

## ***Reducing Heat Stress for Dairy Cattle...***

Heat stress takes a toll on dairy cattle almost every summer, with the impact continuing long after summer heat has past and the weather begins to cool. At temperatures above 77°F, cows have to use energy to cool themselves through heat loss via the skin and respiratory tract. High producing cows are the most sensitive to heat stress because of their high feed intake. Dry matter intake (DMI) starts to drop (8-12%) and milk production losses of 20-30% (which may exceed 10-25 lb/day) occur when temperatures exceed 90° F. It has been found that milk yield peaked at 9 lb more milk/day by cooled rather than non-cooled cows. This equates to more than 2000 lb/ lactation when cows are cooled! Dry cows whose last 3 months of gestation occurred during hot weather also had calves with smaller birth weights and more metabolic problems after calving. They produced 12% less milk in the next lactation, and conception rates were lower due to less activity during estrus, reduced follicular activity, or early embryonic death.

Heat stress can result in sick cows that require prolonged care. It is associated with difficult births, heat exhaustion, fatty liver (fresh cows), mastitis, and adverse reactions to vaccinations leading to abortion and death. Reduced feed intake, followed by slug feeding when temperatures cool down can also cause acidosis, which is considered a major cause of laminitis. As ambient temperatures rise, the respiratory rate increases with panting progressing to open-mouth breathing. Lameness, with sole ulcers and white line disease may also appear in a few weeks – to a few months – after heat stress occurs.

Heat-stressed cows will seek out shade, which they often will not leave to drink or eat, commonly standing rather than lying down and showing an evident increase in body temperature. Water is critical in helping to alleviate heat stress. During times of high heat, water consumption will increase by as much as 50%. Beede (1992) showed that cows consumed about 3 lb water/lb of DMI with temperatures between 0-41° F, but reached 7 lb/lb DMI at high temperatures, with high producing cows capable of consuming 50 gal water/day. In order to encourage water consumption: put waterers in the shade; provide access to water right after milking; provide at least 2 water locations/ group; have a water supply that will provide at least 3-5 gal/minute (cows can consume 6 gal/hour); maintain a minimum of 3 inches water depth; provide a minimum of 0.65 square feet of surface area/cow at each waterer; keep water tanks clean; monitor water temperature – cows prefer water at 70-86° F.

Shade is critical in helping to relieve heat stress. Any shade-related structure should be oriented with a southeastern exposure of an open sidewall. Be sure to eliminate any wind block within 50 ft of the windward side of the building. Each cow should be provided with 60-80 sq ft of shade and the facility needs to optimize natural ventilation as much as possible. Additionally, any holding area should have open sidewalls and ridge ventilation, and cows should be in the holding area no more than one hour per milking. The most common material used for shade is a woven polypropylene fabric, providing at least 80% shade. This material can be used for several years, if kept tight. Make sure cows under shade have adequate feed and water in order to gain the most benefit from shade.

Another consideration in helping to alleviate heat stress is fly control. Flies may cause cows to pile up or gather in a closely compacted group, contributing to heat stress. The first and most important step in fly control is sanitation, along with eliminating breeding areas on a weekly basis – including manure, wet and spilled feed and silage, rotting hay, manure drains and leaking water cups.

And when it comes to cooling it is important to remember a couple of things: cool the holding pen near the parlor using fans and sprinklers to help reduce (up to 15° F) the ambient temperature - cooled cows produce more milk than non-cooled cows! This may include planning banks of 36- or 48- inch fans about 8 ft off the ground and 6-8 ft apart, depending on pen width and place sprinklers under the fans to wet the cows every 5-15 minutes. You might also consider putting shower nozzles on an electric eye as cows exit the parlor, encouraging them to eat after milking. Placing waterers in the barn or travel lanes (with adequate space/cow) is also important.

And when it comes to feed... feed total mixed rations; increase the number of feedings, offering smaller amounts; added buffers or yeast culture; pull unpalatable feeds from the ration and remove old feed; use higher quality, more palatable feedstuffs; feed high quality forages and more digestible feeds; avoid secondary fermentation in the bunk and provide shade for the feed bunk; use mold inhibitors; maintain consistent feeding times and meet minimum fiber levels; and avoid slug feeding. Supplemental fat can also be added to rations to increase energy intake; and avoid overfeeding protein during hot weather because it takes energy to excrete excess nitrogen. Remember: cooler cows make more milk and experience less stress!

(edited from an article by Drs. Jones and Stallings, Dept. of Dairy Science, Virginia Tech; October 1999)