

KEY FACTORS TO KEEPING DAIRY COWS SAFE AND COOL

“When cows are kept properly cooled,...
milk production increases exponentially.”

The U.S. Dairy Industry

According to the International Union of Food (IUF) and the World Atlas, the United States dairy industry consistently ranks in the top ten globally in terms of milk production and top three in exports of dairy products. Furthermore, it represents more than one tenth of the total world milk production. As of 2010, U.S. exports of cheese, whey products, lactose and other dairy products were valued at \$3.71 billion. The Southwest region of the U.S. produces the greatest volume of milk and has 2.8 million dairy cows within the area. This region produced 22,846 pounds of milk per cow and has 2,827 licensed dairy herds with an average of 973 cows per herd. The EU is also a major milk producer, making up 24% of global production. Globally, the dairy industry is trending towards dairies with more milk produced per cow, which means that cows need to be healthier and in peak milking condition. Production per cow on both larger and smaller operations continues to increase because farmers are culling lower producing cows and finding more efficient operations for keeping cows healthy and producing milk.



Regional Challenges

In regions such as the Southwest U.S., as well as global regions with similar climates, year-round temperatures hover around 70 degrees Fahrenheit (21 degrees Celsius) during winter and the summers can top 120 degrees Fahrenheit (49 degrees Celsius). These conditions often make maintaining healthy cows quite difficult. In more moderate climates a dairy facility design may contribute to the same problems, raising already warm outdoor temperatures within enclosed structures.

Heat Stress in Cows

A dairy cow needs to maintain its core body temperature within a very narrow range from 101.3 to 102.8 degrees Fahrenheit (38.6 to 39.3 degrees Celsius). It can be very difficult for cows to maintain a healthy temperature when their environment is not designed to keep it in the optimal range. When the air temperature is higher than the cow's core body temperature, heat flows into the cow and is absorbed. This can lead to severe problems of overheating, which leads to poor milk production, illness, and problems with reproduction, particularly during the transition period. High producing dairy cows are far more affected by extreme heat than lower producing cows. For example, Holstein cows, the most prominent of dairy breeds and excellent milk producers, are less tolerant to heat than Jersey cows. Lactating cows are especially susceptible compared to dry cows because of the additional metabolic heat generated during lactation. Every dairy farmer knows that lactating cows are the backbone of their business, so it is crucial to keep these cows in top condition.

Temperature Humidity Index (THI)

The Temperature Humidity Index (THI) is an important measure in determining if cows are becoming heat stressed. A THI is a single value that is calculated from dry bulb temperature and relative humidity to represent the level of thermal stress relative to environmental conditions. Recently re-evaluated at the University of Arizona to incorporate modern-day, high-producing Holstein dairy cows, studies show that cows become heat stressed at an average THI of 68. This is in contrast to 1950's data published by the University of Missouri that set the mark at a THI of 72.



BEFORE

1950'S STUDIES PUBLISHED BY THE UNIVERSITY OF MISSOURI SHOW THAT COWS EXPERIENCE HEAT STRESS AT A THI OF 72 AND GREATER.



After

Recent studies by the University of Arizona sets the level at a THI of **68 and greater.**

Loafing Areas

Keeping cows cool can be especially hard in loafing areas where cows are often quite crowded together. Even when shelter is provided, the cows will compete for the limited space in the shade, which can lead to smothering. It can also be hard to provide adequate wind flow, which is essential to keeping animals cool. Farmers often see serious health issues when cows are in the transition period of 3 weeks before and 3 weeks after calving. Cows are naturally inclined to eat less during this period from the stress of calving, which can lead to ketosis. When cows begin to metabolize fat for energy, they lose weight rapidly and health effects can snowball. Major problems include placenta retention and infection, hypocalcemia, displaced abomasum, and suppressed peak milk production. This leads to involuntary increased cull rates and suppression of profits, which can lead to serious decline for a farm. When temperatures exceed 103 degrees Fahrenheit (39 degrees Celsius), spontaneous abortion in pregnant cows can occur, along with pneumonia, salmonella, bovine viral diarrhea and many other diseases that flourish in hot weather.

When cows are kept properly cooled, the potential for these problems is significantly reduced and milk production increases exponentially. However, farmers struggle with designing highly efficient and cost-effective solutions. That's where Koolfog comes in. Our misting systems provide high ROI and are proven to work.

How It Works

Operating at pressures of 1000 psi+ Koolfog produces micron-sized water droplets that, while evaporating and turning to vapor, remove heat from the air, cooling the surrounding area. The dry fog produced by a Koolfog system reduces outdoor and indoor temperatures by as much as 35 degrees Fahrenheit, which makes even 100+ degree days comfortable. Systems are customizable and can be expanded to fit a huge enclosure or kept minimal for single stalls. Our systems have been proven to help keep animals safe and comfortable, even in extremely warm temperatures. While alternative forms of cooling such as soaking are available, a Koolfog system may also provide cooling in areas that are particularly difficult to reach such as loafing areas, where cows have the freedom to move and are not held in place.

WHY?

MODERN-DAY, HIGH-PRODUCING HOLSTEIN DAIRY COWS ARE **MORE SUSCEPTIBLE** TO HEAT STRESS THAN THE COWS OF 1950S DUE TO **THE INCREASED MILK PRODUCTION AND FEED INTAKE.**



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