

## **Reducing Heat Stress on Cows**

A 1,400 pound holstein cow giving 70 pounds of milk is the equivalent to about 15 one-hundred watt lightbulbs of heat generated. If cows are exposed to direct sunlight and the cow absorbs 80% of the solar radiation she is exposed to over 1/3 of her body, this cow can add another 10-15 lightbulbs for a total of 25-30 one-hundred watt lightbulbs of heat generated. On cool days, a cow can dissipate this heat. On warm and/or humid days, it cannot.

Cows experience heat stress when the temperature-humidity index (THI) is above 72. Dairy Cows literally become a furnace generating heat that **cannot be dissipated alone without a serious expense to feed intake, milk production and reproduction.**

**Evaporative Cooling is Desired** because heat is removed from the cow's surface to vaporize water. A cow generating the heat of fifteen lightbulbs needs to evaporate about 2 quarts of water per hour to keep her body temperature from rising. Cows dissipate this through respiration and sweating though cows are not very efficient at sweating. As temperatures reach 90 degrees, panting peaks at about 120-140 breaths per minute (5-6 times normal rates below 65 degrees) but, in addition to sweating, can only dissipate about half the water required to keep her keep cool.

Producers can come to the cow's aid by wetting the hair coat and blowing air over them to facilitate evaporation. With fans running continuously, wetting the hair coat for 2-3 minutes every half hour will supply the coat with 2.4 quarts of water for evaporation every hour which is the equivalent of 14 lightbulbs of heat production. Combined with the cow's 1.2 quarts from sweating and panting, it is possible to dissipate 3.6 quarts of water or 22 lightbulbs of heat.

Provide sprinkling systems at bunks to encourage them to eat. It's important to have the sprinklers on a timer to shut off for a minimum of 15 minutes to allow the fans to create the evaporative cooling effect on the cows. Avoid fine misting hoses that are on constantly—they actually create a water barrier around the cow's hide and **hold in the heat!**

**Managing Heat Stress Begins** by keeping the cows out of the sun during hotter periods of the day. Sun shades may be an option that provide 50 square feet of shade per head. Shades should be oriented from north to south to allow sun drying and be built on crushed limestone mounds or be portable to prevent mudholes and congregation in one area over time.

Keeping the cows in larger shaded areas or in the barn during hotter periods of the day may be the best option.

Many dairy barns are equipped with wind tunnel ventilation systems to create a constant breeze of 2.5 to 3 mph. Most stall barns require 3 or 4 large 48" fans installed on one end with inlets of 50 square foot per fan on the opposite end. The paybacks are usually within a short period of time as heat stress causes some serious financial costs to most dairy operations each year.

## **Ventilating More Efficient than Circulating**

Circulating fans are **not** needed in wind tunnel systems as they only circulate the moisture laden air within the barn. Ventilation fans, on the other hand, exchange the inside air for outside air thus removing the moisture generated as cows dissipate heat. Circulation fans or stir fans are much less efficient in moving air per watt than ventilating fans. Large driveway fans are also **not** very efficient in cooling and circulate much more than ventilate.

**Cows Generate Heat to Digest Feed** and therefore eat less feed during periods of heat stress. Cows eat better at night and need a higher ratio of grain to forage dry matter. This change is helpful because the cow's maintenance increases as she uses more energy to cool herself and eats less feed. The forages produce more body heat than grain when digested. Cows should eat at least 1-1.5 pounds of forage equivalent for each 100 pounds of body weight daily. Rumen acidosis or inverted fat-protein tests are important to watch out for during summer months.

**Supply Plenty of Clean, Fresh Water** as milk is 87% water and heat stress can double water requirements. Provide spacious and multiple watering locations as cows exit the barn or parlor. Long waterers made of 18" PVC pipe cut in half lengthwise with a full flow float make nice waterers along exit alleys and can provide adequate linear feet of space per cow and prevent boss cow problems.

**Remember, Cows Can't Do It Alone** as the heat generated when temperatures increase make the cow a furnace. Not taking proactive measures to dissipate the heat created can have serious financial consequences.

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