

## **Environmental effects on dairy cattle**

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The annual economical losses due to heat stress in the US dairy industry have been estimated at \$900 millions (J. Dairy Sci. 2006 [89]:1244). Considering the environmental trends (global warming), this number may increase in the following years. This summer due to the heat stress, there have high mortality rates of poultry and livestock, and because of the lack of rendering capacity, the Merced County Board of Supervisors has declared local emergency. During the local emergency and until further notice or August 21/2006, options for disposing livestock and poultry include: 1) rendering, 2) on-site composting, and 3) on-site burial. Also, the County landfills will accept poultry but not large animals. It is very important to consult the specific County's guidelines for composting, to bury animals, and to avoid environmental impacts (flies, odors and underground water contamination).

Let's update the information on how to control heat stress in dairy animals, reminding that our dairy cows are not genetically prepared to suffer high temperatures or heat stress, and for that reason, we must control and improve the physical environment for them. Shades for animals are considered essential to protect cows and to minimize losses in body weight gain, milk production, and reproductive efficiency. Regardless of climate, a mature cow requires 3.5 to 4.5 m<sup>2</sup> of space beneath the shade, and a north-south orientation to allow penetration of sunlight beneath the shade for drying the ground. It is estimated that total heat load could be reduced from 30 to 50% with a well-designed shade, and animals can yield 10% more milk. Although shades reduce heat accumulation from solar radiation, there is not effect on air temperature or relative humidity; thus, additional cooling is required for lactating cows in a hot, humid climate.

Early work concludes that using sprinklers in combination with supplemental airflow under shade housing was superior to a fan alone or sprinkling. Sprinklers and fans cooling systems generate a large volume of water that must be processed. Thus, attention to water delivery rate through nozzle size needs to be considered. The studies show that large droplets from a low pressure sprinkler system that completely wet the cow by soaking through the hair coat to the skin is more effective than misting system. But, a combination of fans and misters was as effective as fans and sprinklers at maintaining intake and milk yield; and the fan/sprinkler system used about 10-fold more water than did the fan/mist system.

A high pressure mist system injected into low mounted fans stream (near the cow) is very efficient and highly recommended. Studies showed milk yield increments of 0.7 kg/d in moderate temperatures and 2.6 kg/d in warm, humid conditions. Researchers from Kansas State University indicated that with production increases of 5 to 10%, the payback for investing cooling equipment is 2 to 3 years; and one year or less when increases of milk yield approach 20%. (*MERCED SUN-STAR, AGRIBUSINESS, JULY 10, 2006*)