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Assessing the ability of *Aedes albopictus* and *Aedes cretinus* (Diptera: Culicidae) adults to survive winter under sheltered microclimatic conditions in northern Attica, Greece

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INTRODUCTION & AIM

Aedes cretinus is a tree-hole mosquito species native to Greece with limited geographical distribution worldwide and unknown capacity to transmit diseases. It is closely related to the invasive container breeding mosquito species *Aedes albopictus,* which poses a great threat to humans as vector of several pathogens. Mosquito survey data from the Region of Attica and other areas in Greece indicate a significant decline in *Ae. cretinus* populations following the invasion and widespread establishment of *Ae. albopictus*. In this study, we investigated the overwintering capacity of *Ae. albopictus* and *Ae. cretinus* adults under semi-field, sheltered microclimatic conditions in northern area of Attica Region, Greece, during the winter of 2023-2024.

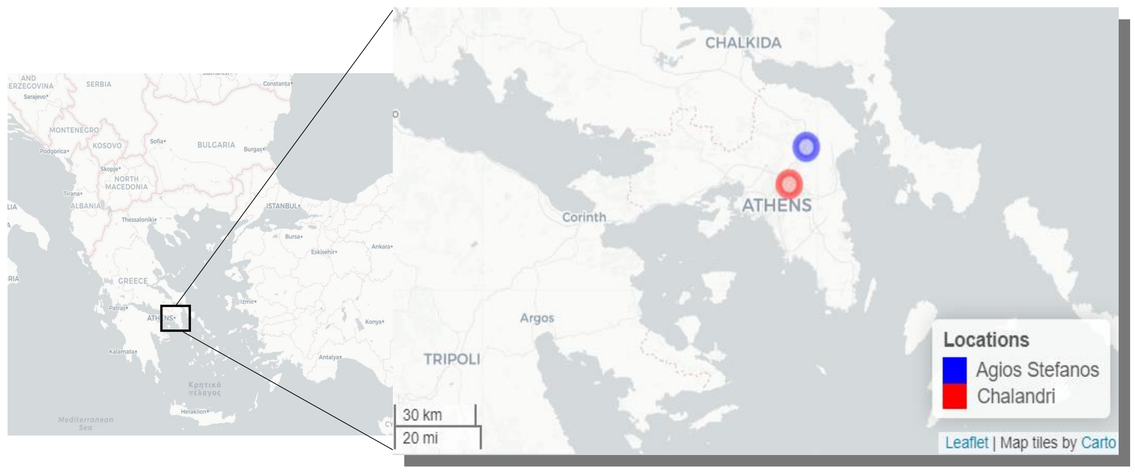
MATERIALS AND METHODS

Origin of mosquito colonies:
Mosquito eggs were collected with ovitraps from two sites of northern Attica:

- *Ae. cretinus* from Agios Stefanos
- *Ae. albopictus* from Chalandri

***Ae . cretinus* (♀)**

***Ae. albopictus* (♀)**



Laboratory colonies: Eggs were transferred to the laboratory (25±2 °C, 75±5 % RH, 14h:10h L:D) and reared to obtain the required number of adult mosquitoes for the experiment.

Cages for mosquito colonies

Experimental design: *Ae. cretinus* and *Ae. albopictus* males and females < 24h old were placed in cages (28×16×16 cm). 25-30 males were caged with 30 females of each species, separately. Three replicates were applied.

Experimental cages

- On 13 December 2023, the caged mosquitoes were placed in an unheated and naturally lit storage room in Chalandri that provided sheltered semi-field conditions. Mosquitoes were supplied with 10 % sucrose solution and no-blood meal was provided.
- Survival of adults was recorded daily until 12 April 2024.

RESULTS & DISCUSSION

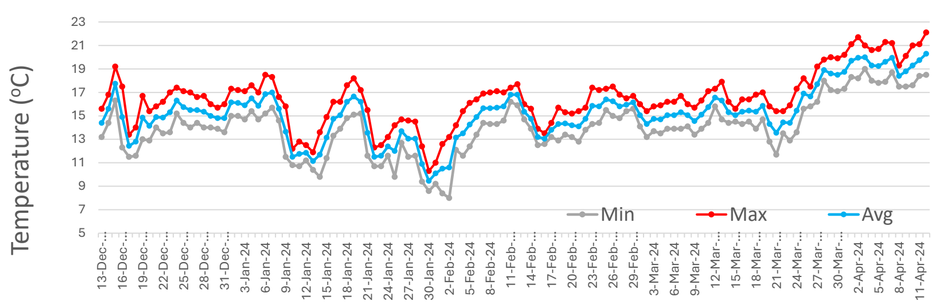


Fig.1. Winter daily mean temperature (°C) in semi-field conditions of the experimental site.

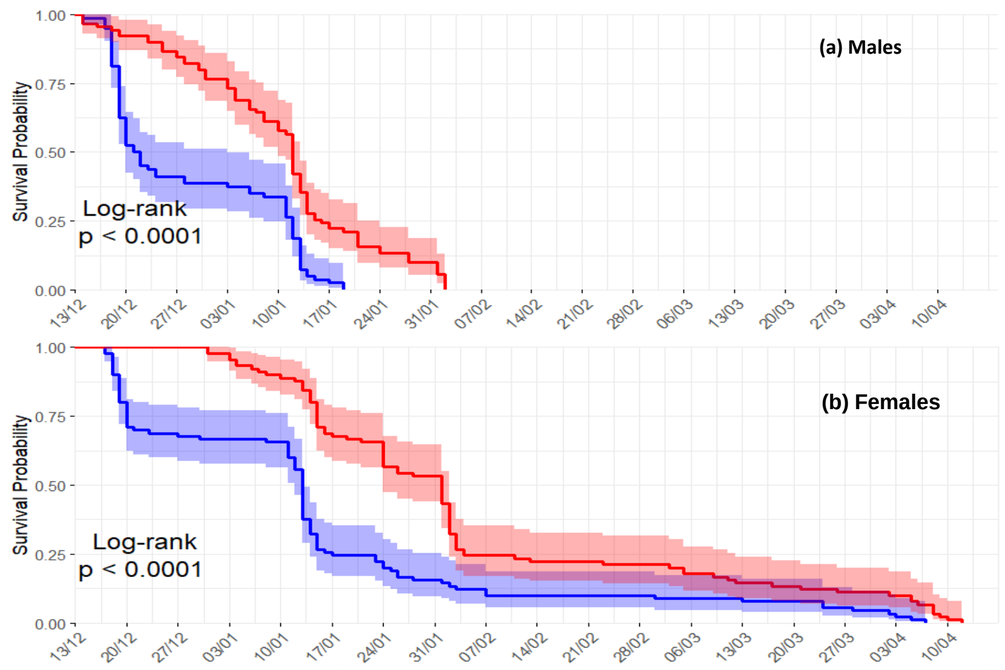


Fig.2. Comparative survival of *Ae. albopictus* and *Ae. cretinus* adult males (a) and females (b) exposed to semi-field conditions (Kaplan Meier survival curves with log-rank test).

Table 1. Life span (days ± SE) of *Aedes albopictus* and *Aedes cretinus* adult males and females exposed to semi-field conditions

Aedes adults (Sex)	n	Average	Percentiles 25%	50%	75%	min	max
***Aedes cretinus* (♂)**	90	28.25±1.3	34±2.8	30±0.8	21±2.8	1	51
***Aedes albopictus* (♂)**	80	15.78±1.3	30±1.3	8.5 ±3.6	6±0.25	1	37
***Aedes cretinus* (♀)**	90	54.25±3	53±9.95	50 ±2.3	33±2.6	18	121
***Aedes albopictus* (♀)**	90	32.48±3	35±4.6	31±0.25	7±5.9	4	116

- ✓ Adult females of both species survived winter under semi-field conditions in the sheltered microclimatic environment highlighting the importance of sheltered microclimates in enabling overwinter survival under low outdoor temperatures.
- ✓ The overwintering survival ability of females indicates the potential of these species to build up large populations early in spring, suggesting mosquito surveillance be conducted year-round.
- ✓ The winter survival ability of adults was significantly greater in *Ae. cretinus* than in *Ae. albopictus*, and this may account for the occurrence of *Ae. cretinus* in the cooler environments of vegetated and wooded locations in northern areas of Attica Region.
- ✓ The ability of *Ae. albopictus* females to also overwinter under the same sheltered microclimatic environment may affect the potential of interspecific competition in areas where these species co-occur.