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# Guidelines to Culling Cows with Mastitis

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With the price of milk and the cost of milk production where they have been the past few years, tight control over dairy management decisions will make a significant impact upon farm returns. One decision which will improve profitability is to cull problem cows. A dairy farm's goals should include: (1) Maintaining profitable levels of milk production based upon sound feeding, breeding, and management programs; and (2) An effective herd health program to reduce losses from mastitis and other cow disorders. On most dairy farms, annual culling rates exceed 30-35% of the herd. According to December 1998 DHI summary for Virginia, 36% of all cows enrolled in Virginia's DHI program were culled. The major reasons for culling in these herds were: low production, 11%; dairy, 9%; reproduction, 17%; disease and injury, 24%; mastitis or udder, 15%; feet and legs, 9%; and 15% died. Culling due to mastitis increased only to 18.5% in third and later lactation cows. This is surprising because 29% of the cows had DHI somatic cell count (SCC) scores of 5 and above and 17% were 6 and over. At the same time, an average culling rate of 36% of the herd might be considered excessive since Rogers et al (1988) concluded that the optimum average yearly culling rate was 25.1%, and this rate did not increase until sixth lactation.

Culling is often the most practical means for eliminating chronically infected cows (National Mastitis Council). There is little justification for keeping cows that have consistently high SCC, sporadic mastitis flare-ups, and infections that persist in spite of dry cow treatment. These cows can act as reservoirs of infection which may spread to other cows during the milking process. Cows which are infected with *Streptococcus agalactiae, Staphylococcus aureus* (*S. aureus*), or Mycoplasma spp. present a risk to non-infected cows in the herd. A successful *Staphylococcus aureus* control program will eliminate existing infections, prevent new infections, and have a system for ongoing monitoring of the infection status of the herd (Leslie and Schukken, 1993). In fact, the culling of chronically infected cows is one of the cornerstone recommendations in the original five-point mastitis control programs published by Philpot (1979). Cows that do not respond favorably to treatment continue to flare-up repeatedly with clinical mastitis and should be culled (Philpot and Nickerson, 1991). Their continued presence in the herd may result in other cows becoming infected.

A study was designed to determine differences in mastitis control strategies between Washington herds with low SCC and high SCC (Hutton et al., 1990). High SCC herds had an average SCC of 460,000 (+ 176,000), produced 17,299 lb. milk/cow, and 14.6% of cows were infected with S. aureus. Low SCC herds averaged 175,000 SCC (+ 60,000), 21,021 lb. milk/cow, and only 3.0% of cows were infected with *S. aureus*. Managers of herds with excellent mastitis control programs more frequently milked highest producing cows first and cows with clinical mastitis last, and a greater percentage of these herds culled cows because of mastitis (74 vs. 50% in high SCC herds).

In The Netherlands, over a 1.5 year period, data on clinical mastitis were collected from 274 herds with an average bulk tank SCC below 400,000 (Lam et al., 1997). A total of 28.5% of cows suffered clinical mastitis on at least one occasion and 10.9% of quarters showing mastitis had more than one clinical case. *S. aureus* caused 53.4% of recurrent clinical mastitis. The same pathogen was found in 35% of cases.

In one California herd, cows were cultured at calving and whenever there was a clinical episode (Leslie and Schukken, 1993). Cows confirmed positive for *S. aureus* were culled. For every $1 spent, $2.40 was

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returned, but there was an initial period of loss because of heavy costs of culling. However, the reservoir of infection remained significant with many new infections. In Ohio, two of three herds experienced a negative financial impact from excess culling, although milk production and returns from quality premiums were increased (Hoblet and Miller, 1991).

In Virginia Cooperative Extension Publication 404-228 I suggest that one reasonable use of individual DHI SCC is for determining which cows should be culled from the herd. Chronically infected cows have high SCC month after month, although some may vary considerably from one month to the next. Cows with persistent high SCC (DHI Score of 5 or greater) and especially those that carry over from one lactation to another are prime considerations for culling. Often such infections will never be cured. Consequently, these cows shouldn't be bred. Use the California Mastitis Test (CMT) on these cows. There is little chance that infections can be eradicated when cows become infected in three or more quarters. Also, cows whose milk has been withheld from the bulk tank for 28-30 days or more, or who have been treated three times or more for mastitis should be culled. This stresses the importance of keeping up-to-date treatment records.

As the age of the cow increases, the probability of *S. aureus* infections being cured decreases whether by lactating or dry cow therapy. When clinical mastitis occurred before peak production, lactation milk yield was reduced by 1,188 lb. in one study and 11% in another study. In another study, cows with clinical mastitis produced 750 lb. less milk during the 60 days following onset. In general, milk yield in cows with clinical mastitis is depressed by 1,000 lb. per lactation in second lactation cows or older and 500 lb. during first lactation. A 1,000 lb. depression in milk yield is equivalent to reduced milk sales of $148.40. A majority of clinical mastitis cases (68%) are caused by environmental streptococci and coliforms (Anderson et al., 1992), and environmental streptococci infections may usually be eliminated by antibiotic therapy. Morse (1990) reported that the duration of an episode of clinical mastitis lasted an average of 6.6 days. Discarding 6.6 days of milk (70 lb. per day) costs another $68.56 in reduced milk sales, for a total of $216.96 in lost milk sales. A financial analysis of 1996 records for 35 Eastern U.S. herds showed a net farm income of $1.48 per 100 lb. milk or $314 per cow. If such a cow had two episodes of clinical mastitis during lactation, this cow would lose money. If the cow was infected by *S. aureus*, she might have recurring clinical mastitis and production loss from two episodes would approximate $297. S. aureus infections generally do not respond to antibiotic therapy and, thus, treated milk would not have to be discarded. A lactation average SCC score of 5 would be associated with an 800 lb. reduction in milk yield ($119) which might be accompanied by a loss of 1,000 lb. for a clinical episode, for a total reduced milk yield of 1,800 lb. during the lactation or $416. Discarding this cow's milk for more than 30 days would result in a negative income, without considering reduced milk yield. In fact, in this example, this cow with one episode of clinical mastitis would lose money if her milk were discarded for 16 days or more.

The preferred approach to controlling *S. aureus* mastitis is through prevention of new infections (Leslie and Schukken, 1993). This includes sanitizing teatcups between cows, segregation of infected cows although costly and time-consuming, and avoiding the introduction of infected cows into the herd, including replacement heifers.

The following guidelines for selecting unprofitable or problem cows for culling were proposed by Jones and Lineweaver (1985) and are still appropriate:

1. Low producing cows (more than 20% below herd average or DHI "E" rated cows).
2. First-calf cows producing 30% or more below herd average.
3. Cows with consistent, chronic clinical mastitis infection (cows whose milk has been withheld from the bulk tank for 16 days or more, or who have been
4. Keep no calves from the bottom 15-20% of the cows (the "E" cows again). Sell calves and yearlings from all low producing cows.

Mastitis control is not achieved by aggressive culling because such a control program does not prevent the spread of new infections caused by *Staphylococcus aureus*, and to a lesser degree, *Streptococcus agalactiae* and Mycoplasma.

*Reviewed by Christina Petersson-Wolfe, Extension specialist, Dairy Science*

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