A thorough analysis of mastitis and lost milk production in dairy cows

What is this research about?

Mastitis is the most common disease of dairy cattle, and is responsible for large economic losses for dairy producers, mostly as a result of reduced milk production. Mastitis is a persistent inflammatory condition of the udder, in which the milk-producing mammary glands are damaged by bacterial toxins. Mastitis can be detected in the milk by looking at the somatic cell count (SCC), which is a measure of white blood cells (part of the infection response) in the milk. Cows with a SCC greater than 100,000 somatic cells per mL of milk are considered to have mastitis. Typically, the higher the SCC is, the lower the milk quality. Several studies have attempted to describe the relationship between SCC and milk production, but most of these only took one measurement per animal. Also, no research has yet been done to study level of milk production as a risk factor (something that increases the chance of getting the disease) for production loss, despite the fact that individual animals which produce more milk are more likely to develop mastitis.

What did the researchers do?

869,414 test-day records were collected from 115,617 Ontario Holstein cows. Each test-day record included: 24-hour milk yield (amount of milk produced), 24-hour fat yield, stage of lactation (number of days producing milk), number of previous births, season (warm: May-Sept, cool: Oct-Apr), and milk quartile class (for example, MQ4 consists of the animals that produce the highest amount of milk of all the animals measured in a herd). A model was then created to determine the mathematical relationship between a cow’s SCC and milk loss, while taking into account the effects of MQ, season, and number of previous births.

What you need to know:

A mathematical formula was created to describe the relationship between the severity of a cow’s mastitis and the resulting decrease in milk production. Milk loss was greater for higher somatic cell counts, higher milk production, and greater number of previous births.
What did the researchers find?
Milk loss was found to increase with increasing number of previous births, which agreed with earlier findings from other research groups. Milk loss was also found to increase with increasing milk production, as measured by MQ, suggesting that high milk production is a significant risk factor for greater milk loss. Season had no effect on the relationship. Milk loss was higher with higher SCC values, and the estimates of milk loss per SCC value was on the upper end of or higher than earlier published findings. This may be because this study collected more data from each cow and thus was able to make better comparisons.

How can you use this research?
Dairy producers can use this research to understand how different factors such as milk production, number of previous births, and SCC values influence milk loss due to mastitis.
Veterinarians can use this research to help dairy producers decide when to treat mastitis, based on both the cost of the treatment and the cost of lost milk production.

Article citation:

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