Cooling cows to improve calf health and long-term productivity

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It’s well known that heat stress has a negative impact on lactating cows: reduced dry matter intake, decreased milk yield, shifts in metabolism, compromised immune function and decreased mammary growth are some of the changes that have been observed. Cooling cows, through the use of fans, sprinkler or soakers, help mitigate these challenges. But what about calves? What impact does heat stress have on calf health, calf growth and future productivity? The negative impacts of heat stress can occur prior to birth and carry through life. Heat stress during the last 6 to 7 weeks of gestation can impact calf growth and development, as well as future immune function, health status, reproduction and milk production.

Calves that experience heat stress in-utero are born with lower body weights, shorter stature at weaning and failure to reach the same height and weight at 12 months of age as observed in calves from dams that didn’t experience heat stress. What causes the difference? Heat stressed calves are likely to be born 4 to 5 days earlier, accounting for a percentage of the smaller size, however the lighter birth weight is more likely due to placental nutrient insufficiency and decreased dry matter intake. Calves that experience heat stress in-utero have permanent changes in metabolism, as they have had to make physiological accommodations in response to the higher heat loads, less effective placental support and reduced maternal nutrient intake. Heat stressed calves tend to have smaller frames and greater fat deposition as compared to calved from cooled dams.

Late gestation heat stress also affects both passive and developing immune competence in the calf. Calves that experience heat stress in-utero have a reduced capacity to absorb IgG in the colostrum. It has been reported that heifers born to heat stressed dams left the herd at a higher frequency prior to puberty as compared to non-stressed dams.

Growth and immune function are not the only areas of concern, long-term productivity if also impact by heat stress. The goal of a heifer program should be to raise the highest quality heifer that can maximize profits when she enters the lactating herd. Heifers that experience heat stress in-utero are at a disadvantage. In addition to reduced growth, and weaker immune system, heat stress in-utero leads to increased number of services before conception (2.6 vs 1.8) and decreased milk production. One study reported a 5.1 kg/day difference for the first 35 weeks of lactation between heifers that experience heat stress in utero and those that did not.

The heat-stressed dry cow often has an elevated respiration rate, depressed feed intake and a higher rectal temperature, however, these signs of heat stress are less obvious as compared to those exhibited by a lactating cow. While outward signs may be harder to detect, the impact of heat stress on the cow and the growing fetus can be great. Cooling cows during the dry period increases mammary growth, maintains dry matter intake and improves immune status during the transition into lactation, but the most significant impact of cooling dry cows, may be the benefits that accrue to the calves born from cooled cows as compared to heat stressed dams.