INFLUENCE OF RURAL LANDSCAPE STRUCTURES ON THE DISPERSAL
OF THE ASIAN TIGER MOSQUITO Aedes albopictus: a study case at La Réunion Island

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CONTEXT

Aedes albopictus Skuse (Diptera: Culicidae) is a mosquito species of major importance involved in the transmission of several diseases (Dengue, Yellow Fever, Chikungunya, West Nile Fever). Ae. albopictus is considered as the most efficient vector of Chikungunya virus and second for the dengue. This species has a high dispersal ability and is considered as an invasive species. Following the Chikungunya outbreak in 2006 at La Réunion island, the biology of Aedes albopictus is under investigation.

The dispersal of male Ae.albopictus must be understood in a SIT programme in order to optimize the release of sterilized males using landscape ecology tools.

METHODOLOGY: two major levels

Lanscape level :
Raster & vector analysis
Mapping the landscape mosaic

The different landscape elements of the site (matrix, patches, corridors) are mapped using the ArcGis software and a connectivity index is used to estimate the length between two contact classes as follows:

The study site (2 ha)

Raster map (5m x 5m pixels)

Population level :
Mark Release and Recapture Technique

25 BG Sentinel traps to catch adult Aedes albopictus

The raster model will be used to determine the roughness and aggregation of elements (contacts between pixels of a same class of land use i in a given window/possible maximum number of contacts) using indexes as follows:

PRELIMINARY RESULTS AND FUTURE RESEARCH

Impact of environmental factors (treatments, wind) on the distribution of mosquitoes (in red: breeding sites; in yellow: blood feeding sites) using a diffusion model (system of quasi linear partial differential equations) on an homogenous landscape.

The next step is the use of a complex landscape model including several indexes in order to estimate the role of the major filters and corridors in the context of optimized releases of sterile males.