



THESIS

THE EFFECTS OF HIGH TEMPERATURE AND HOUSING MODIFICATION ON THE PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF DAIRY COWS

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The four experiments, under tropical conditions, reported in this thesis were aimed to assess the potential of housing modification on the productive and reproductive performance of dairy cows.

Experiment 1 The results revealed that daily variations in meteorological parameters were much less in the rainy season than the other seasons and the cows (n=355) were heat stressed more consistently in rainy season. The mean THI values ($P<0.01$) for Winter. The cows that calved during the summer months had lower milk production and reproduction performance than cows that calved in the other seasons. The days open values ($P<0.05$) for Winter. It is suggested that in the monsoonal area dairy cow calving should be aimed for the mid rainy season.

Experiment 2 Sixteen crossbred cows (Holstein X *B. indicus*). Results indicated that the Double Shade (DS) offered better and more efficient amelioration of the heat stress than the Single Shade (SS). The difference was sufficient to enable the cows housed under the DS house to have lower mean rectal temperature and respiration rate than that of the SS cows. The DS cows produced more milk ($P<0.05$) but did not differ significantly in reproductive performance compared to the SS cows.

Experiment 3 Fourteen crossbred cows (Holstein X *B. indicus*). The cows housed in an evaporative cooled environment had both a rectal temperature and respiration rate significantly lower than the non-cooled cows. The former group also had higher milk yield and more efficient reproductive performance (pregnancy rate and reduced days open) than the latter group. It could be suggested that non-evaporative cooled cows did not gain benefit from lower heat stress during night time.

Experiment 4 Ten crossbred cows (Holstein X *B. indicus*). The cows housed in the Double shade cooled environment had both a rectal temperature and respiration rate significantly lower than the non-cooled cows. There were no significant differences between the hormones cortisol, T3, T4, IGF-I and leptin from the two groups of cows. It was suggested that by using an electric fan during sunshine hours may further reduce heat stress in the DS shed.

It is concluded that both the DS cooling and the evaporative cooling techniques can be used throughout the year. Although the DS cooling was not effective in ameliorating the depression in some of the reproductive parameters. However, it has the advantage of requiring minimal energy for cooling. Further research should examine ways to increase the performance of heat stressed cows in small dairy farms through genetic improvement, by increasing heat tolerance and lowering the ambient temperature of the animal house being used under the tropical conditions.

Student's signature

Thesis Advisor's signature

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