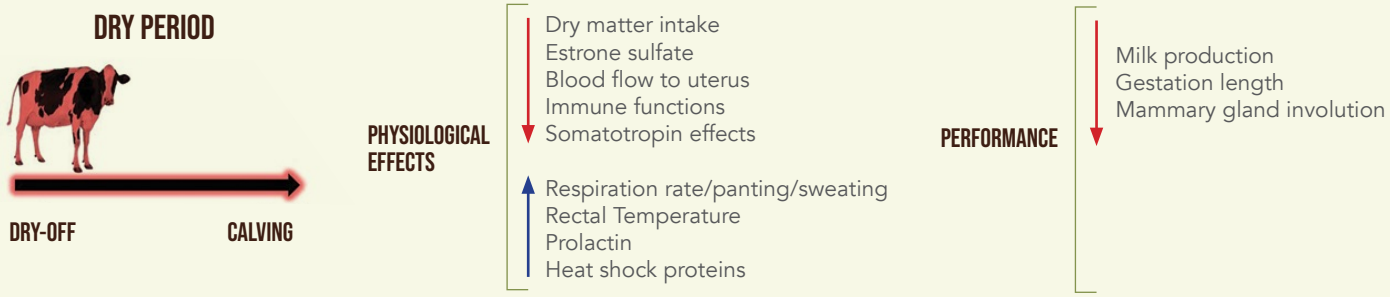
HEAT STRESS

HEAT ABATEMENT: A COOLING INVESTMENT THAT KEEPS ON GIVING.

Heat stress not only impacts cows in the short-term, but can have long-term intergenerational consequences. Failing to cool cows not only causes economic losses today but also costs you in the years to come.

OFTEN OVERLOOKED: COOLING DRY COWS



Heat stress on gestating cows not only affects the cow but also the developing fetus, since thermoregulation of the fetus is dependent on the dam's ability to cool herself. When dry cows are not cooled under heat stress environments, maternal heat is transferred to the fetus via the placenta and uterus causing the fetus to be heat-stressed. The cow responds to heat stress by diverting blood flow from the gravid uterus to the periphery in an effort to maximize maternal radiant heat loss, thereby limiting the fetal temperature increment (Reynolds, 1990).

HACK FACT 1

When blood flow to the pregnant uterus is reduced, placental function is affected, limiting fetal growth and resulting in epigenetic changes that may contribute to altered postnatal phenotypes.

Late-gestation heat stress exerts epigenetic carryover effects on at least two subsequent generations. Heifers born to heat-stressed dams during late gestation were smaller and produced 11.2 lb/d less milk in their first lactation relative to heifers born to cooled dams, despite their similar age and weight at calving (Skibiel et al., 2018a). It is clear that maternal heat stress exerts lifelong negative impacts on the resulting offspring that cannot be rescued by postnatal management (Laporta et al., 2020).

HACK FACT 2

Providing heat abatement to dry-pregnant dams is important to rescue milk loss of the dam and to prevent losses in their progeny (Laporta et al., 2020).

Lack of cooling impacts reproduction
The effects of heat stress on reproductive performance are well-documented and result in significant economic losses to the dairy. The economic losses are primarily due to increased calving intervals and culling rates.

Dransfield et al. (1998) reported that the number of mounts in warm months was almost 50% lower compared with cool months, resulting in fewer cows being inseminated or inseminated at the wrong time.

HACK FACT 3

Timed AI protocols may reduce the necessity of visual estrus detection and increase pregnancy rates.

Conception rates decreased by 23% for heat-stressed cows compared to thermoneutral cows (Garcia-Ispiearto et al., 2007). And Pereira et al. (2013) found that rectal temperatures above 102.4° F on day of insemination caused conception rates to significantly drop by 28.5%.

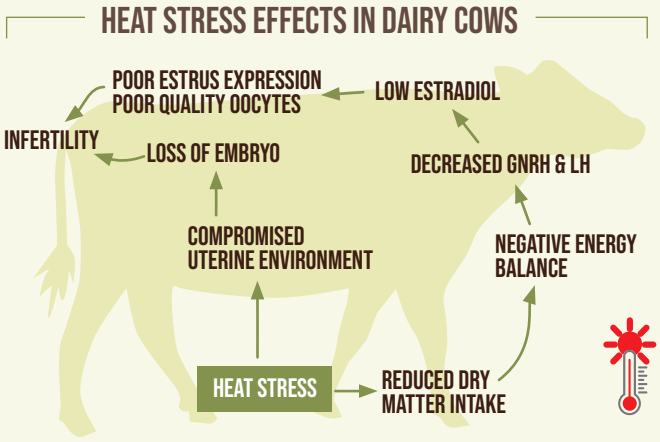
On the day of breeding, cows exposed to ≥9 h of a THI of 73 had a 26% decrease in conception rate compared with cows exposed to a THI of 73 for < 9 h.

HACK FACT 4

Ensuring cows are cool on day of insemination can improve conception rates.

Heat stress affects endocrine status, follicular growth and development, and the luteolytic mechanisms. It also affects early embryonic development, survival, and fetal growth.

Cooling cows by physically modifying their environment has large economic benefits in reducing the summer slump in milk production, milk components, getting cows pregnant, and the number of straws per conception, as well as improving the calving interval together with producing progeny that can perform to their genetic potential.



HACK FACT 5

Altering the physical environment by providing shade, misters, fans, sprinklers, or a combination of these heat-abatement methods can help alleviate the negative effects associated with heat stress (Becker et al., 2020).