary. Herd Summaries can be very useful in helping to identify herd management problems. It is often very difficult to decipher herd problems by looking at individual cow data alone.

Both herd summaries consider only the positively infected cows in the herd. They characterize the incidence of mastitis with respect to age of the cow and stage of lactation.

Close monitoring of the heifers gives good indication if the mastitis control program is being effective. Theoretically, heifers properly managed should freshen without mastitis and, if effective mastitis control procedures are being used, they should remain uninfected throughout the lactation.

SCC Trends

This herd Summary categorizes the infection status of heifers and older cows comparing the percentage of infected heifers and older cows from current sample last month to month and to a year ago. This herd summary is useful as a monitor of measuring progress in mastitis control over both the short term and the long term.

EXCELLENT			
SCC TRENDS			
LACT. NO.	PCT POSITIVE OR V STRONG		
	CURRENT	LAST MO	YEAR AGO
HERD A 1st	0	0	0
Other	9	13	18
All	6	10	14

This dairyman is doing an excellent job. The heifers have remained clear of mastitis, indicating that control procedures preventing cow to cow spread of mastitis are working well. Progress may also have been made by successful dry cow therapy or the culling of chronically infected old cows.

Drastic increases in the percentage of infected cows from one month to the next should raise questions and instigate an investigation as to what's happening. Is it due to:

1. an equipment problem such as a loose belt on the vacuum pump, a stuck vacuum regulator, a plugged vacuum line, or any other equipment deficit that may have a detrimental effect on the machine's milking characteristics?
2. a different person doing the milking?
3. a sudden and severe change in the weather, with lots becoming muddy and the cows wet and dirty, frozen teats, etc?

4. sudden onset of a disease process such as psuedo cow pox, or mamillitis causing teat end damage, etc?

HERD B SCC TRENDS				Sudden Increase	HERD C SCC TRENDS			
LACT. NO.	PCT POSITIVE OR V STRONG				LACT. NO.	PCT POSITIVE OR V STRONG		
	CURRENT	LAST MO	YEAR AGO		CURRENT	LAST MO	YEAR AGO	
1st	15	7	3	↙ ↘	1st	29	0	5
Other	21	7	9		Other	50	17	15
All	20	7	7		All	45	12	12

Yearly SCC Summary

This summary considers the percentage of infected cows or heifers relative to stage of lactation. Determination of when the most infections occur during the lactation and in which group (heifers or cows) they are most often occurring will enable us to identify which management factors are the most likely cause of the herd mastitis problem.

Mastitis control in the below herd is good. Heifers are freshening free from mastitis and remain that way through out the lactation.

YEARLY SCC SUMMARY				
LACT. NO.	PCT POSITIVE OR V STRONG			
	<30 DIM	30-220 DIM	>220 DIM	
1st	0	0	0	← 1st Lactation Cows Clean
Other	10	7	13	← Some Older Chronic Cows
All	7	6	12	

Milking equipment, milking procedures, general sanitation, effective teat dipping, and dry cow therapy are controlling mastitis spread in this herd. However, there are a few older chronic cows in the herd which are probably being milked last.

Herd E is having a high incidence of mastitis in the heifers early after calving. Some possible reasons for this

YEARLY SCC SUMMARY				
LACT. NO.	PCT POSITIVE OR V STRONG			
	<30 DIM	30-220 DIM	>220 DIM	
1st	42	1	0	} Heifer maternity facilities Udder edema Calf sucking problems
Other	14	15	21	
All	32	9	8	

are listed. In general, the level of mastitis in this herd, except for heifers fresh less than 30 days is relatively good.

Searching for deficiencies in milking equipment, milking procedures, teat dipping, or dry cow therapy would probably be unproductive. However, placing emphasis on heifer management should solve the problem.

Herd F demonstrates the typical pattern

HERD F

YEARLY SCC SUMMARY			
LACT. NO.	PCT POSITIVE OR V STRONG		
	<30 DIM	30-220 DIM	>220 DIM
1st	0	46	60
Other	20	34	37
All	11	39	42

Marginal equipment
Failure to use teat dip
or dry cow therapy
Milking practices need
improving.

seen when there are poor milking practices, marginal milking equipment, or the failure to consistently teat dip or use dry cow therapy. Any one of these circumstances by itself or in combination with the others will result in this type of pattern.

Note that the heifers in this herd begin their lactation as expected with no infection. However, as the lactation progresses, these seemingly small deficiencies (failure to use separate towels to wash and dry, failure to consistently teat dip, allowing too many air slips and many other similar management defects) have the cumulative result of increasing the level of mastitis. In herd F, by the end of the lactation, 60% of the heifers are infected. Any herd with this pattern needs careful analysis of milking equipment performance, milking procedures, teat dipping, sanitation, and dry cow therapy.

Herds with mastitis problems due to multiple management and/or equipment deficiencies throughout the dry period and lactation may not show any of these typical patterns. Therefore, all aspects of mastitis control need serious consideration.

Problem Cow List

The upper-right portion of the herd summary lists those cows contributing a significant portion of the bulk tank somatic cells. The cow name or number is at the left, the percentage of the somatic cells coming from the milk of that one cow is listed on the right.

Herd G has two cows that account for 40% of the SCC's. Kelly is contributing more than one-fourth of all cells, Sally another 14%. Keeping Kelly's milk out of the tank, would lower the Herd Avg SCC significantly. For example, herd G had a Herd Average SCC of 365,000. Removal of Kelly's milk lowered the Herd Average SCC to 279,000.

HERD G		
LIST OF PROBLEM COWS WITH PERCENT HERD SCC		
Kelly, 26		
Sally, 14		

If you are in the unfortunate situation of having a herd SCC that approaches 1.5 million, withholding the milk from a couple of cows will often reduce the bulk tank count and help insure your ability to remain on the market.

Individual Cow Data

The column at the left of the page identified individual cows. Age of cow (lactation number), state of lactation (days in milk) and current month sample data (milk weight and SCC score) are listed in the next 3 columns. Any cow with a score of 3, 4, or 5 should be considered suspicious of being infected. Positive cows, those likely to be infected but not causing severe economic losses, are those with a SCC of 6, 7, or 8. Cows with a score of 9 or more are in the very strong category, and are most certainly infected with mastitis.

A "C" in the SCC code column means this cow has had a high somatic cell count for two or more consecutive months since calving. A "P" indicates this was a "high SCC" cow in the previous lactation. An "N" in the SCC code column means this cow has had a new infection. This includes a cow that is reinfected after having two or more months less than 250,000. The level of infection in any herd depends on the number of cows already infected and the rate of occurrence of new infection. Therefore, knowing the rate of new infection each month is very helpful in determining whether or not your mastitis control program is working. If you have just begun some new mastitis control procedures, then a decrease in new infections may indicate that the new control procedures are being effective. Any significant rise in the new infection rate may indicate a breakdown in mastitis control procedures or improper functioning milking equipment.

Individual cow cell count data is useful in identifying problem cows and as an aid in culling decisions. Milking order where implementation is possible is a good means of reducing spread of contagious mastitis. High cell count cows could be milked last.

Monitoring the individual cow SCC at the end of lactation may aid in the anticipation of potential flare-ups during the early dry off period. Certainly the cow with a consistently high SCC late in lactation needs close observation during this critical period. Appropriate drying off procedures and dry cow treatment should be discussed with your veterinarian.

What About Treatment?

Should I treat lactating cows with SCC greater than 500,000/cc? Many dairymen want to treat those cows with subclinical mastitis (SCC greater than 500,000/cc) during lactation. Obviously, all cases of clinical mastitis should be treated whenever they occur. Generally, it would not be wise to recommend treatment of subclinical mastitis during lactation. Treatment of most subclinical infections during lactation cannot be economically justified. The cost of treatment and discarding milk far outweighs the benefits. Application of good milking procedures as well as teat dipping and dry cow treatment are the most sensible ways of attacking this problem. There is one exception to this general rule. The subclinical mastitis is caused by the organism Streptococcus agalactiae, there is a good chance that treatment during lactation will be effective. This means, of course, that if treatment of a subclinical case of mastitis is desired, the infected quarter must be identified (CMT) and cultured to determine the causative agent as well as its drug sensitivity.

USING SCC FOR CONTROL

Here is a suggested approach for establishing a control program using SCC.

1. Determine the severity of your mastitis problem.
2. If your herd average SCC is greater than 250,000 or the average yearly SCC is greater than 15%, you should review your mastitis control procedures and milking equipment. Determine the nature of the infection by aseptically collecting and culturing a composite sample from the cows with a persistently high SCC. Another means to characterize the herd mastitis problem is by the aseptic collection and culturing of five consecutive bulk tank samples on special culture media. This procedure should be coordinated with your local veterinary clinic and processed through a veterinary diagnostic lab.
3. Review what control procedures you are currently using and initiate those practices not being used.
4. Have the adequacy of the milking equipment operation checked 2 times per year.
5. Be sure proper milking procedures are followed.
6. Improve stall and lot sanitation and other practices, such as clipping the udder, which contribute to keeping the udder clean and dry.
7. Routine use of effective teat dips and dry cow treatment.
8. Treat all clinical cases and cull chronic nonresponding cases.
9. Minimize the spread of new infections by establishing a milking order in which infected cows are milked last. Monitor the response of your control program by monthly review of SCC Report.

Evaluation of John Dairyman Herd

The John Dairyman herd has a high Herd Average SCC (570,000). The high Herd Average SCC and a yearly average percent SCC positive of 33% tells that this herd has a widespread mastitis problem. The problem is chronic in nature. There are several cows that were infected last lactation as well as this lactation ("P" in the SCC code column).

Recently the problem seems to have worsened (SCC Trends) with 45% of the herd infected this month, compared with 17% last month. This may indicate a recent breakdown in equipment or management.

The Yearly SCC Summary indicates there is a relatively high rate of new infections as cows progress through lactation. Heifers beginning lactation are clean and by the end of lactation, 38% are infected. This may indicate sloppy milking procedures, ineffective and inconsistent teat dipping or marginal milking equipment. Any one or any combination of the three might explain this pattern.

The problem is a dynamic one and certainly not under control. There have been 3 new infections or 10% of the herd this month. The number of new infections is a good measure if mastitis control is being used and/or is effective.

Further study will yield much more information about this herd but suffice it to say that proper use of the SCC Summary is a very effective aid in mastitis control.