CANWEST DHI
Profitable Dairy Management

The Catalyst

The Value and Use of DHI Somatic Cell Count

It has been estimated that mastitis costs about $200 per cow per year. This figure may increase unless dairy producers can achieve a reduction in prevalence of the disease.

Reprinted in part with permission of the NMC (formerly the National Mastitis Council), Verona, WI. The NMC is a not-for-profit organization that provides a forum for the global exchange of information on mastitis control and milk quality. www.nmconline.org

Mastitis is the most costly dairy cattle disease. In herds without an effective mastitis control program, approximately 40 percent of cows are infected in an average of two quarters. It has been estimated that mastitis costs about $200 per cow per year. This figure may increase unless dairy producers can achieve a reduction in prevalence of the disease.

How Much Does Mastitis Cost You?

The only way this question can be answered is to know how much mastitis is in your herd. Mastitis robs you in many ways: reduced milk production; treatment cost; discarded milk; death and premature culling; decreased genetic advancement; and reduced milk quality. Reduced milk production accounts for approximately 70% of the total loss associated with mastitis. Unfortunately, this loss is often not fully appreciated by producers. First, it occurs at the subclinical level (the quarter is infected but the milk appears normal) and second, the loss is from less milk produced, which can be difficult to recognize.

Why Measure Somatic Cells?

Because mastitis is frequently subclinical or "hidden", a number of tests have been developed for detecting mastitis. Most tests estimate the somatic cell count (SCC) of a milk sample. All milk contains white blood cells known as leukocytes which constitute the majority of somatic cells. The cell count for "normal" milk is nearly always less than 200,000 cells/ml (lower for first lactation cows). Higher counts are considered abnormal and indicate probable infection. Higher counts are also associated with decreased production.

How Should You Evaluate Your Herd Mastitis Control Program?

(1) BULK TANK SOMATIC CELL COUNTS (BTSCC), if conducted frequently and accurately, provides a general indication of a herd's mastitis status. Research indicates that losses in milk production associated with elevated BTSCC are higher than previously thought. While bulk tank counts may be a good indicator of a herd's general udder health status, their use will not identify problem cows nor locate factors contributing to the high counts.

(2) SOMATIC CELL COUNTS ON COMPOSITE MILK SAMPLES from each cow are available for herds on Dairy Herd Improvement (DHI) test. DHI reports available to producers will vary somewhat according to the DHI Processing Center. However, most DHI's report extensive SCC information. In addition to current SCC, many report previous SCC history for individual cows. Herd summary data such as SCC by lactation number and stage of lactation also are frequently available.

In an effort to provide uniform SCC reporting, the DHI's have adopted a uniform scoring method known as the linear score (LS). The LS divides the SCC into ten categories from 0 through 9. Table 1 (below), shows how SCC is converted to LS. Each increase of one in LS is associated with a doubling of the cell count.

Analysis of records from many cows indicated that as the LS increased, milk yield decreased. Moreover, the incremental production loss was found to be the same for each doubling of somatic cell count. For example, in cows of second lactation or greater, each doubling of cell count after 100,000 (LS 3) resulted in an additional loss of 400 lbs. per lactation (Table 2). A LS from an individual cow for any single month doesn't correlate well with production loss. However, using either average LS from a cow's entire lactation or the average monthly LS from an entire herd has been shown to be reasonably accurate in estimating losses.

(3) SCREENING TESTS ON INDIVIDUAL QUARTER SAMPLES. The effectiveness of a control program can be evaluated by conducting the California Mastitis Test (CMT) on milk from each quarter of each cow and determining the frequency of the various reactions. To be of value as a management tool, the screening test must be conducted on a regular basis and results recorded so a history can be developed. The CMT has been used in combination with DHI somatic cell counting. After the DHI LS results have been received, the CMT is used to identify the positive quarter or quarters. If desired, milk from positive quarters can then be cultured to identify which bacterial species may be involved.

How Should You Use DHI LS Information to Evaluate Your Herd Mastitis Control Program?

A monthly summary of LS on milk samples from each cow provides you with an evaluation of the effectiveness of the mastitis control procedures used in your herd. When combined with the results in Table 2, a realistic assessment of the amount and cost of subclinical mastitis can be made in your herd. Further, LS allows you to measure the reduction in subclinical mastitis as management is improved.

Although no single LS level can be used to separate infected from noninfected cows, about 80% of the cows with LS 5 are infected in one or more quarters. As the LS increases, the percentage of cows and quarters that are infected also increases.

A realistic goal in your herd is for more than 90% of your cows to have a LS of less than 5. Producers with more than 25% of their cows with a LS of 5 or greater can improve their herd mastitis control procedures in the following ways:

(a) Correct milking procedures, including milking time sanitation (emphasizing dipping all teats immediately after each milking with a product proven effective under controlled research conditions).

(b) Restore milking equipment to proper operating condition.

(c) Review other management practices such as the basis for culling, source of herd replacements, condition of lots and free stall bedding, etc.

(d) Evaluate dry cow treatment and management program. Comparing each cow's LS before drying off and a month after calving will give you an indication of the effectiveness of the dry cow treatment used and dry cow management program.

Improvements in your mastitis control program will appear within a few months. LS is also very helpful in identifying those few cows that contribute the major portion of the total somatic cell count in the bulk tank. Often, withholding milk from this relatively small number of cows is enough to reduce the BTSCC enough to qualify for bonuses.

Continued

TABLE 1 Relationship between linear score (LS) and somatic cell count (SCC)

LS	Midpoint SCC (1000's/ml)	Range
0	12.5	0 - 17
1	25	18 - 34
2	50	35 - 70
3	100	71 - 140
4	200	141 - 282
5	400	283 - 565
6	800	566 - 1,130
7	1,600	1,131 - 2,262
8	3,200	2,263 - 4,525
9	6,400	4,526 -

TABLE 2 Estimated change in lactation milk yield associated with an increase in linear score (LS)

Lactation Average LS	Average SCC (1000's/ml)	Milk Yield Decrease (lbs/305days)	
		Lact 1	Lact 2
0	12.5	-	-
1	25	-	-
2	50	-	-
3	100	200	400
4	200	400	800
5	400	600	1,200
6	800	800	1,600
7	1,600	1,000	2,000

Adapted from University of Wisconsin data.

Somatic Cell (Continued)

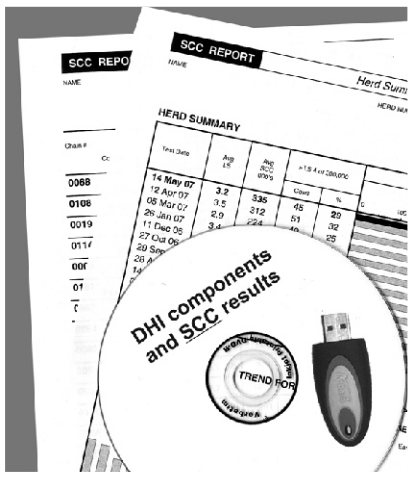
What Should You Do With High SCC Cows?

The SCC program pinpoints problem cows. Unfortunately, even after problem cows are identified, management options for these cows are limited.

(1) SELECTING COWS FOR CULTURE. The major reason for elevation in LS is intramammary infection. Monthly individual cow DHI-LS are good indicators of infections caused by the major contagious pathogens, Streptococcus agalactiae and Staphylococcus aureus. Although elevated LS is an indicator of probable intramammary infection, a distinction between contagious and environmental mastitis cannot be made on the basis of LS alone. This distinction must be made by microbiological culture of milk. Determining whether problems are contagious or environmental is necessary to enable a producer to make decisions regarding a herd's mastitis control program.

Before sampling, producers should discuss strategies and techniques with their herd veterinarian.

(2) LACTATION TREATMENT. Some producers enroll in the SCC program expecting to use SCC as a basis for treating individual cows. However, research has shown that when cows with a LS exceeding 5 were treated there was very little effect on milk production during the remainder of that lactation. Much additional research is needed before we can clearly determine conditions



Producers can receive their SCC results from DHI in paper form or electronically for importing into their herd management software.

(age, pregnancy status, stage of lactation, type of bacteria, etc.), where therapy during lactation could be economical.

Producers in danger of losing their market because of high BTSCC may find it necessary to treat cows with high LS during lactation. The last LS, milk culture results, milk production, stage of lactation, and age should be considered by the veterinarian and producer when selecting cows for treatment. Early drying off and dry treatment should be used for cows in late lactation. Milk from cows with the highest LS in early to mid-lactation can be withheld from the bulk tank. Using this method, withholding milk from only a few cows can lower the BTSCC by as much as 50% or more. Some DHI processing centers provide SCC contribution to the bulk tank for high SCC cows in the herd. This list is a weighted average based on milk production and SCC and can be used to target cows for culture, treatment, or withholding from the bulk tank. Often this will qualify the farm for quality premium payments.

The number of times a cow is LS 5 or greater in a lactation can indicate chronic problem cows requiring special attention. High LS in early lactation, followed by a decrease later in lactation may indicate problems with dry cow management, maternity pens, or dry cow therapy (often poor treatment technique). LS that generally rise throughout lactation are usually associated with cows infected by contagious pathogens and may indicate problems with milking hygiene, milking equipment, milking practices, or housing of the milking herd.

(3) DRY COW TREATMENT. The general recommendation is that all quarters of all cows be treated with an intramammary antibiotic preparation at drying off. Dry treatment has a higher cure rate than lactation treatment, eliminating existing infections and preventing new infections during the early dry period. Commercially prepared, approved products in single-dose containers should be used.

(4) CULLING. Culling is often the most practical means for eliminating chronically infected cows. There is little justification for keeping cows that have consistently high LS, sporadic flare-ups, and infections that persist in spite of dry cow treatment. These cows may be reservoirs of infection which may spread to other cows during the milking process.

(5) MILKING ORDER. Consider managing cows with high LS as you would cows with clinical mastitis. Milk these cows last to decrease the spread of infection to uninfected cows during the milking process. In many herds this may not be practical. An alternative method is to identify cows with high LS by a leg band and milk these cows with a separate milking unit.

Summary

The DHI somatic cell count program is a valuable tool for monitoring and evaluating a herd mastitis control program. This program can be used to identify problem cows that have high LS resulting from mastitis. After problem cows are identified, management options can be recommended that will lower the BTSCC and reduce mastitis losses.

For more information on somatic cell count service, please contact CanWest DHI at 1-800-549-4373.

CANWEST DHI