

**Modelling the role of temperature and humidity on the transmission dynamics  
of east coast fever (ECF)**

**Fredrick Egebert Kileo**

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East coast fever (ECF) is a tick borne disease that kills cattle if left untreated and has impacted the economics of livestock sector due to morbidity and mortality rate. The research developed deterministic mathematical model to study the role of temperature and humidity on the dynamics of east coast fever which takes into account the role of temperature and humidity to the seasonal dependent parameters. Reproduction number ( $R_0$ ) was computed to determine the characteristics of ECF in the cattle and ticks population by using the next generation method, considered that model parameters depend on the time factor only. The effective reproduction number in the periodic environment  $R_0$  was shown to be the spectral radius of the next infection operator (L), however it was not computed. The existence of the disease in a periodic environment was determined by using the Poincare map associated with a model and it was shown to persist uniformly such that model system admits at least one positive periodic solution when  $R_0 > 1$ . The numerical simulation was conducted by using MATLAB software. The results have shown that, temperature and humidity played a role on the disease dynamics. Since it gives different values of  $R_0 > 1$  due to variation of temperature and humidity on the model dependant parameters. This study has shown that, the prevalence of east coast fever is not constant with time factor only, but the disease incidence is contributed by some of the weather derivatives specifically temperature and humidity variations. It is recommended that the, control measures of the east coast fever should be provided according to the periodic incidence of the diseases due to temperature and humidity variations.