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Ways to Prevent Heat Stress

Planned prevention is necessary to abate heat stress.

by *Kasey Brown*, associate editor

It was a long, hard winter, and most cattlemen have eagerly awaited warmer temperatures. However, when the thermometer's mercury climbs too far in the other direction, it can still cause issues.

Heat stress is easy to recognize in cattle, says Lindsey Hulbert, assistant professor in animal science at Kansas State University, when cattle start breathing heavily and panting. Ideally, cattlemen should have already started measures to help cool the cattle before panting starts.

Terry Mader of Mader Consulting LLC adds that cattle will have an elevated body temperature and respiration rate. They also change their eating behavior by reducing feed intake when stressed.

Noticing acute heat stress is much easier than preventing it, but Robbi Pritchard, distinguished professor in animal science at South Dakota State University (SDSU), says cattlemen need to pay attention and work ahead, because by the time cattle are visibly showing signs of advanced heat stress it is too late to do much good.

"Heat stress becomes an issue when cattle can't dissipate both metabolic and climatic heat loads at night," notes Mader.

Cattle suffering from heat stress don't perform well. Feed intake declines, and Mader notes that black-hided cattle are more susceptible to heat stress than light-colored cattle. Also, animals with less external backfat have less insulation and are able to dissipate heat more easily. Though breeders select for marbling and not external backfat, Mader grants that the two traits are difficult to uncouple. Because of this, Angus breeders should certainly plan ahead to mitigate heat stress.

All areas of the country have experienced large swings in weather patterns in recent years, and these animal scientists don't anticipate those going away. The best way to

manage for these swings is to be prepared, says Pritchard.

"The biggest thing to realize is that heat stress isn't a one-day event. You have to do the preparation ahead of time. Cattlemen need to have a plan in place in May so they have the capacity to intervene before cattle start dying," he emphasizes.

Mader recommends putting a plan on paper and discuss the plan monthly or weekly to decide the protocols your operation will take to prevent heat stress.

Here are 10 factors to consider for your heat-stress-abatement plan.

1. Shade

Shade has been getting more attention from researchers. Shade structures, whether permanent in feedlots or mobile in pastures, vary in terms of investment. Hulbert says the Harris Ranch study showed that the shade used in the feedlot has paid for itself. In this study, the feedlot cattle exposed to shade had better feed efficiency and fewer instances of heat stress.

Pritchard explained that placement of shade is important. In a monoslope pen, shade is more beneficial to cattle if there isn't a breeze. In an open pen with a mound, a breeze can be more beneficial to cattle.

For creating shade, Mader suggests using shade cloths about 100- to 200-feet (ft.) long and in 12- to 20-ft.-wide spans. Shade structures should be a minimum of 10- to 12-ft. high to allow for breeze underneath.

He says he tends to prefer a north-south orientation so shade moves throughout the day. This makes cattle move throughout the

day and decreases the amount of mud and water buildup beneath the structure. However, this method does result in the ground the shade moves to having to be cooled. He says

on really hot days, the floor of a feedlot pen can easily reach temperatures as high as 140° F.

Mader notes that his research has shown unshaded animals show some compensatory gain, but he rarely sees cattle get back to where they could have been.

2. Sprinkling

Sprinkling can cool down animals and pens alike. Mader says cooling the ground by sprinkling is about as effective as cooling the animals themselves. A cooler pen floor helps cattle dissipate heat more easily.

Sprinkling is most effective at night. Pritchard says at the SDSU feedlot, they run sprinklers at 6 p.m. and midnight, wetting about 30 square feet of mound space per steer. The water draws heat away from the surface of the mound. He recommends two to three sprinklings to avoid creating mud. In the morning, steers are often observed standing where the ground was sprinkled, and those areas of the pen were 20° F cooler.

3. Soaking

In severe cases of heat stress, an option is to thoroughly soak cattle with cold water. This shocks the system if it is done too late. If done preemptively, soaking allows the heat in the body to transfer.

Hulbert adds that this area of research is relatively limited, but a study at the University of California–Davis is looking at droplet size and how it affects soaking. Small droplets are the best mix of cooling and less stress on the animals. Fully soaking the animal works well in areas with wind because it doesn't exacerbate humidity. This approach works best if used in late afternoon or early evening the day before things become acute.

4. Water quality

"Cattle do sweat and with increased

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respiration, they lose a lot of water. The heavy breathing cools them down, but they lose water in the process. Cattle need ample access to clean water to make that up,” says Hulbert.

There has been quite a bit of research on optimal feedbunk space in feedlots, but very little on optimal “waterbunk” space, she says. If cattle drink more, it is highly correlated that they will eat more, too.

She has observed that in times of heat stress, a calf will position itself next to the waterer for conductive cooling. When that calf finally moves, other cattle crowd around the waterer. Crowding around the waterer just compounds the problem. Her new study proposes determining what the ideal “waterbunk” space in feedlots is and increasing that space during times of heat stress.

It is important to note that water consumption increases by 20% when the water is clean, so make sure your waterers are cleaned more often in hot weather, Hulbert adds.

5. Diet

Cattle produce heat themselves when digesting feed. One way to reduce the heat cattle produce is to change the diet. Fat is a low-heat source of calories, and feeding more fat in the diet is beneficial during hot weather. Pritchard notes that distillers’ grains usually have a higher fat content, which provides calories without causing as much heat from metabolizing fiber. Be aware of changes in products. Many ethanol plants are beginning to remove some of the corn oil, making this less helpful during heat stress.

Mader adds that fiber in forage or roughage is poorly digested in high-energy

diets. By feeding more roughage with high-energy diets during times of heat stress, metabolic heat is reduced.

He grants that manipulating the ration poses a question: In an effort to minimize stress on a few animals, should you compromise the performance of those cattle not suffering as much from heat stress? Observation is key to knowing when heat will be an issue.

6. Timing of management

All three scientists suggest shifting more management to the evenings. Pritchard says in severe cases, the SDSU feedlot stops feeding in the mornings.

“Feed generates heat when it is being metabolized, and heat from the sun just compounds the issue, so we take that out of the equation,” he explains

He adds that instead of shifting all feeding to the evening, he has seen feedlots shift to feeding 30% of the ration in the morning and 70% in the evening. With this equation, cattle often don’t eat enough in the morning to make the heat worse.

Mader notes that rumen fermentation creates the most heat three to five hours after eating, and the hottest part of the day is from 2 p.m. to 3 p.m. If you do feed in the morning, feed earlier (prior to sunrise if possible) so cattle can digest food before the hottest part of the day.

Sprinkling should be done in the evenings to conserve water-flow capacity for water fountains during the day. Sprinkling at night helps the cattle dissipate the day’s heat so they are in good shape for the next day.

Avoid transporting cattle or working cattle during the day in hot weather, Hulbert

emphasizes. Shift it earlier or later in the day if at all possible.

7. Pen cleanliness

Organic matter holds heat, Hulbert says. If manure covers the pen floors, cattle can’t get as much conductive cooling from the pen floor. If the ground is warmer, then cattle stand more during the day and will eat less.

8. Bedding

In addition to cleaning the pen of manure, Pritchard recommends bedding pens with straw. The bright-colored straw reflects light so the floor is cooler. He likens it to the same relief as walking from hot asphalt to grass.

9. Fans

Cattle housing will dictate this option, but if available, fans can create breeze when there is no wind. In humid areas, no wind makes the heat worse, says Hulbert. She says these are more common in dairies, but can still be applicable in some beef operations.

10. Plan ahead

“Learn to watch the signals, and you can manage heat stress most of the time,” says Pritchard.

Pritchard suggests creating a shortcut on your computer to the National Oceanic and Atmospheric Administration (NOAA) heat stress forecast map, www.ars.usda.gov/Main/docs.htm?docid=19887. 