

ALLEVIATION OF THERMAL LOAD IN THE HIGH PRODUCING DAIRY COWA.B. HALL^A, B.A. YOUNG^A, P.J. GOODWIN^A, T.M. DAVISON^B and J.B. GAUGHAN^B^A Dept of Animal Production, The University of Queensland Gatton, Lawes, Qld 4343^B Dept of Primary Industries, Mutdapilly Research Station, MS 825, Ipswich, Qld 4306

Environmental heat has been shown to be a significant limiting factor to obtaining maximum milk production from the high producing dairy cow (Hahn and McQuigg 1967). Metabolic heat from concentrate feed has also been shown to elevate the body temperature of feedlot beef cattle (Beede and Collier 1986; Brosh *et al.* 1993).

A trial was conducted at Mutdapilly Research Station in south-east Queensland during February and March 1995 to examine the effects of metabolic and environmental heat on milk production. Milk production from 24 high producing Holstein Friesian cows housed in a feedlot with free access to shade and *ad libitum* roughage were compared. The 2 x 2 factorial experiment, with 6 cows in each treatment, consisted of (a) feeding 5 kg vs. 9 kg maize concentrate in 2 feeds per cow daily and (b) shade only vs. cooling by sprinklers (turned on for 2 minutes every 15 minutes) whenever the dry bulb temperature exceeded 26°C.

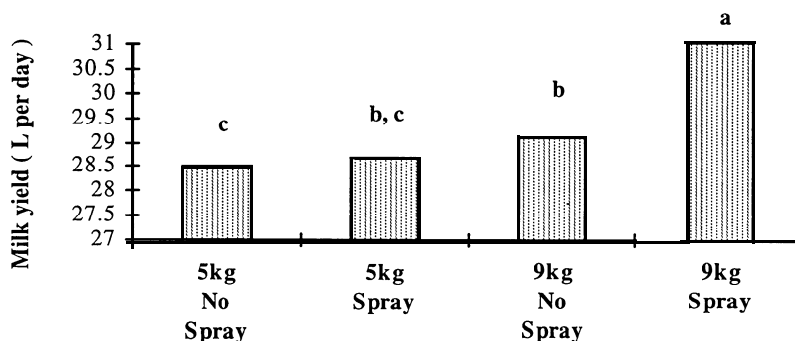


Figure 1. Analysis of concentrate level and spray cooling treatments on daily average milk yield. Different letters denote significant differences ($P < 0.05$) between treatment groups

Figure 1 shows that cows receiving 9 kg and which were spray cooled produced significantly higher milk yields than the other 3 groups ($P < 0.05$). There was no significant difference in milk yields between the spray and no spray treatments for cows receiving 5 kg concentrate. Cows receiving 5 kg concentrate and the spray treatment produced similar milk yields ($P > 0.05$) to the cows fed 9 kg concentrate but no spray treatment.

During the summer environmental heat load the level of concentrate feeding must be considered. A higher concentrate level in the diet will produce more milk only if the subsequent metabolic heat load is alleviated by adequate environmental cooling. Shade cooling alone is not sufficient to counteract the metabolic and environmental heat load when a higher level of concentrate feed is included in the diet of high producing Holstein Friesian dairy cows.

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BEEDE, D.K. and COLLIER, R.J. (1986). *J. Anim. Sci.* 62: 543-54.

BROSH, A., FENNEL, S., WRIGHT, R., BENEKE, G. and YOUNG, B. (1993). IUPS Thermal Physiology Commission Symp. on Temperature Regulation, University of Aberdeen, Scotland, p 10.

HAHN, G.L. and McQUIGG, J.D. (1967). ASAE Paper **MC-67407**, 16pp.