Introduction

Outbreak risk for Chikungunya (CHIKV) and Dengue (DENV) viruses is influenced by different parameters among which the distribution and density of the vector population.

The present study was carried out within the framework of the Emilia-Romagna Aedes albopictus monitoring and control program with the aim to create epidemiologic risk maps. The statistical model used to calculate the mean egg threshold corresponding to $R > 1$ (outbreak risk) was developed on data obtained in a study conducted in 2008 in four cities where a Chikungunya epidemic occurred in the summer 2007.

Material and Methods

Mean egg density aggregated for each municipality, and mean egg threshold based on $R$ model-based was calculated for each monitoring week in the period of highest density and diffusion of the species, from week 27 to week 36. Epidemic risk maps (choropleth) were produced by using ESRI ArcView 3.3 for: CHIKV, CHIK-A226V mutation, DENV I, DENV II, DENV III and DENV IV (Ae. albopictus is a more efficient vector for Dengue virus type II than for the other types).

Results and conclusions

Cluster (a) and Significance (b) maps calculated using LISA (Local Indicator of Spatial Associations) for percentage of weeks exceeding threshold for CHIK-A226V mutation virus.

Epidemic risk maps (choropleth) calculated on the percentage of weeks exceeding threshold during monitoring period (weeks 27-36) for each virus.

Choropleth maps show high percentages of week threshold exceeding only for CHIK-A226V mutation virus that was the responsible of 2007 outbreak in Italy. LISA Cluster map, that was based on local Moran’s I spatial correlation for each municipality, and Significance map, that showed the classification of significant (at $p<0.05$) municipalities for the Moran’s I statistics, were elaborated for percentage exceeding threshold data of CHIK-A226V mutation virus and large municipality areas of high epidemiologic risk (Red color) were identified in the north of the province of Modena (MO), Reggio Emilia (RE) and Piacenza (PC).

The highly autocorrelated values of these areas could be due to environmental factors, poor mosquito control or other factors that needs further investigations.

CHIKV and DENV Epidemic risk maps based on ovitraps data and $R$ model-based are a good tool at low cost for the evaluation of the risk and a possible need to increase mosquito control activities when the mean egg threshold is exceeded.

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