KIRKTON
BOVINE SERVICES

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DAIRY NEWSLETTER

Heat Stress – Don't Forget about the Dry Cows

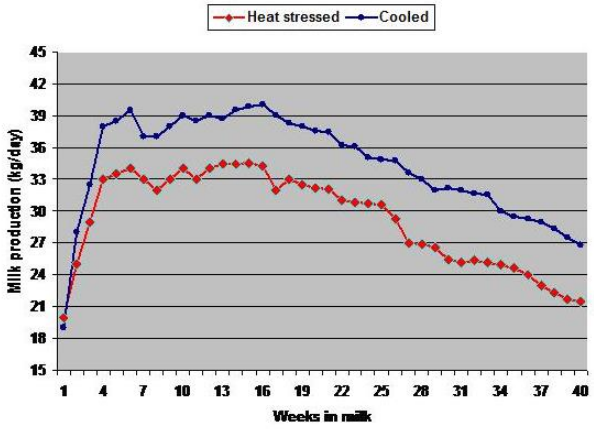
Winter 2018 seemed like it would never end and yet, here we are, complaining about the heat again. The negative effects of heat stress in the lactating cow herd are obvious – feed intake decreases, milk production drops and reproduction usually plummets. But the impacts the heat can have on the dry cow, the subsequent lactation and the newborn calf, are just as detrimental and equally costly.

Dry cows that experience heat stress carry many of the profound negative impacts into their lactation, and the deleterious effects of heat stress in the dry period can not be corrected simply by cooling the cows once they are milking. Prevention is key. Cooling strategies for dry cow is necessary!

Effects on Milk Production:

Dry cows that experience heat stress consistently produce less milk during their lactation, compared to a cow that went through the dry period without being exposed to heat stress. **On average, more than 20% less milk in their eventual lactation**! In addition to less milk, components were also reduced, namely butterfat, as heat-stressed cows consistently produce more 3.5% fat-corrected milk throughout the lactation.

Figure 1. Lactation curves for 2 groups of dairy cows exposed to heat stress or cooling during dry period (Tao, et.al, 2011)



Why Less Milk from Heat Stressed Dry Cows?

- Reduced dry matter intake
- Increased risk of transition cow diseases
- Decrease immune function
- Lower mammary blood flow and mammary epithelial cell proliferation

Effects on Dry Matter Intake:

Similar to lactating cows, **heat-stressed dry cows have reduced dry matter intake**. Reduced intakes lead to an increased risk of a negative energy balance throughout the dry period and early lactation, **increasing the risk of milk fever, ketosis and other transition illnesses**. Reduced intakes also lead to reduced rumination, that decreases saliva production and increases the risk of rumen acidosis and related troubles.

Effects on Health and Immune Function:

Both innate immune function and adaptive immune function are affected by late gestation heat stress. This means that a cow's ability to naturally fight off disease or infection is compromised, as well, her ability to

develop immune memory cells to prevent the disease from re-occurring is also reduced. Studies have found **higher incidence of mastitis, respiratory disease and retained placenta in the first 60 days in milk in cows that were dried off in the summer**, compared to cows dried off during the cold winter months. Cows that were dried off in the hot summer months also had longer days to first breeding and an increased number of breeding services were required, compared to cows dried off during the winter months.

Effects on Udder and Placental Development:

Heat stress in dry cows causes a reduction in both mammary and placental blood flow. When blood flow is limited to these organs, development of these organs is inhibited. The dry period is when the mammary system is supposed to regenerate and proliferate new epithelial cells to aid in increased milk production. In properly cooled dry cows, this epithelial cell proliferation occurs three to six weeks prior to calving. Unfortunately, with a lack of blood flow due to heat stress, this cell proliferation is restricted and is a major contributor to the reduced milk production throughout the subsequent lactation.

Similarly, reduced blood flow to the placenta results in lower placental weight and lower circulating placental hormones. As a result of this, as well as reduced uterine and umbilical blood flow, fetal development is compromised in heat-stressed dry cows. Because of this, **calves born to dry cows that are not adequately cooled are on average born 5-7 days earlier** compared to cooled cows. The bovine fetus grows 0.5kg/day in the last week of gestation, so when this final week is removed, in addition to the reduced placental efficiency for nutrient transfer, calves born to heat-stressed cows have **significantly lower birth rates.**

Effects on Calves:

A heat-stressed dry cow produces a lower birth weight calf, but she also produces less IgG antibody in her colostrum compared to a dry cow that is cooled. Therefore, calves born to heat stressed cows were **more likely to have failure of passive transfer**, despite being given adequate amount of colostrum within a reasonable time frame.

Differences are still evident at weaning, as calves born to heat stressed cows have **lower weaning weights (65.9kg vs. 78.5kg) compared to cooled cows**, despite calves receiving the same quantity of milk. (Tao et.al, 2014). The growth rate continues to differ between these groups of calves, as even out to 7 months of age, calves born to heat stressed cows were shorter and lighter compared to their cooled cohorts.

Ways to Promote Cooling of Dry Cows

- Provide plenty of drinking water! Make it readily available and accessible.
    - Ideally farms should have at least 2 sources of drinking water per dry cow pen and flow rate should be checked to ensure cows can consume their desired quantity efficiently. 3.5” of water space per animal should be provided
- Provide shade, good ventilation and airy movement!
    - If dry cows are pastured, ensure there is a shade shelter or shade canopy from trees. If housed indoors, provide shade awnings if direct sunlight to the pen is an issue.
    - Add additional fans and ensure adequate air changes – ideally air should be moving at >200ft/min
- Invest in sprinkler or misting systems to help keep cows cool

We can’t stop the heat from coming, but we can make management decisions that will make all of the cows on our farms more comfortable and result in less negative effects from the scortching summer temperatures.