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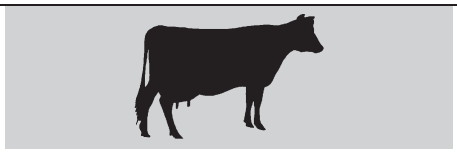

Characterization of management practices used on Kentucky dairy farms with low somatic cell counts

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ABSTRACT

The objective of this research was to summarize management practices used by Kentucky dairy herds with low SCC. Herds with an annual mean SCC <250,000 cells/mL were identified from Dairy Herd Improvement Association (DHIA) and milk-cooperative records. A 54-question survey was mailed to 71 producers, with 48 producers (67.6%) responding. Lactating herd size ranged from 25 to 2,000 cows, with a mean (±SD) of 145 ± 297. Mean (±SD) DHIA SCC and producer-reported SCC were 190,333 ± 36,281 (n = 27) and 223,475 ± 71,257 (n = 40) cells/mL, respectively. Housing facilities included freestalls, tie-stalls, compost bedded packs, bedded packs, and no housing. The most common management practices incorporated by these producers were postdipping (100.0%, n = 47), drying teats before attaching milkers (95.8%, n = 46), predipping (91.7%, n = 44), dry treating all quarters of all cows (85.4%, n = 41), incorporating DHIA as an SCC management tool (83.3%, n = 40), using individual towels to dry teats (77.1%, n = 37), receiving bulk-tank SCC (77.1%, n = 37), and trimming hooves at least annually (75.0%, n = 36). When asked to identify the management practice that contributed the most to their low SCC, the most frequently cited practices were (1) keeping cows and facilities clean (n = 31), (2) maintaining dry, clean bedding (n = 14), (3) adhering to a consistent milking routine (n = 10), (4) forestripping (n = 7), and (5) pre- and postdipping (n = 7).

Key words: low somatic cell count, best management practice, dairy survey

INTRODUCTION

Mastitis costs $71 per cow annually and $179 per clinical-mastitis case (Bar et al., 2008). Somatic cell count is a useful predictor of a herd's udder health status. Maintaining a low SCC can be linked directly to a farmer's management style (Barkema et al., 1999) and relates to the cleanliness of the farm (Haskell et al., 2009).

Shook (1989) explained, "where eradication is not possible, sanitation is an essential first step to reduce exposure of animals to disease." Exposure to environmental pathogens may be reduced for clean animals (Sant'anna and Paranhos da Costa, 2011). Excessive dirt or manure, particularly on the legs and udder, has been positively associated with increased mastitis (Schreiner and Ruegg, 2003; Reneau et al., 2005). Freestall cleanliness is often associated with reduced environmental bacteria exposure (Hogan et al., 1989). Management practices may help reduce cow exposure to environmental bacteria and minimize contagious bacteria spread. For example, premilking hygiene, including predipping, can reduce the teat-end and skin bacterial contamination before attaching the milking unit (Galton et al., 1986; Pankey, 1989).

In 2012, the average SCC for southeast (Florida, Georgia, Kentucky, and Tennessee) dairy farms was 330,000 cells/mL, compared with 255,000 cells/mL in other regions of the United States (Dong et al., 2012). The objective of this research was to summarize management practices used by Kentucky dairy herds with low SCC. Results of this survey may be used to promote best management practices among other producers attempting to lower SCC.

MATERIALS AND METHODS

Kentucky herds with an average annual SCC of <250,000 cells/mL were

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identified through data provided by Dairy Herd Improvement Association (**DHIA**) and 4 participating cooperatives: Maryland and Virginia Milk Producers Cooperative Association Inc. (Reston, VA), Organic Valley (La Farge, WI), and Mideast and Southeast Area Dairy Farmers of America Inc. (Kansas City, MO). Although DHIA and cooperative SCC values were used to determine study eligibility, producers were also asked to report their most recent bulk-tank SCC. The list of producers' names and addresses was used only to distribute surveys and was not referred to after final survey distribution.

A 54-question survey was mailed in late November 2010 to the 71 producers who met the SCC requirement. The same survey was mailed again in early January to those who had not responded by December 15, 2010. One incomplete survey was omitted, leaving 48 completed surveys to include in the analysis (68% return rate). Data were entered into and descriptive statistics were analyzed in Excel (Microsoft Corporation, Redmond, WA). The MIXED Procedure of SAS (SAS Institute Inc., Cary, NC) was used to evaluate the fixed effects of breed group (Holstein, Jersey, Brown Swiss, Ayrshire, and mixed or combination herds) and milking frequency (2× or 3× daily) on DHIA- and cooperative-reported SCC.

RESULTS AND DISCUSSION

Mean (±SD) DHIA SCC and producer-reported SCC were 190,333 ± 36,281 (n = 27) and 223,475 ± 71,257 (n = 40) cells/mL, respectively. The same annual mean DHIA SCC was not updated between the first and second mailings to unresponsive survey recipients. However, because producers responded to the survey at different times, the most recent bulk-tank SCC reported by surveyed producers were obtained on different dates. Seasonal results on bulk-tank SCC were unlikely because data were collected between the winter months of November and January.

Herd size ranged from 25 to 2,000 lactating cows, with a mean (±SD) of 145 ± 297 (n = 48), almost twice as high as the Kentucky mean of 77 milking cows (from October to December 2010; USDA et al., 2012). Although the mean herd size is greater than the average Kentucky herd size, the largest herd in the state (2,000 milking cows) was included in the analysis, which skewed the mean. The median herd size in this study was 72 lactating cows, implying that the farms included in this survey were likely representative of the state's dairy population. Herd size did significantly affect SCC in a study by Dong et al. (2012). Conversely, Ingham et al. (2011) observed a significantly higher mean SCC in small herds (≤118 cows) than in large herds (119 to 713 cows) and confined animal feeding operations (≥714 cows) of 369,000 cells/mL, 273,000 cells/mL, and 240,000 cells/mL, respectively. Norman et al. (2011) reported that large herds were less likely to break SCC quality limits.

Surveyed producers often owned more than one breed of cows. The most common breeds were Holstein (85%, n = 41) and Jersey (27%, n = 13). Other breeds represented included Brown Swiss (13%, n = 6), crossbred (8%, n = 4), Ayrshire (4%, n = 2), Guernsey (4%, n = 2), Dutch Belted (1%, n = 1), and Milking Shorthorn (1%, n = 1). Breed group did not have a significant effect on DHIA- or cooperative-reported SCC ($P = 0.49$).

Participating farms employed a mean (±SD) of 2 ± 2 milkers (n = 48), with a range of 0 to 9. Bartlett et al. (1992) associated the use of hired labor with lower SCC. Hired labor may allow a producer to focus on management while designating milking tasks to the hired milkers. Ninety percent of farms milked twice daily (n = 43), and the other 10% milked 3 times daily (n = 5). Milking frequency did not have a significant effect on DHIA- or cooperative-reported SCC ($P = 0.32$). Dong et al. (2012) was also unable to identify an association between milking frequency and SCC.

Most producers managed partial confinement systems, providing cows ≥4 h outside per day (54%, n = 26). Ten (21%) of the farms were total confinement with no daily pasture access and exclusively pasture or grazing systems (17%, n = 8). In a survey of 204 Kentucky farms by Russell and Bewley (2011), 48% of the farms were pasture or grazing systems, 38% were partial confinement, and 14% were total confinement. Producers surveyed in this study used more partial confinement systems and less pasture or grazing systems. Total confinement operations have been associated with an increased incidence rate of mastitis caused by *Escherichia coli* (Schukken et al., 1991). In a study by Pomiès et al. (2000), turning cows out to pasture did not significantly increase SCC. Sant'anna and Paranhos da Costa (2011) cited a higher percentage of dirty cows on pasture during January to March when rainfall was increased, indicating that mud had a negative effect on cow hygiene. Because mud, moisture, and manure are the primary sources of teat-end and skin environmental pathogen exposure (Schreiner and Ruegg, 2003), ambient weather and pasture maintenance likely affect SCC more than the act of pasturing animals itself.

Producers were asked to cite what they thought was the most important key to maintaining a low SCC (Table 1). The most commonly cited practice was keeping cows and facilities clean (n = 31). Barkema et al. (1998a) cited that more attention was paid to hygiene in herds with a bulk-tank SCC ≤150,000 cells/mL. Cows with dirty udders require more care in premilking preparation and are a sign of facility and management problems (Sant'anna and Paranhos da Costa, 2011). Cows with dirtier legs were 1.3 times more likely to have major pathogens isolated from milk samples (Schreiner and Ruegg, 2003). Using a 5-point hygiene scoring system, each increase of 1 SD of udder, hind-legs, and the combination of udder and