

EGU2020-10413

<https://doi.org/10.5194/egusphere-egu2020-10413>

EGU General Assembly 2020

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Key socio-economic and environmental factors in the reappearance of the *Aedes aegypti* mosquito in the Atacama (North Chile) Desert areas and mitigation risk measures.

Mauricio Gonzalez-Pacheco¹, Marcos Francos¹, Angelo Olivares¹, and Xavier Úbeda²

¹Departamento de Ciencias Históricas y Geográficas, Universidad de Tarapacá, Arica, Chile (mauriciogparica@gmail.com; marcosfrancos91@gmail.com; angeloolivaressolis@gmail.com)

²Department of Physical Geography, University of Barcelona, Barcelona, Spain (xubeda@ub.edu)

The *Aedes aegypti* mosquito is the main urban vector that transmits Dengue disease worldwide. In the last 25 years it has had a significant increase at a global level, reaching areas where it was eradicated, such as the reappearance in the extreme north of Chile, an area covered by the Atacama Desert. This mosquito is closely related to human settlements, which present risks that lie in the capacity of transmission of diseases caused by arboviruses by *Aedes aegypti* such as: Zika, Chikungunya, Yellow Fever and Dengue. The last one is the most important viral disease transmitted by mosquitoes in humans with more than 50 million estimated cases annually in over 100 countries. The aim of this study is to analyze the urban and environmental variables that determine the reappearance of the vector and to propose mitigation measures to reduce the risks of contagion. This study is located in the city of Arica (18°28'28.6" S 70°17'52.5" W) in the extreme north of the Atacama Desert, which has extraordinary habitability conditions characterized by rivers that are reactivated by summer rains in the Andes and valleys with agro-ecological productivity. The Pan American Health Organization determined the end of the presence of the mosquito in 1961 and its reappearance from 2016 in continental Chile. About the methods, the Health Authority established action limits based on the risks presented by these areas in terms of health interest and location, through inspections that allowed the identification of the vulnerability of each area. This was done by means of inspections that made it possible to identify the vulnerability of the sites. The discovery sites were geolocated according to the phenomenology of the species, considering the radius of flight among other phenological characteristics. The results allowed the identification of critical areas for the establishment of focus. The residential typologies of the sites were classified as industrial zones and suburbs in the urban limits with space-time coincidences. During 2016, 56 cases were found in urban and peri-urban areas between May and June. In 2018 there were findings between March-April with 14 cases in industrial and residential areas, while in 2019 there were findings between January-May and December with a total of 27 positive cases in peri-urban areas. In conclusion, there is evidence of a shift in findings from residential areas of paired housing (2016) to industrial areas (2018) and to suburbs in 2019. There is evidence of a deseasonalization in the findings of the mosquito, being a problem that must be controlled throughout the year. Therefore, there is an urgent need to find work methodologies

that can anticipate the detection of mosquitoes in sites that present a high risk, in order to take decisions on health management and apply control measures to regulate the accumulation of water. Environmental Education is proposed as a method to promote citizen awareness to face the risks associated with the vector together with government, academic and community coordination, cooperation and collaboration.