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Abstract Title

Enhanced surveillance of mosquitoes and vector-borne diseases in the Maltese Islands: Molecular species identification, insecticide resistance monitoring, and risk assessment for vector-borne infections

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Abstract

Background:

Over the last decade, the combined influence of global travel, climate change, migration and the spread of vector-borne infections like chikungunya, dengue and malaria in Europe has made the spread of vector mosquitoes in Malta a public health priority. We sought to identify competent vectors for infectious diseases in the Maltese islands, in order to inform public health response.

Methods:

Entomological surveillance was conducted July 2018 to February 2019 across Malta with larvae, pupae and adult mosquitoes collected in 23 sites. From July to November 2018, egg density was measured weekly in 32 sites. Species were identified via morphological and molecular analyses and insecticide resistance mutations were analysed. We analysed national surveillance data on vector-borne infections in Malta (1990-2018).

Results:

The species most frequently found were *Culiseta. longiareolata* (9 sites), *Culex. pipiens s.s* (8 sites), including the hybrid *Cx. pipiens pipiens/molestus* biotype and *Aedes albopictus* (4 sites). Neither *Anopheles* nor *Ae. aegypti* mosquitoes were detected. Mutations relevant for pyrethroid-based insecticide resistance were detected among 53% *Culex* (n=37) and 15% *Aedes albopictus* (n=17). During 1990-2018, 103 malaria, 7 dengue, one chikungunya and no WNV cases were reported with the exception of one cryptic *Plasmodium falciparum* infection (October 2018), all other mosquito-borne infections were travel-related.

Conclusions:

This is the first molecular species identification and insecticide resistance analysis of mosquitoes from Malta. The sustained presence of competent vectors for arboviruses prompted the implementation of enhanced surveillance to monitor the arrival and spread of mosquito species, and the emergence of insecticide-resistant mutations.

Key Message 1

In Malta, there is sustained presence of competent vector mosquitoes for arboviruses

Key Message 2

We need enhanced surveillance to monitor arrival and spread of mosquito species, and insecticide-resistant mutations.