Evaluation of the saltmarsh mosquito eradication programme in the Hawkes Bay

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EXTENDED ABSTRACT

Aim

The data that was collected by the Exotic Mosquito Control Centre at Healthcare Hawkes Bay during it's eradication program was examined to see if it could answer several questions of interest. The main question of interest was to evaluate effect of eradication programme on the mosquito population.

Background

The saltmarsh mosquito (Aedes camptorhynchus) is a potential vector for Ross River virus which makes the arrival of it in New Zealand of particular public health concern. In December 1998 the Southern Saltmarsh mosquito (Aedes camptorhynchus) was found to have infested an area in the Hawkes Bay region. Starting in January 1999 a programme has been carried out to monitor and completely eradicate Aedes camptorhynchus.

Methods and Materials

ArcView was used to examine the spatial and temporal distribution of the data. Quasi-likelihood methods were used to fit a model to a subset of the data, which was consistently collected, to evaluate the spatial and temporal effects of the eradication program.

Results

Although the data was not collected for the purposes of this research it was possible to produce some analysis on the eradication programme. Both the maps and the statistical analysis demonstrate that the eradication programme has had a significant impact on the numbers of Aedes camptorhynchus larvae in the Hawkes Bay region, with a dramatic decrease in numbers over time. The statistical model does not have a particularly good fit because of the over-dispersion of the data. The over-dispersion is mainly due to a large time variability in the favourability of each site for the detection of larvae. In particular this has led to a large number of sampling results showing zero larval density. Many of these zero sampling results are due to the fact that either the habitat and/or the environmental conditions were not ideal for larvae to be present. The statistical model does however provide some reasonable estimates of the larval density and hence the egg stocks over time. The model also provides the relative contributions of the individual sampling locations that had enough non-zero larval density to enable the statistical analysis to be performed.

Implications for Public Health Practice

Some care needs to be taken in the design and data collection processes when examining a issue that has complex spatial and temporal properties. It was possible to extract some useful information from the Hawkes Bay data, but the data was collected for very different requirements than this analysis, and was therefore far from optimal to answer all the questions of interest.