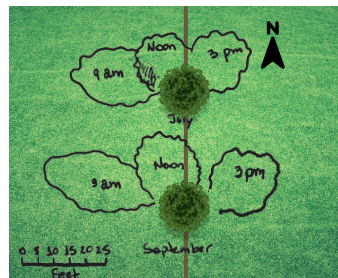




Provide 40 sqft of shade per cow

Use paddocks with shade trees during periods of heat stress.



- Provide enough space so cows will not congregate (reduce mud formation and chances to kill the tree)
- Planting shade trees on the west side of pastures will provide protection from the afternoon sun.

Shade patterns of a 20-foot tree during summer months. Information is intended as a guide.

Mobile shade structures can be built using pipes and shade cloth that reduces light by 80%.

- Can be moved in the paddock to avoid manure build up and damage to the forage.

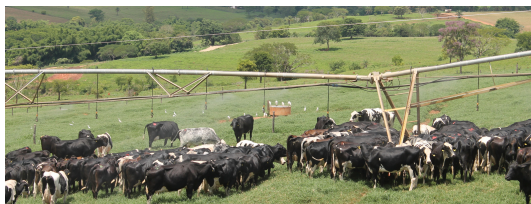


Cows under a portable shade structure



Water

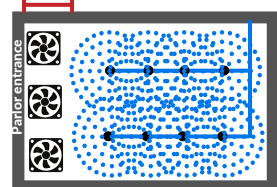
Grazing dairies using center-pivots can cool cows during summer using the pivot sprinklers - cows will spend periods of time under the pivot sprinklers before moving out to the pasture to evaporate and cool down.



Cows under the pivot mist

The time cows spent in the holding pen before milking is a great opportunity to cooling down grazing cows

Drip dry area



- Place sprinklers 8 to 10 feet above the holding pen floor.
- Holding pen fans should be set to come on at 65°F.
- Wet cows to skin, the udder will not get wet when done correctly.

Not to scale. Information is intended as a guide.

Breeding as strategy to improve heat tolerance

Some cows have a naturally shorter hair coat. Those cows, called "slick", have this different hair coat due to a mutation in the prolactin receptor gene. This mutation occurs naturally in some breeds and is dominant - meaning inheritance of one copy of the gene leads to the offspring having short hair.

The slick gene was introduced to the Holstein breed, and recent studies have shown that slick cows are more heat tolerant and that the slick gene minimizes the effects of heat stress on milk production.



Slick animals have a short and sleek hair coat that was most obvious because of the very short hair on the face and poll. Image: Adapted from Dikmen et al. (2014)

Introducing the slick gene in your herd can be an effective way to improve the weather resilience of your cows!



MSU Extension dairy team

Find us at:

Dairy at MSU

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For additional information or if you are interested in discussing your heat stress abatement strategies, please do not hesitate to contact Michigan State University Extension / Dairy Team personnel. To contact an expert in your area, visit <https://extension.msu.edu/experts>, or call 888-MSUE4MI (888-678-3464).



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MOVING MICHIGAN DAIRY FARMS TOWARDS CLIMATE AND WEATHER RESILIENCY



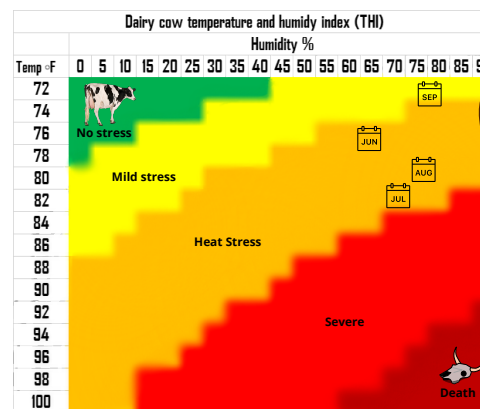
MOST OF THE STATE OF MI HAS WARMED TWO TO THREE DEGREES (F) IN THE LAST CENTURY.



Change in temperature is accelerating, Experiencing warmer nighttime temperatures and winters



The temperature-humidity index (THI) takes into account both temperature and humidity to estimate the level of heat stress cows will experience based on environmental conditions.



High-producing cows can begin to experience heat stress in barns at air temperatures as low as 65°F.

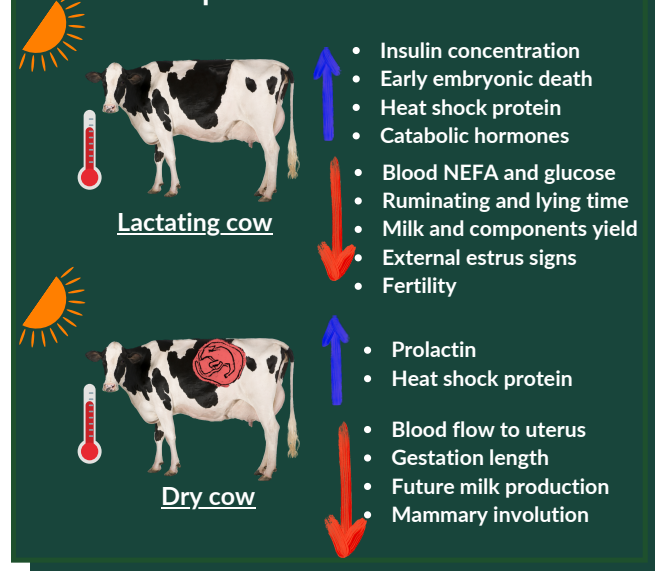


Number of heat stress days per year

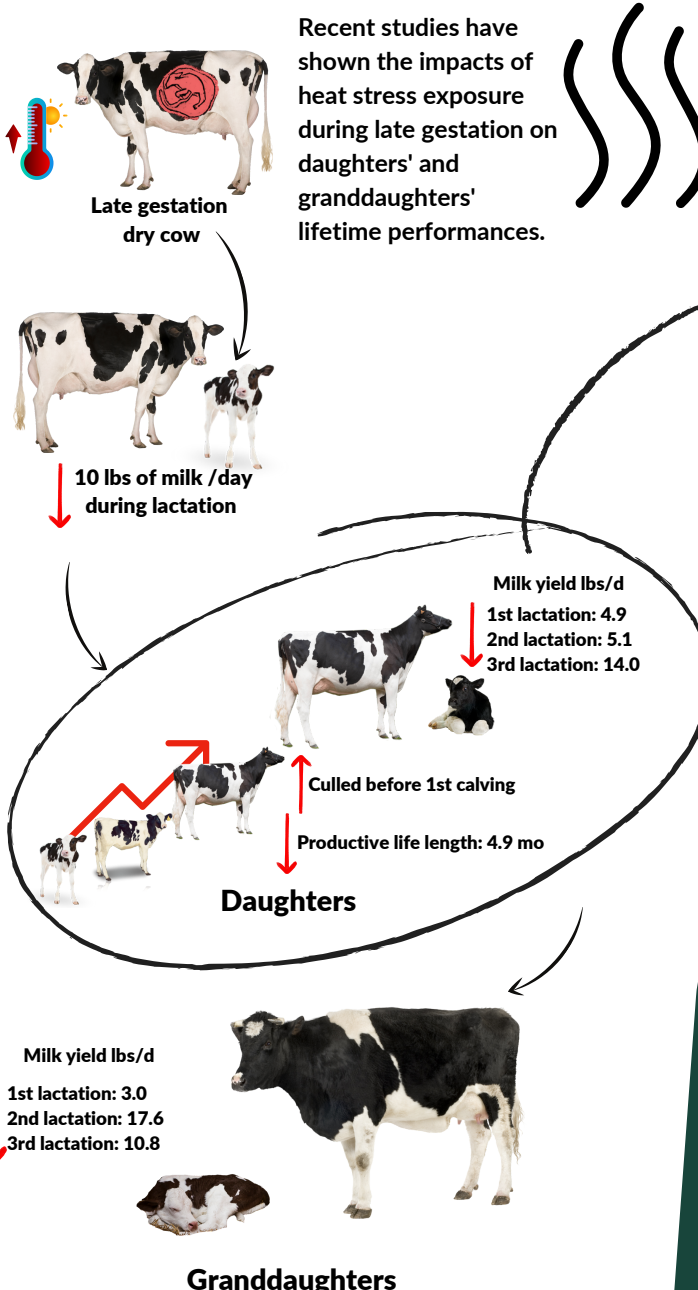
Months in the graph indicate a THI calculated using Michigan's average high temperature and average humidity.

Source: Laporta et al. 2020

Impact of heat stress



2 Generations!!!



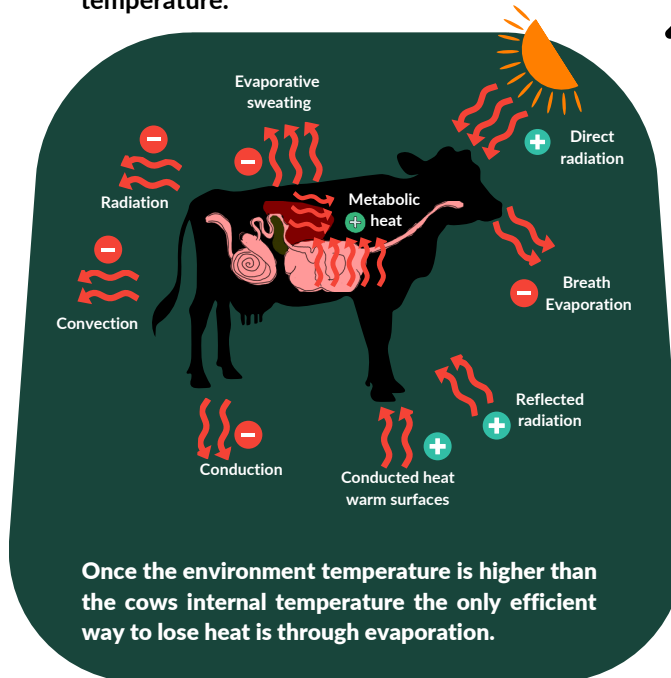
Recent studies have shown the impacts of heat stress exposure during late gestation on daughters' and granddaughters' lifetime performances.



Annual economic loss associated with extra heifer rearing costs, reduced productive life length, and milk yield of daughters, estimated for Michigan

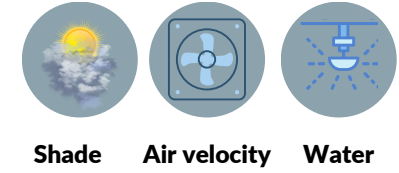
How do cows cool down?

The heat absorbed by the environment and produced by the metabolic process need to be lost and help the cow control its internal temperature.

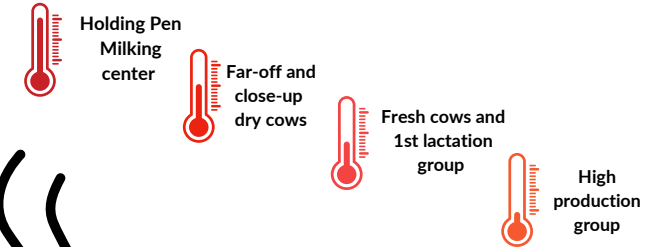


Opportunities

Appropriate cooling system relies in 3 components



When installing a refrigeration system, prioritize areas where heat stress is more severe, it will have the most return and is easier to implement:



Cooling strategies:



Hydration is VERY important for a cow to regulate body temperature.

Water

Water should be provided with free access all the time!

- 1.5 inch tank perimeter per cow.
- At least two sources.
- Extra space warm and humid conditions.
- Ideally each paddock should have a access to water.
- Cows should not walk more than 800 feet to drink water

