

# Considering evaporative cooling

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Heat stress costs the U.S. dairy industry nearly \$900 million annually. It's a problem producers have to face every summer as rising temperatures affect their cows' milk production levels, immune systems, fertility and more.

Unpredictable heat waves can affect cows even in the early part of the warm seasons; problems from heat stress can start appearing as low as 68°F if the humidity is also high.

Heat stress management techniques can range from providing shade to cows to adjusting their feed to include options that produce less heat when they are digested. One option growing in popularity is evaporative cooling systems.

Just as kids cool down with a run through the sprinklers on hot summer days, the same principle can reduce the impact of heat stress on a herd.

Edwin Smith, a district manager with Senninger Irrigation Inc. out of Lubbock, Texas, has helped producers answer questions about evaporative cooling for years.

"We've still got a major drought going on in many areas of the country, and along with that drought comes pretty high temperatures," says Smith. "I think we're going to have a lot of heat this summer, and because of that evaporative cooling for cows will be very beneficial."

## **The system**

Senninger Irrigation first got involved in the late 1990s, after receiving a request from a dairy about evaporative cooling. The company took existing i-Wob products, installed them and tested if irrigation nozzles would work in the dairy barn as well as in the field.

The resulting system is simple.

The sprinkler heads are suspended above the holding pens on dropped hose attachments. The sprinklers dispense water droplets big enough to give the cows a good soaking. Fans kick in to increase the cooling process.

As the water evaporates, it cools the cow. The system is especially effective in dry climates. Often dairies already have a fan system in place to help alleviate the heat. These existing systems can be retrofitted and used with the water-based cooling systems.

Smith explains some of the benefits of using evaporative cooling in addition to fans, saying, "On a really hot day, a fan just blows hot air, so even though you are getting some air movement, which does help cool the cows a little bit, it's still just blowing hot air on them."

Cycles of short bursts of water followed by a few minutes with the fans on can be very effective in reducing heat stress on cattle and increasing milk production. Often producers run this cycle just before the cows are milked so they are still cool and relaxed in the parlor.

Joe Torres of Presidio Dairy in Texas has been using this system for two years. He runs the sprinklers for a few minutes in the pre-milking area. Cooling not only keeps them comfortable but also helps to increase the cows' appetite.

He says, "Any time a cow feels good and is not stressed, she goes out to eat when she cools down. That's the whole purpose of it."

Droplet size has been shown to be significant. One variation on using sprinklers is a mister, which uses much smaller droplet sizes than a sprinkler. But it also introduces some problems.

Smith says, "Light or fine droplets on the hair of the cow can act more like a blanket to hold the heat in ... rather than allow the evaporative cooling to take place."

### **Making a decision**

As producers research the possibility of evaporative cooling for their operations, the first thing to consider is the availability of water.

The low-pressure and individualized nozzle sizes are designed to conserve water, but producers will need to take stock of the resources available and make an informed decision, especially with a hot, drought-ridden summer predicted for 2013.

Another variable to consider is water quality. The sprinkler was originally designed for the field, so it isn't delicate, but if large quantities of sediment are present, a filter may be needed. Larger nozzle sizes are less likely to get clogged than misters.

Cost is always a consideration in a new project as well.

Torres says he considered the project inexpensive. The setup for Presidio Dairy cost about \$3,000, and Torres says he has been satisfied with the system.

Smith further explains that the system has a long life expectancy, saying that most of the systems which have been installed in the last 15 years are still in their original installations.

Once the system is installed, little maintenance is required. Since there are few moving parts, the system needs little upkeep. If a filter is used, it will need to be cleaned periodically.

Once the decision to move forward has been made, the cooling system can be designed and installed. The company offers design suggestions for each dairy based on the size of the pen in question.

“In the smaller pens, we usually just hang one line of sprinklers down the center of the pen. A lot of times that is adequate, but if the pen is quite a bit wider we can do two lines,” says Smith.

So what does this installation process look like? It is fairly simple. PVC pipe is run from the water supply to the holding area.

The size of the pipe is adjusted for cattle count and desired pressure. These figures are part of the initial installation suggestions that come from the company.

Once the pumps and valves are in place, the nozzles are attached to drop hose fitting and hung over the holding area. These include weights to hold the nozzles in place.

The system can either operate with a manual valve to be turned on and off as desired or on an automatic timer and can be installed by the producer or others familiar with installing irrigation equipment.

Torres says his installation process took about two weeks.

“There was a lot of climbing around up on top installing a sprinkler every few feet. Then it’s kind of like a lawn sprinkler; you just turn it on, and it waters the lawn.”

Systems can be installed in several areas on the dairy in addition to the holding area. Some producers have a system just outside of the milking parlor to give the cows a cooling spritz as they leave and even in feedbunk areas if the area is carefully maintained.

Producers should be careful, however, that cows are mostly dry by the time they lay down. If they are still wet when they lay down, the moisture can be trapped beneath them and increase the chance of mastitis.

However, the system is designed for hot days and the cows dry in a few minutes, especially as the fans help accelerate evaporation.

Smith says shaded areas should be watched especially closely. “That’s where the cows are more apt to lay down. If that area is kept dry, then there won’t be any problems.”

As producers consider their options for heat stress management this summer, evaporative cooling deserves a look. As with any major operation decision, research is key.

"If a producer will study on [an evaporative cooling system] and try it or talk to a dairy who has used it, they will see that the dairies are seeing pretty dramatic results from the system," says Smith.

"It's pretty simple, but it works," Torres says. "Of course you won't know it 'til you've tried it or maybe seen it, but it does work. Believe me." **PD**

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