When It Comes to Solving SCC Crimes, If You Don't Culture, You Don't Know

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Flipping through television channels, it's hard to go very far without running into some type of crime show. Although I have to admit I don't watch many of them, the popularity of these shows is undeniable. The CSI (Crime Scene Investigation) series appeals to a diverse audience by using modern forensic sciences to describe mysterious crimes and murders. While some of the methods and results may seem out-of-touch with reality, these techniques are used by real-life investigators. On a more basic level, investigators have used more simple tools such as good questioning techniques of suspects and witnesses, fingerprints, seeking evidence to support various alternatives, or simply using the process of elimination to remove implausible alternatives.

Trying to solve a somatic cell count problem is often like trying to solve a crime. First of all, we are always starting with an imperfect set of information. We don't know exactly what happened or how the situation progressed to the point it did. Secondly, there's generally a high degree of frustration and a strong desire to solve the problem as soon as possible. Finally, the solution is rarely as simple as it seems nor is it the first thought that crosses our mind. Solving a somatic cell count "crime scene" is challenging because there are so many factors that impact mastitis incidence/somatic cell count.

When solving a SCC crime scene, we'll typically start by trying to compare a farm's practices to best recommended practices. Years of practical experience and research have led to a series of best management practices for minimizing mastitis. The National Mastitis Council (http://www.nmconline.org/) works hard to summarize these recommended practices and keep up-to-date with new options for managing mastitis. But, in the end, every dairy producer must decide which management practices he or she wants to employ on his or her farm. Because of economic, human resource, cow, or facility limitations, some of these steps may be skipped sometimes. Often, these skipped steps may not result in a SCC problem because other management practices are covering up for them. However, if one of these areas slips, the skipped step becomes the weakest link in the SCC situation. With the overwhelming, sustained heat of this past summer, heat stress exposed underlying problems for many dairy producers. When cows were not at such high stress levels, it's possible that they were better equipped to make up for a missing link in mastitis management. The same problems may have been present for months or years but they were not exposed until the heat stress created the situation for the weakest link to be exposed.

So, how can we uncover the weak links? Unlike human crimes, we can't ask affected cows or their herdmates about what has happened. We can communicate with farmers to identify what has changed. And, with DHIA, we can often quantify what changes have occurred over time. However, we are often still left without enough information to solve the problem. But, we can learn a lot more about the situation by culturing the milk to determine what kind of bacteria has caused the mastitis for particular cows. Taking this extra step in solving the SCC crime is similar to taking the extra step of using forensic sciences in human crime solving. It provides us that additional piece of information that enables us to solve the SCC crime.

To accomplish this goal, a microbiological analysis, or milk culture, must be performed on milk samples collected from cows showing clinical or subclinical signs of mastitis. Results of the milk cultures will help identify which bacteria are causing the mastitis. In turn, this information can be used to alter mastitis control, prevention, and treatment options to fit your herd's conditions. During an investigation of a herd dealing with high somatic cell counts or a high incidence of clinical mastitis, milk culture results provide essential evidence for solving the SCC problem. Milk cultures are even more important when managing a contagious mastitis problem (*Staphylococcus aureus* or *Streptococcus agalactiae)* to help make individual cow treatment and culling decisions. Extra care and precaution are necessary during the collection process using strict, clean, aseptic (without germs and bacteria) procedures to be sure that the bacteria originated from milk from the udder and not the teat end or hair, the sampler's hands, or the barn environment. If the samples are not collected, handled, and transported correctly the bacteriological results will not be of any diagnostic value. View our factsheet (http://www.ca.uky.edu/agc/pubs/id/id180/id180.pdf) for more detailed directions on collecting samples for culturing.

Culturing selected cows within a herd allows us to focus our prevention and treatment efforts. Without this information, we are merely guessing as to what the cause of the mastitis/ high SCC is. As a result, we may make changes (sometimes costly) that don't even address the root cause of the problem. For example, someone might recommend utilizing coliform mastitis vaccines to a producer facing a contagious, *Staph. aureus* mastitis problem. While the recommendation is still solid and would be beneficial for most herds, it would not be the best short-term solution for this farm. Meanwhile, *the staph. aureus* problem could grow as the contagious bacteria spreads between cows because milkers are not wearing gloves in the parlor. Culturing would provide us with the extra information we need to refine our recommendations and focus prevention strategies on the most important practices for a specific farm at a specific point in time. This can be the key component of solving a SCC crime and preventing future SCC crimes. It's simply taking advantage of the tool set that is available to us in our crime-solving arsenal, just like those television investigators do in solving human crimes. So, remember when it comes to solving a SCC crime, if you don't culture, you don't know!