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EVAPORATIVE COOLING FOR DRY COWS: DOES IT PAY?

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Traditionally, dry pregnant cows receive little protection from heat stress, because they are not lactating. It is incorrectly assumed they are less prone to heat stress. Additional stressors occur during this period due to abrupt physiological, nutritional, and environmental changes. These changes increase the cows' susceptibility to heat stress and have a critical influence on postpartum cow health, milk production and reproduction.

Researchers in California observed that dry cows with feed line sprinklers, fans and shade (evaporative cooling) had an increase in milk yield for the first 60 days after calving compared to cows with only feed line sprinklers. No difference in body condition score changes, incidence of postparturient disorders, or serum non-esterified fatty acid concentrations occured.

To estimate the potential economic benefit, a partial budget was constructed with marginal costs and returns (Table 1). Marginal capital costs included the cost of purchasing and installing the fans, metal frame, and shade cloth. Annual operating costs include an estimate for routine maintenance and cleaning of fans, electricity required to power the fans, and an additional marginal 1.32 lb of feed (dry matter basis) that cooled cows might consume. Economic returns from the evaporative cooling include the additional milk over the first 60 days of lactation for cows completing a 14 day stay in the dry pen and successfully completing the first 60 days of lactation. With the 3.08 lb increase in milk per day, cows ate additional feed, netting a marginal milk price of $0.10/lb of milk.

Cooling dry cows with shades, fans, and sprinklers compared with only sprinklers improved milk production within the first 60 days by 185.5 lb/cow, and increased estimated annual profits by $8.92/cow (based on milk only). The $8.92/cow/yr return is probably underestimated, since reproduction information was not collected to estimate the added benefit reported in other studies. Additionally shade structures were positioned in a north-south orientation, so there would not have been shade over the feed line during the late morning and mid-afternoon.

Table 1. Projected economic returns for dry cow pen fans, sprinklers, and shades vs. sprinklers only based on marginal milk production for the first 60 days of lactation for dry multiparous Holstein cows enrolled from June to October 2002.

Period, yr.	5
Fans used, no.	7
No. cows cooled/summer	239
Interest rate (cost capital)	7.00%
Cows culled in first 60 d (%)	10.00%
Median DIM at culling	25
Capital costs:	
Fans, shade cloth, frame, etc.	$7,040.00
Residual value of capital equipment after 5 yr	$1,500.00
Annual capital costs	$1,456.15
Annual operating costs	$776.78
Total annual costs	**$2,232.93**
Returns:	
Additional milk over 60 DIM	3.08 lb/d
Marginal milk price for additional milk, $/lb	$0.10
Total annual benefit (milk returns)	**$4,363.66**
Profit per year (based on milk only)	**$2,130.72**
Profit per cow per year	**$8.92**

* Adapted from Urdaz et al., 2006.

Evaporative cooling provides the greatest opportunity to reduce the negative effects of heat stress during both the pre- and postpartum periods. Cooling dry cows with feed line sprinklers, fans and shades proved to be beneficial for increasing milk yield after subsequent calving with a significant return on investment compared to cows cooled with feed line sprinklers only.

Reference

Urdaz, J.H., M.W. Overton, D.A. Moore, and J.E.P. Santos. Technical Note: Effects of adding shade and fans to a feedbunk sprinkler system for preparturient cows on health and performance. J. Dairy Sci. 89:2000-2006.