



River Valley Veterinary Clinic

August 2017 Newsletter

Heat Stressing

A good description of a cow is a furnace on four legs. While it works to her favor during the winter, it means she has a very poor tolerance to hot weather. The ideal air temperature for a dairy cow is between 40-60°F, and 39-75°F for beef; anything above this, her core body temperature rises and she needs to use energy to cool off. If her core body temperature rises above 102.5°F, she's experiencing heat stress.

Heat stress comes from a mixture of temperature and humidity, measured by the Temperature Heat Index (THI), which can be checked on a chart easily found online. Even 72°F can bring mild heat stress if humidity is moderate to high, like we often see in Wisconsin. Prolonged moderate heat stress will raise the body temperature to 103-104°F, and severe heat stress will raise the body temperature to 106°F, which is life threatening. Cows have sweat glands only on their muzzles and udders, so they rely heavily on dissipating heat through respiration, which isn't very effective. They end up accumulating heat during the day and dissipate it at night when it's cooler. A cow's body temperature peaks two hours after the air temperature peaks, and it takes a full six hours for her to dissipate her excess heat once the temperature drops into the ideal air temperature range.

If the air temperature doesn't drop that far or for long enough, she'll start the next day already in heat stress. The THI doesn't take this built up 'heat load' into consideration, so even though the THI might drop at night, the cows are still experiencing heat stress. Dairy cows experience the most severe heat stress in the holding pen due to high animal density in an often poorly ventilated space.

Even with mild heat stress, there is a significant impact on the cow's feed intake, weight gain, milk production and reproduction. A heat stressed cow will eat >35% less so less heat is produced during digestion, resulting in poorer nutrition and decreased weight gain in beef cattle. A lactating cow will lose at least 5 lbs of milk per cow per day with mild heat stress and over 50% decrease in extreme conditions. In 2016, there were 152 days of potential heat stress in Sauk County. At the current milk price for 100 lactating cows, that would be at least \$12,707 of lost income due to mild heat stress.

Heat affects the dry cows as well, as they will develop fewer milk secretory cells in the udder and therefore decreased capacity for milk production during the next lactation.

Fertility is also reduced for 60 days after a heat stress event, with decreased conception rates and poor cyclicity in cows and reduced fertility in bulls. Pregnancy rates in beef cattle bred between July and September can be as low as 10-25%. In a

newly pregnant cow, the embryo is very sensitive to heat stress in the first six days of pregnancy, with a greater risk of embryo loss with a cow body temperature of >102.2°F. The last day of possible heat stress in Wisconsin in 2016 was November 5th, so the effects of heat stress on fertility would be seen into January of 2017!

Classic signs of heat stressed dairy and beef cattle are:

- High respiratory rate
- Open mouth breathing
- Bunching together
- Refusing to lie down
- Crowding around waterers, drinking more than usual
- Seeking shade or aligning themselves with the sun if there isn't any shade
- Eating less
- Drooling
- Decreased activity

The approach to cooling cows can be broken into three parts: shade, air velocity and water. If a cooling system is being installed in a milking cow barn, the most economical location is in the holding pen, followed by the far-off and close-up pens, maternity pen, fresh cows groups and then high production lactating groups, although all areas would be ideal.

1) Shade

Dairy or beef cattle on pasture should have access to actual shade, not just the dead tree in the middle of the pasture. Shade can be a specially installed structure or trees and brush. Either way, 65 sq feet of shade per cow should be available for resting. Shade over feed bunks and waterers will increase feed and water intake, as cows are more likely to congregate there.

2) Air Velocity

Regardless of barn design, be it free stall, tie stall or stanchion, the air speed around the cows should reach 4-6 mph. Proper air speed combined with proper ventilation, or air exchange, removes stagnant air, brings in fresh air and aids in cooling cows.

Fans are a great way to increase air speed, but they do not aid in ventilation (bringing new air into the barn). A properly designed naturally ventilated free-stall barn will have correct air speeds and ventilation, so fans can be used solely for cooling cows. Fans should be installed over the feed lane to encourage eating, especially when combined with soakers in the feed alley. Over the stalls, fans should be centered over each row.

Most tie-stall/stanchion barns are tunnel ventilated: fans on one end of the barn blow air outward, which pulls new air into the barn at the opposite end. Additional fans are used to keep air moving around the cows.

High Volume/Low Speed or Low Volume/Low Speed fans, such as the BigAss fans, do not provide adequate air speeds alone. They push air downward, then outward and away, and since they are usually centered in the barn, the air velocity isn't where the cows need it most: in stalls where they should be lying down for 50% of the day. These fans work really well in the holding pen where the cows will be directly under the air flow.

Positive Pressure Tube Ventilation Systems (PPTS) are able to bring cooler, less humid air in from the outside. They are incredibly useful in the holding pen where they can be combined with drop hose soakers, in barns with poor natural ventilation, and in calf barns. The PPTS should be designed by a professional or veterinarian trained by the Dairyland Initiative and installed by someone with prior experience, as there are lots of calculations involved to ensure that the system works correctly. A few veterinarians at RVVC have gone through the training and would enjoy working with you to design one for your barn.

It's impossible to control wind speeds outside in dry lots or on pasture, but a few things can be done to help increase air movement, such as removing brush from around the pen and having removable wind breaks that provide shelter in the winter but won't interfere with air-flow in the summer. Biting flies will cause cattle to crowd together which decreases their cooling ability, so good fly control helps them spread out as well as reduce pinkeye infections.

3) Water

Drinking water is the fastest way a cow can decrease her body temperature, and a heat stressed cow can drink up to 10 additional gallons every day. Cool water should be available at all times, even in cooler temperatures. In the barn, there should be three linear feet of watering space per 10 cows per pen and at least two watering areas per pen with a waterer within 80 feet of any cow. Cows will drink >10% of their daily water consumption immediately after milking, so waterers should be placed along the exit lanes and return alleys. They could even be installed along the sides of the holding pen.

Additional waterers should be placed in pastures to provide 3 in of linear watering space per cow near the feeders and in the shade. If a cow has to walk more than 100 ft from shade to a water source, she won't go.

Using soakers along the feed alley and in the holding pen mimics sweating and can significantly decrease heat stress. The soakers create large droplets of water that soak the cow to the skin from the shoulder to the hooks, and then fans or natural air flow evaporate the water and provide the cooling effect. Soakers can be installed in pastures for beef cattle, but they must be installed and turned on prior to hot weather so the cattle don't spook when they're actually needed.

4) Other Options

Getting hot cows to increase their feed intake is difficult, but one option includes feeding early in the morning, when it's cooler and cattle are more likely to eat more. The nutrient content of the ration could also be increased, knowing that the cows will eat

less, but to ensure she meets her daily requirements. Discuss any changes to the ration with your nutritionist to see what would work best.

If possible avoid working beef cattle during extreme heat; rather work only in the early morning when it's still cool and they've had all night to cool off. Even if it cools off quickly in the evening, remember that it will take another 6 hours for a cow to cool off and any additional activity will raise her body temperature. Evaluate beef cattle on pasture daily during the warm months, looking for signs of heat stress, especially those that are black, over-conditioned or have a history of respiratory disease.

Even though the summer is already half over, some of the hottest days of the year are still coming. While cows are already heat stressed almost daily, it's never too late to add additional ways to keep them comfortable.

Welcome Dr. Alison Inlow!!

Dr. Alison Inlow joined RVVC in July at our Reedsburg clinic after graduating from veterinary medical school at UC-Davis. She grew up in the suburbs of northern California and developed an interest in veterinary medicine from working with the cattle, sheep and goats while at community college in Los Angeles county. Her interests lie in herd health and reproductive management and advanced reproductive techniques in cattle and small ruminants. Dr. Inlow will be doing 100% large animal work, so look for her on the road on the way to a call!

Newborn of the Month!

It is our pleasure to announce the arrival of the littlest member of the RVVC team: Everett William Kruse was born on July 7th, weighing 8lbs 13oz and 20.5 inches. From Dr. Kruse: "Everyone is doing great and the brothers love him!" If you're lucky, you might catch a glimpse of him visiting the Reedsburg clinic!

