

Helping Cows Tolerate the “Dog Days” of Summer

Summer heat hurts milk production and breeding. In extreme situations, it can kill cows. As milk production and feed intake go up, so too does the metabolic heat produced. Therefore, it should be no surprise that high producing cows are affected most.

White cows absorb 40 percent of the hot solar radiation and reflect the rest. Black cows however, absorb about 80 percent. In a Florida study, milk production of white cows exceeded that of black cows by 600 lbs of milk per lactation, presumably because of the better heat tolerance of the white colored animals.

To reduce heat stress we must help our cows avoid the sun's radiant heat. We must help our cows dissipate their body heat. Finally, we must monitor the ration to minimize the heat of digestion. The severity and number of heat stress days common to the locality determines the measures taken to minimize heat stress and the potential economic benefit of those measures.

Heat stress can occur when the temperature exceeds 80°F with low humidity or at even lower temperatures with high humidity. Cows can tolerate higher daytime temperatures as long as the weather cools in the evening. Heat stress is characterized by one or more of the following:

- open mouthed breathing
- tongue hanging out
- excess salivation
- elevated body temperature (normal is 101-103°F)
- respiration rates greater than 80 per minute
- dry matter intake or milk production loss of 10 percent or more
- reduced conception rate
- development of unviable follicles
- decreased estrous behavior (from 14 to 8 hr.)
- early embryonic death

Start with shade ...

Most herds do not have access to natural shade. Hence, we must provide alternative sources to block solar radiation. If cattle are kept in an open lot, consider building a shade for the herd, using shade cloth fabric. Shade cloth fabric comes in various weaves providing 30-90 percent shade. A common type used is a woven polypropylene (black) fabric that provides 80 percent shade. Shade cloth can last 5 or more years if properly maintained. Keep shade 12-15' off the ground. Allow about 40 ft² per mature cow under the shade. Shades should be oriented in a north-south direction to get maximum shaded area under the structure.

In many dairies, cows have access to shade in the free stall barn, yet the bunk may be unshaded. Adding a shade over the feeding area will increase feed consumption during hot weather. Cows will stay and eat rather than seek the shade of the resting area, plus less feed will spoil.

Keep air moving ...

Natural ventilation relies on wind and the buoyancy of hot air to create air movement through the barn. Barn construction that utilizes natural ventilation forces will provide a better cow environment at a lower cost than poorly designed facilities.



The taller the barn, the more natural air movement. Sidewalls should be at least 12' high; 14 feet is better. A roof pitch of 4:12 is recommended to move hot air up and out. A continuous open ridge allows hot air to escape. A common guideline is for a ridge opening to be at least 2" for each 10' of building width. Sidewalls should open at least 60 percent to allow natural air movement through the barn.

Fans can be used to move air through enclosed barns. Air movement by fans is only as good as inlets allow. Often, providing more inlet space improves the ventilation more than another fan would. During the summer tie-stall barns may use tunnel ventilation techniques to draw huge amounts of air from one end to the other.

Dairies often have a well-ventilated free stall barn, but hot cows are corralled into a small holding area (with low ceilings and solid walls) for milking. On many farms, this is the area of most heat stress. This is typically the best place to install fans to cool the cows. Generally fans are placed every 3-4 feet along the wall. Mount them at a 30° angle to blow down and around the cows. Usually 36-48" fans are used, but if building height allows, larger paddle fans (50-60" diameter) may be more economical. Consider two-speed fans for flexibility.

Another area that might benefit from fans is the feed bunk area. Blowing air down over the cows encourages maximum feed intake! The need for this, depends upon the amount of normal air flow at the bunk area.

Wetting helps ...

Animals that are wet will dissipate more heat than with a dry hair coat. As the water evaporates, it draws heat from the surface of the animal. When the temperature of the air exceeds the animal's body temperature, all heat must be lost by evaporation. If the cow cannot get rid of heat fast enough she starts panting to increase evaporative cooling from the respiratory tract.

Dairymen can use a controlled spray system to aid in the cooling. Generally a spray system is installed over the feed bunk or in the holding area. Often, the spray system is incorporated with fans. The spray applied to the cow is dependent upon the nozzle size, spray pattern, radius of the spray, timing of the spray and operating pressure.

Sprinkling with large droplets is more effective than producing a mist or fog. Large droplets penetrate the hair coat to reach the skin for heat transfer. A fine mist actually serves as insulation on top of the hair coat.

Sprinkle cows for a short period (1/2 to 3 minutes). This should be enough time to soak cows to the skin, but not enough to get water running down the cow onto the udder. Intermittent sprinkling is as effective as continuous spraying and reduces the amount of water used.

Make ration changes ...

Pay close attention to nutrition during hot weather to help minimize the metabolic stress caused by the heat, especially the reduction in dry matter intake and milk production. Following are suggestions related to the feeding program:

- Increase the amount of freshly mixed feed offered at night and early morning. During hot weather feed about 60 percent of the feed between 8:00 p.m. and 8:00 a.m. This feeding pattern will conform to the cow's tendency to eat more when it is cool.
- Clean the feed bunks and mangers daily. Feed spoils faster in high heat and humidity. Spoiled feed decreases dry matter intake.
- Include a preservative in the TMR mix to reduce heating of the feeds. There are a variety of commercial products in the marketplace to accomplish this. Generally 1 to 2 lb per ton of TMR mix should be sufficient.



- Reduce the “heat increment” of the ration. Heat increment is the rise in the cow’s heat production due to the digestive process. Fibrous feeds generate considerable heat as they are digested in the rumen. Feed the best quality forages available. High quality forages provide more energy while keeping the fiber levels up in the diet. Within the safe parameters of the diet you may increase the amount of grain and fat in the ration to replace a portion of the forage. Be careful with this strategy however, so as not to cause acidosis. A small shift may be beneficial, a large shift may be devastating.
- Make sure the ration is balanced for all nutrients. It requires metabolic work (expressed as heat), both to excrete excess nutrients as well as to suffer the reduced efficiency caused by nutrient deficiencies.
- Maintain potassium at 1.5 percent of the diet dry matter. Adequate potassium will allow optimum balance of plasma electrolytes and water. Potassium is the predominant element of bovine sweat. Increase sodium to 0.5 percent of dry matter intake. Balance magnesium at 0.3 percent of dry matter.
- Make sure the cows have access to free-choice salt.
- Add carbonate buffers (sodium bicarbonate, sodium carbonate, sodium sesquicarbonate, potassium carbonate, potassium bicarbonate) to the diet to replace the considerable bicarbonate converted to carbon dioxide while panting. Some producers offer free-choice buffer along with the free-choice salt.
- Consider adding yeast to the diet. Research suggests a positive response to yeast during heat stress.
- Monitor the degradable and soluble protein levels in the ration. Cows fed diets high in degradable and soluble protein tend to have a greater depression of milk production during heat stress than those cows fed more undegradable protein.
- If necessary add water to the TMR so that the moisture of the TMR is between 45 and 50 percent.

Don’t forget water ...

Providing adequate drinking water may seem very simple, but of all measures suggested, this is the most important and probably least expensive to implement. During heat stress water consumption may double. Cows need water to dissipate heat through the lungs (respiration) and the skin (sweating).

Have no more than 20 to 25 cows per waterer and place them strategically so cows have access to the water source. Keep waterers in the shade. A large stock tank is especially good for supplying extra summertime water. Making water available to cows as they exit the parlor is especially beneficial. Cows will consume 30 to 50 percent of the daily water intake within 1 hour after milkings. When the cows exit the parlor there should be enough space for all cows in the group to drink at the same time.

Weekly, or as needed, the waterer should be cleaned and scrubbed using a dilute chlorine bleach solution. For water tanks, consider adding 3 oz of bleach per 50 gallons of drinking water capacity every 10-14 days.

In summary ...

You cannot change the weather! You cannot change the cow! Paying attention to a few management and facility issues however, will allow cows to better tolerate the heat. Bottom line... this means more milk and better fertility. Some of these losses such as milk production are immediate and obvious. Other losses such as the development of unviable and damaged follicles may not be recognized for 60 days, well after the heat stress.

