Decreases in Milk Production Seen 1 to 2 Days after Heat Stress Event

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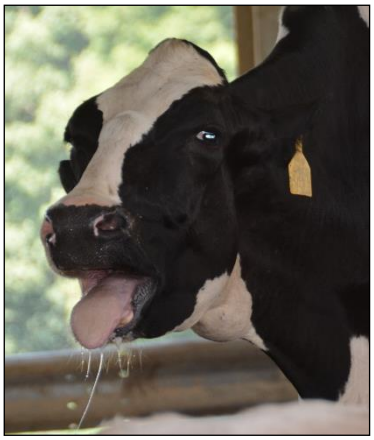
The dog days of summer definitely come with increased environmental temperatures and, often times, high humidity, resulting in heat stress conditions for dairy cows, as well as those who care for them. Heat stress results in an increased body temperature, which can negatively impact milk production, reproductive performance and health of cows. These effects can be seen in not only the milking herd, but also in dry cows, heifers, and baby calves. To maintain a normal body temperature, cattle must dissipate heat gene rated from digesting their feed along with the additional heat load from their environment with increasing temperatures. Shade, air movement with fans and through natural ventilation, and wetting of the hair coat with sprinklers/soakers help decrease this heat load and help mitigate the negative impacts caused by heat stress to dairy cattle. By learning more about how dairy cows respond to heat stress, one can better manage one's dairy herd and minimize the negative impacts resulting from heat stress.



Heat Stress Lags Increasing Ambient Temperature

Dairy cows are most comfortable when the environmental temperatures are between 40 and 77ºF, known as the thermal-neutral zone. As the environmental temperature increases above this threshold, dairy cattle must expend energy to dissipate the additional heat load to maintain their body temperature. At the same environmental temperature, increasing humidity increases the heat stress potential. Thus, the potential for heat stress is often defined using a temperature-humidity index, which meteorologists often refer to as heat index. Temperature-humidity indexes at or above 68 are generally considered to have a negative effect on dairy cattle performance.

Normal circadian rhythms result in lower body temperatures found in the morning with maximums seen later in the afternoon. In addition, environmental temperatures generally increase throughout the day along with cattle becoming more active during this time period. These changes result in an increased amount of heat that needs to be dissipated and, thus, an increased potential for heat stress and greater heat stress potential later in the day.

Cows are better able to deal with the increased heat load when the difference between the daytime and nighttime temperatures are greater. This difference in temperature allows cows to dissipate the heat load generated during the day. When a difference in temperature does not exist, cows become subjected to a more continuous state of heat stress and performance can be impacted to a greater degree and more prolonged period of time.

Increases in body temperature are seen 1 to 5 hours after an increase in ambient temperature. Thus, the physical effects of heat stress, such as increased number of respirations per minute or panting, are seen a few hours after the start of the heat stress event and not at the start. Thus, waiting until you see signs of cows undergoing heat stress to implement, change or increase heat abatement practices is later than ideal. Remember that dairy cows, which experience a short period of heat stress, take 5 days to recover.

Holsteins are more susceptible to heat stress than Jerseys. Within a breed, higher producing cows have a lower heat stress threshold than lower producing herd mates. Higher producing cows eat more which generates more heat during the digestive process and they also generate more heat from metabolic processes needed to produce the additional amounts of milk. Dark-haired cattle absorb more solar radiation than cattle with a lighter hair coat.

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Cow Performance Impacted Long After Heat Stress

Decreased Fertility: Heat stress negatively affects fertility with decreases seen in estrus expression and duration, conception rates, and early embryo development and survival. Heat stress occurring *1 to 2 days before AI and during early pregnancy* can decrease fertility. These negative effects on reproduction can last 6 weeks past the heat stress. Fertility of bulls used for natural service is also negatively impacted by heat stress and may last for up to 6 weeks.

Decreased Milk Production: Drops in milk production are the performance indicator most producers notice first. However, a lag time of 24 to 48 hours exists after a heat stress event before the majority of decreases in milk production are seen. For each unit increase in temperature-humidity index, Holsteins decreased milk production by almost 2 lbs of milk. Cattle under heat stress eat less and generally have lower milk production. However, this drop in feed intake only explains about half of the drop in milk production. Changes in metabolism and the use of energy to dissipate the added heat load, i.e. panting and sweating, explain the additional half of the drop in milk production.

Increased Disease Chances: Heat stress decreases the response of the immune system to fight off a disease challenge. Thus, making cows more susceptible to mastitis and other diseases, such as metritis. In addition, coliforms and other bacteria that cause environmental mastitis are more prevalent in the summer months compared to cooler times of the year. Heat stress has been shown to decrease lying times by 30%. As dairy cows spend more time standing in an attempt to dissipate the additional heat load, the incidence of lameness may increase.

Continuously Review Heat Abatement Practices

To minimize the effects of heat stress on the milking dairy herd, review your heat abatement practices throughout the year. Heat stress, although milder, can also occur at times other than the hot days of summer.

1. Fans in eating and resting areas and in the holding pen should come on automatically when temperatures are greater than 65°F. Sprinklers or soakers should be placed on a timer and run for approx. 2 minutes and off for 10 to 12 minutes with fans running continuously when temperatures are greater than 68°F. Soaker time should increase with increasing temperatures.
2. Ensure adequate amounts of cool, clean water are available at all times.
3. Mix feed twice a day with more feed fed at night since cows eat more during the cooler hours of day.
4. Ensure adequate amounts of potassium and sodium are included in the diets to replace those lost as a result of heat stress.
5. Remember to provide heat abatement to dry cows as heat stress reduces future milk production and calf survivability.
6. Calf hutches should also be shaded to reduce heat stress on baby calves and improve their immunity.