Beat the Heat!

By: Casey Havekes & Lindsay Ferlito

Heat stress is a hot topic these days as more and more research demonstrates the negative impacts it can have not only on mature cows, but also on calves born to heat-stressed dams, and the future performance of those calves. Every year we are learning more about heat stress, and perhaps even more importantly what we can do in terms of heat abatement. We are no stranger to heat stress in the North Country, especially after the summer we have had so far, so we decided to host a program dedicated to discussing strategies to beat the summer heat! We hosted the program at 2 locations across the North Country in the month of June, the first was hosted at the Kelly Farm in Rennselaer Falls, NY, and the second was hosted at Miner Institute in Chazy, NY. We were fortunate to have Dr. Rick Grant, Katie Ballard, and Emily Freed, all from Miner Institute as our featured speakers for the program. Below are some of the take home points for those who were not able to attend the program in person.

First, it is important to recognize that temperature is not the only factor that plays a role in heat stress. When we talk about heat stress and livestock, we often refer to the term “THI”, which stands for temperature humidity index. Both ambient temperature and relative humidity are considered when calculating THI, and the resulting value and severity of heat stress can be seen in the chart seen in Figure 1. Past research has concluded that lactating cattle start to experience heat stress at a THI of 68. According to Figure 1, this could happen with a temperature as low as 72°F if the humidity approaches 45%. During our in-person session, Katie Ballard explained that last year in the North Country between the months of June and October there were 45 days where the THI exceeded 68, and 27 days where it was above 70. This may not seem like a lot compared to a state like Florida where the THI is chronically high; however, Katie emphasized the importance of recognizing that the cows in Florida are at least able to adapt to the high THI levels. On the flip side, cows in the North Country are constantly shifting back and forth from hot and humid days to cooler days. In fact, the day we hosted the program at the Kelly Farm everyone was wearing long pants and a sweater, whereas just days before the heat and humidity were almost unbearable. These swings in temperature and humidity result in what we call episodic heat stress. Episodic heat stress can be more challenging for cows as it can take weeks for cows to acclimate to the heat.

Recently, researchers at Miner Institute conducted an on-farm experiment across four farms in Northern New York that had differing levels of heat abatement. The results from this trial concluded that the presence of fans increased lying time and resulted in lower lameness levels compared to the barn that did not have any fans. It was also found that the cows in barns with no fans had higher reticular temperature compared to cows housed in barns with fans. Interestingly, these reticular temperatures were highest at night which suggests that even at night when the temperatures are typically lower, cows are still experiencing the impact of heat stress from throughout the day. Another interesting conclusion from this research was that cows that had ample water availability had lower reticular temperatures compared to cows with limited water availability. This finding really emphasizes the importance of providing adequate clean and fresh drinking water to cows and calves.

It's well known that heat stress can lead to reduced feed intake, milk production, and lying time, and the last subject we touched on was the impact on milk components . Often when we discuss milk fat depression during the summer months we associate it with heat stress, and this makes sense when we think about what is happening from both an intake and rumen functionality perspective. The on-farm

trial mentioned above also measured milk components, and Rick described how they also saw a milk protein percentage decrease in response to increasing THI regardless of heat abatement system. This is interesting because we don't often associate milk protein depression with heat stress, and although the mechanism driving this is still unclear, it drives home the point that heat stress has a profound impact on cow behavior and physiology.

After we discussed the potential negative impacts heat stress can have on cows, we also discussed some basic cooling strategies. The most important and likely the easiest strategy is to make sure that cows have sufficient drinking water. Rick shared that cows will drink 0.4 more gallons per day for every 1.8°F increase in ambient temperature, so making sure the supply is there is very important to help with heat stress. Proper fan placement and angles are also important considerations for proper heat abatement. Fans should be positioned appropriately so that air is moving across cow at lying and standing heights at 4 to 6 miles per hour. Lastly, placing fans and sprinklers over feed alleys and in the holding area can go a long way in helping cows cool down.

If you have any questions, or suspect that heat stress may be an issue for your herd, please reach out to either Lindsay or Casey (lc636@cornell.edu, cdh238@cornell.edu). We have equipment and tools to measure different environmental parameters like temperature, humidity, THI, and windspeed and we can help troubleshoot these areas on your farm.

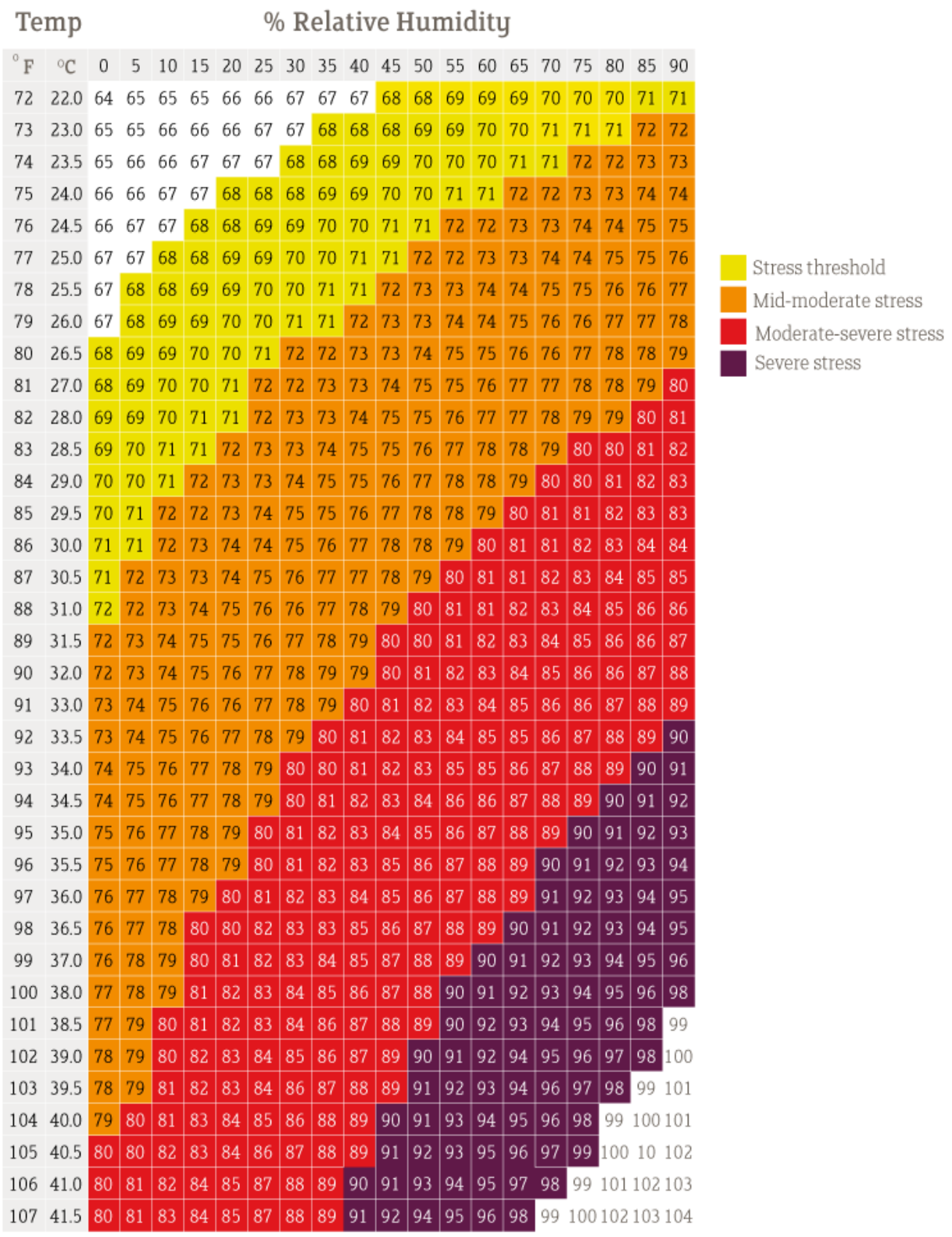

Figure 1. Temperature Humidity Index for Dairy Cattle.

Figure 2. CCE NCRAT Lindsay Ferlito identifying hot spots in the barn by using an infrared thermal imaging gun. Photo credit: C. Havekes