Keep Your Cows Cool Not Cooked

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Several methods are used on today's farms to reduce heat stress on dairy cows. These methods include providing, 1) clean water readily available, 2) shade, 3) adequate natural or forced ventilation, 4) altered feeding strategies, and 5) sprinkler and fan evaporation cooling.

Most dairymen have incorporated many of their procedures into their summer practices. Many dairymen have tried to provide sufficient shade, many have built roofs or shade over their feed bunks and several have increased the feeding frequency during the summer. Many have also tried to incorporate some type of sprinkler system into their heat stress management. Two areas for using the sprinkler system are in the holding area and over the cows when they are at the feed bunk.

I would like to focus on the sprinkler system at this time because I believe most producers are still doing it wrong. Sprinkling is more effective when combined with air movement. This allows the haircoat to function most efficiently as an evaporative cooling pad. If a light mist or fog is applied continually on the cows, the water forms an insulating blanket that **raises**, rather than lowers, body temperature.

The sprinkler system - DO NOT Mist or Fog:

The object here is to get enough moisture on the cow to penetrate the hair coat and reach the skin. Again, if the moisture does not penetrate the haircoat, water forms an insulating moisture blanket that **raises**, rather than lowers, body temperature. Water pressure and nozzle selection are keys to applying water.

Spray Nozzles:

Two types have been used in current research . . .

A) Solid-cone, low pressure agricultural spray nozzles (0.0625 in. orifice diameter) rated at 0.6 gal/min at 10 psi mounted 4-5 ft. above the cows approximately 5.6' apart (avoid spraying on feed in bunk) have been used effectively.

B) Low pressure, 180 deg. plastic spray nozzle with 0.22" diameter orifice can also be used. At 10 psi pressure the nozzles have an 8' spray radius. Thus, nozzles should be placed approximately 8' apart. With each nozzle, it appears from the literature that a low pressure system with a larger nozzle is preferred. This means incorporating a **pressure reducing valve** into the system. I would also suggest some type of filter system to avoid clogging the nozzles.

Air Movement

Sprinkling is more effective when combined with air movement. This allows the haircoat to function most efficiently as a evaporative cooling pad.

An air velocity of about 400 to 600 feet per minute over the cows is recommended from Florida studies. At least one 36-inch fan for each 40 cows is needed to provide this velocity. More fans may be required in areas where cows are grouped closely, such as holding area.

Each fan should provide 11,000 cubic feet per minute of air flow when it is operating in free air. A fan of this type will move air effectively for a distance of about 10 fan diameters or 30 feet. This arrangement suggests this type of fan be hung every 16' when used near the feed bunk and tilted slightly downward to direct the air onto the cows.

This no doubt seems excessive; however, we must remember that the humidity on the Delmarva Peninsula reaches near saturation many days. Thus, we must increase the volume of air over the cows to effectively evaporate the moisture.

Other studies have been completed in Kentucky using smaller 18 in. diameter fans connected to a polyethylene tube 18' long. Holes were cut in the tubes to force air directly onto the cows. This system provided air flow to reach velocities of 208 ft./minute over the cows.

As you read other articles about this subject, you will see that the air velocity recommended will range from 200 to 600 ft. minute. Be sure to read where the research was completed and what the average relative humidity during the test was. Again, I repeat, as humidity increases, velocity must increase accordingly to effectively evaporate this moisture.

The Key - Alternative

The key to this type of system is altering water with air. Get them wet then blow them dry. This is the key point that we have overlooked here on Delmarva. It appears a cycle of about 1 part water to 5 parts air is most widely used.

In the studies that I reviewed, it appears that the water to air cycle can range from 1 min. water to 5 min. air up to 1½ min. water to 13.5 min. air.

Two key points when setting your cycle are: 1) How much time does it take the cows to get wet to the skin?; 2)How much time does it take the fans to blow them dry?

The Controller:

To effectively operate this system of water/air in this intermittent fashion, you need to incorporate 1) solenoid valve, 2) thermostat, and, 3) a timer.

Control boards are currently being used to cool hog and poultry barns. Some units come complete ($375.00) and others can be prepared by attaching the individual components on a board ($125.00).

It appears that these units should be set to operate when the temperature reaches 78-80 deg. F. Timing the water flow in this fashion also has the added advantage of reducing the amount of water that flows into the manure system during use.

In conclusion, producers must decide if they are going to use water cooling or evaporative cooling. Evaporative cooling is the only method shown to be effective. However, evaporative cooling means applying water and air in an intermittent fashion. Get them wet to the skin, then dry them off. Thus, to properly set this system up, select the proper nozzle, place them to reach all animals, incorporate the correct pressure and use a filter system. Fans then need to be placed to blow air at 200 to 600 ft./minute over the cows. The key to the system is a controller that includes a solenoid valve, thermostat and timer. For more information, call the Extension Office at 778-1661 or 758-1107.

Clinton Co. DHIA dhia Monthly Report

Pennsylvania Dairy Herd Improvement Association

March, 1990
Rolling Herd Average

Name	Brd.	No. Cows	% Days In Milk	Milk Lbs.	Fat Lbs.
Ronald H Meyer	B3	111.8	88.9	19,916	751
Paul L Courter	3	71.1	87.2	19,886	731
Blair&Elaine Courter	3	71.2	88.0	19,367	698
Richard L Schenck	3	123.9	86.0	18,468	690
Robert Billman	B3	32.4	86.9	17,796	677
Jacqueline Seyler	B3	44.2	89.2	17,784	652

Lactation Report

Ronald H Meyer #108	305	20,233	857