

## The Culex Pipiens Niche: Assessment with Climatic and Physiographic Variables via a Geographic Information System

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**Abstract :** Using a geographic information system (GIS), the relations between a georeferenced data set of Culex pipiens sl. mosquitoes collected in Portugal mainland during seven years (2006-2012) and meteorological and physiographic parameters such as: air relative humidity, air temperature (minima, maxima and mean daily temperatures), daily total rainfall, altitude, land use/land cover and proximity to water bodies are evaluated. Focus is on the mosquito females; the characterization of its habitat is the key for the planning of surgical non-aggressive prophylactic countermeasures to avoid ambient degradation. The GIS allow for the spatial determination of the zones where the mosquito mean captures has been above average; using the meteorological values at these coordinates, the limits of each parameter are identified/computed. The meteorological parameters measured at the net of weather stations all over the country are averaged by month and interpolated to produce raster maps that can be segmented according to the thresholds obtained for each parameter. The intersection of the maps obtained for each month show the evolution of the area favorable to the species through the mosquito season, which is from May to October at these latitudes. In parallel, mean and above average captures were related to the physiographic parameters. Three levels of risk could be identified for each parameter, using above average captures as an index. The results were applied to the suitability meteorological maps of each month. The Culex pipiens critical niche is delimited, reflecting the critical areas and the level of risk for transmission of the pathogens to which they are competent vectors (West Nile virus, iridoviruses, reoviruses and parvoviruses).

**Keywords :** Culex pipiens, ecological niche, risk assessment, risk management

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