Impact and Mitigation of Heat Stress for Mastitis Control

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According to the thermoneutral zone for lactating cows, which is between -15°C and 25°C, mature cows are able to maintain a normal body temperature and basal metabolic rate. Dairy cow experiences heat stress and discomfort above this zone. Rectal or vaginal temperatures and respiration rate (> 60 bpm) are two methods for measuring "heat," but a combination of environmental temperature and humidity known as the temperature-humidity index (THI) measures the effect of heat stress on cows and is one of the best tools for reflecting the true impact of the environment on the cow.

The main concern is often loss of milk production, but heat stress can also cause lower milk quality, increase the incidence of mastitis and somatic cell count. several studies have identified heat stress as a contributor to lower milk quality. In cows as other animals, Cortisol levels in the blood is an indicator of stress responses. As temperatures rise, there is an acute increase in cortisol but over time, as animals adjust to the increased heat load, cortisol levels decline. Immune function is probably impacted by this alteration in adrenal tone. The idea of a connection between endocrine and immunological function is supported by the fact that heat stress increased circulating leukocyte counts in a way comparable to direct corticotrophin injection. Prolactin is another endocrine signal of the immune system and is considered a cytokine. Prolactin is known to regulate several physiological functions via its effects on cellular processes such as proliferation, differentiation, cell survival, and immune function. The actions of prolactin are mediated through the prolactin receptor. Heat stress like other stressors will affect prolactin signaling either by synthesis, secretion of prolactin or through receptor expression. Heat stress perturbs prolactin release and affects dairy cow lactational performance and immune cell function. Collectively the effects of heat stress on cortisol and PRL are consistent with a decrease in cow immune function. Heat stress may negatively

affect the process of involution during the dry period due to endocrinological changes reduced estrogen and increased prolactin. We know that during earlier steps of involution many immune cells are active in the mammary gland to prepare mammary tissue for the next lactation. Successful immune function is very important to protect the mammary gland during lactating and non-lactating period. Some negative impacts of heat stress are, decreased milk production in subsequent lactation and Increased bulk milk SCC. Furthermore, it is important to keep bedded areas CLEAN and DRY. This will help to reduce bacteria growth and encourage cows to lay in stalls instead of the alley when trying to stay cool, but during the summer bacterial contamination of bedding material increases and increased humidity levels help provide the best environment for bacteria growth.

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