Effect of Weather Patterns on Bovine Clinical Mastitis in Nuwara Eliya District of Sri Lanka

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Mastitis is a complex multi-factorial disease, which affects the quality and quantity of milk. Among several factors, climatic conditions have a serious influence on the prevalence and incidence of clinical mastitis (CM). Studies have shown that the temperature-humidity index has a direct effect on the occurrence of CM. This is mainly due to moisture which facilitates the growth of environmental bacteria on organic substrates. Bacteria gain access through the teat canal resulting in udder infection when cows rest on humid and soiled bedding and wade through mud. Detailed information on patterns of mastitis in relation to climatic conditions in Sri Lanka is limited. Therefore, this pilot study was aimed to determine the relationship between climatic conditions (temperature, rainfall and humidity) and incidence of mastitis in Nuwara Eliya district of Sri Lanka.

Weekly climate summaries [relative humidity (X_1), cumulative rainfall (X_2) and ambient temperature (X_3)] from 2008 to 2010 were collected and data on occurrence of CM were obtained from eight veterinary ranges (VR) in Nuwara Eliya district. Weekly incidence of CM (Y) in these VR was calculated. Correlation coefficients (CC) of variables were determined and multiple linear regressions with backward elimination (MLR) were performed. General 'drift' of scatter diagrams illustrated a linear relationship between variables. The CC indicated that X1 and X3 positively correlated with Y ($rX_1Y=0.452$, $rX_3Y=0.363$), while X_2 has a weak correlation ($rX_2Y= -0.092$). After removing the non-significant term (X2), the reduced model was $Y=-8.17 +0.029X_1+0.82X_3$. Even though the model is significant ($P<0.0001$), the adjusted R-sq is substandard (0.33). Parameter estimates of the variables X_1 and X_3 were significant ($P< 0.0001$, 0.0006) and no significant multicolinearity was observed between variables.

According to this study, X_1 and X_3 were significant factors in occurrence of CM. Similar studies have shown both temperature and humidity are associated with the occurrence of CM while no trend was evident with cumulative rainfall. But the low R-sq might be due to less variability observed in the explanatory variables within the study area. Even though the observation in this study concurs with the literature, the predicted model might be improved if different climatic zones were studied. It is recommended to carry out further investigations covering all climatic zones (wet, intermediate and dry) to predict a better regression model and to identify the most significant weather factors that correlate with the occurrence of CM in Sri Lanka.