DIFFERENTIAL COLD TOLERANCE ON IMMATURE STAGES OF GEOGRAPHICALLY DIVERGENT *CERATITIS CAPITATA* POPULATIONS

Antonis G. Papadopoulos, Panagiota Koskinioti, Kostas D. Zarpas & Nikos T. Papadopoulos

Department of Agriculture, Crop Production and Rural Environment, Laboratory of Entomology and Agricultural Zoology, School of Agricultural Sciences, University of Thessaly, Fytokou St., 38446, Volos, Greece

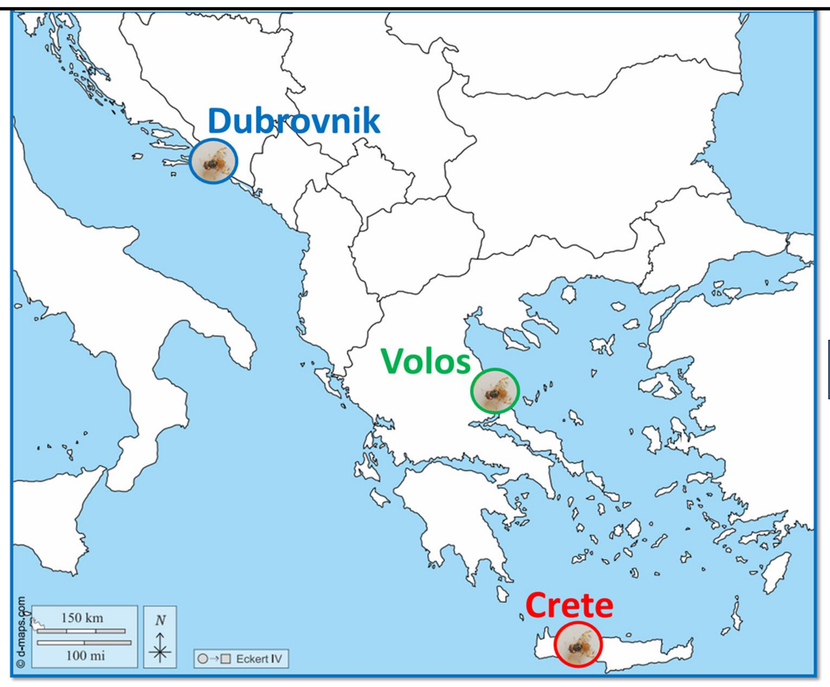
INTRODUCTION

The invasion success of the Mediterranean fruit fly (medfly) (Diptera: Tephritidae), among others, depends on its intrinsic ability to tolerate the thermal stress induced by temperature shifts in invaded regions. Despite a wealth of data regarding cold tolerance of adult medflies, the effect of subfreezing temperatures on the immatures remains poorly investigated, and no data exists regarding different populations.

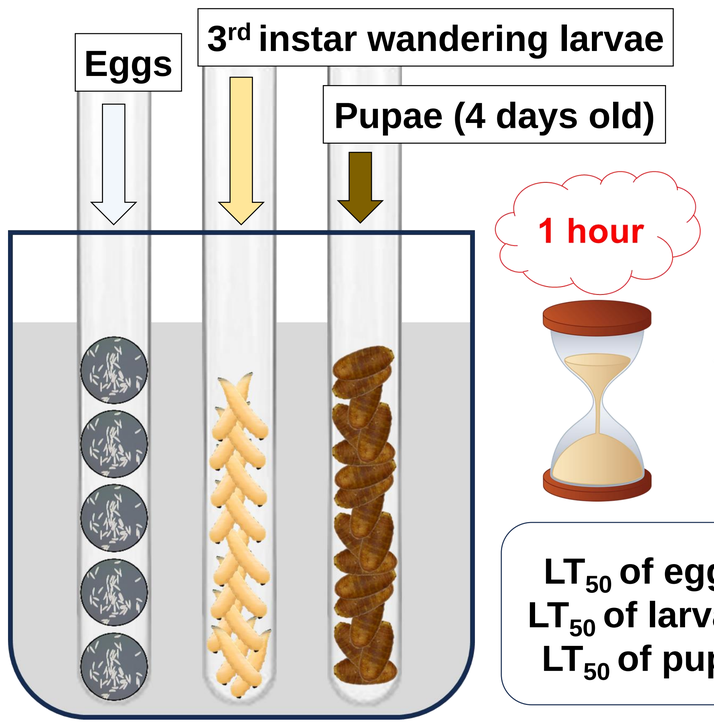
We explored the effect of medfly population origin on acute cold stress response of immature stages (eggs, larvae, pupae), considering three geographically isolated medfly populations obtained from a wide latitudinal range of the Northern Hemisphere.

MATERIALS & METHODS

3 geographically divergent populations



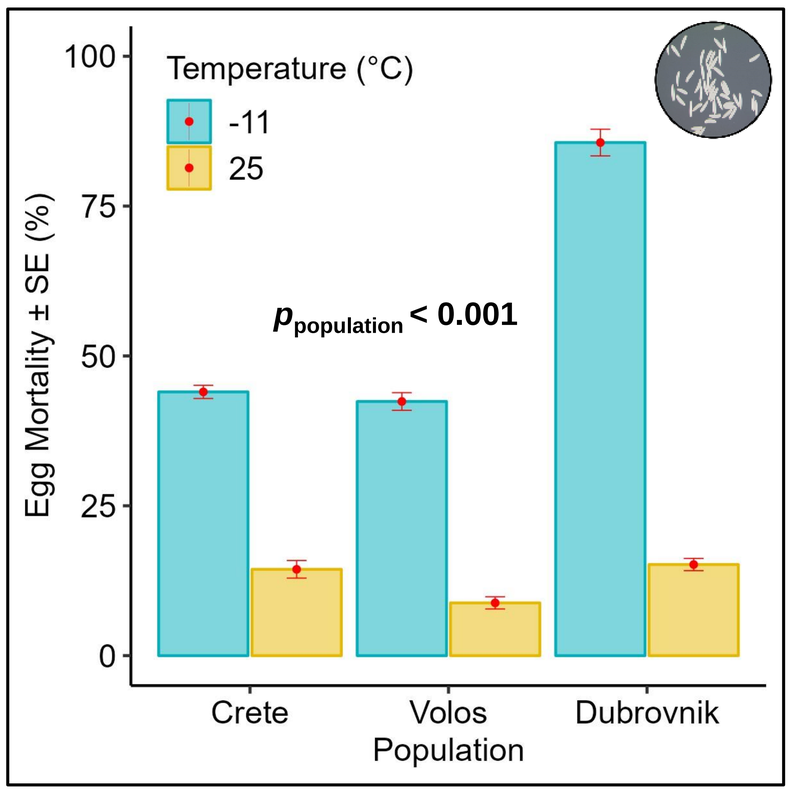
Exposure to the LT_{50} of each developmental stage for 1 hour



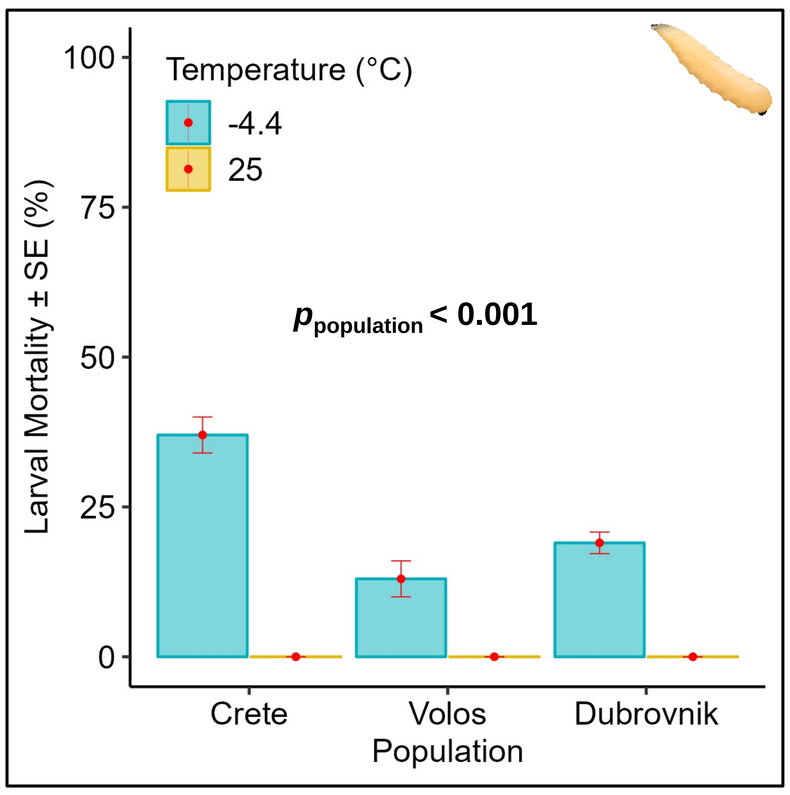
- ✓ Transfer at 25°C after the exposure
- ✓ Recording of mortality (%)

LT_{50} of eggs = -11°C
LT_{50} of larvae = -4.4°C
LT_{50} of pupae = -5°C

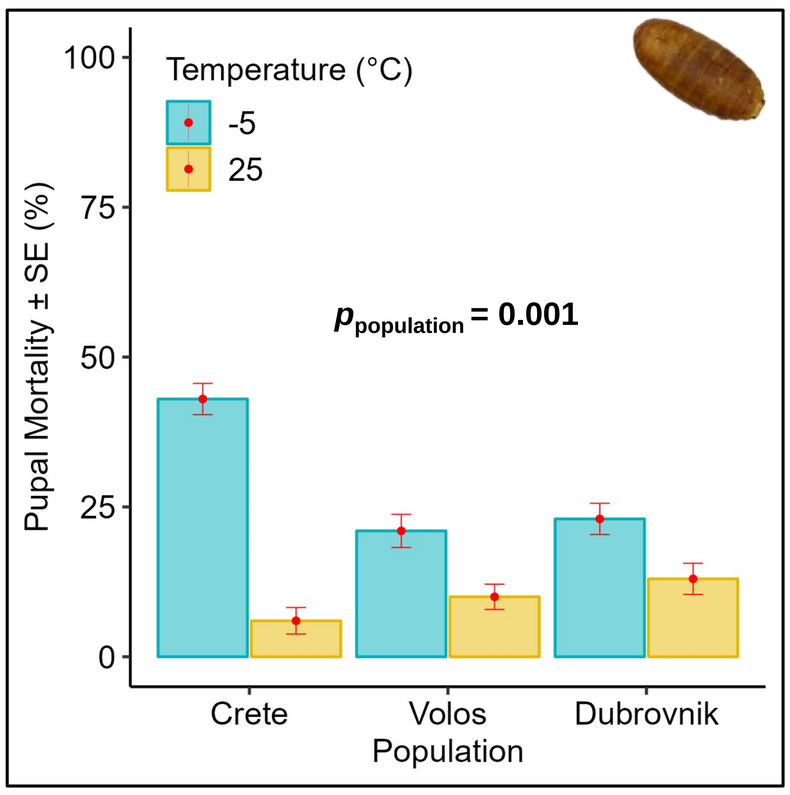
RESULTS



1. Average egg mortality of eggs exposed to −11°C for 1 hour



2. Average mortality of larvae exposed to −4.4°C for 1 hour



3. Average mortality of pupae exposed to −5°C for 1 hour

CONCLUSIONS

- ❖ Response of immatures to cold stress depends on developmental stage and the origin of the population.
- ❖ The egg stage was the most cold-tolerant, followed by 4 days old pupae and finally the 3rd instar wandering larvae.
- ❖ The population of Volos (intermediate) was the most cold-tolerant considering all developmental stages. The population of Dubrovnik (northernmost) was the most cold-susceptible at the egg stage, whereas that of Crete (southernmost) at the larval and pupal stage.

"This research was supported by the Hellenic Foundation for Research and Innovation (H.F.R.I.) under the "1st Call for H.F.R.I. Research Projects to support Faculty Members & Researchers and the Procurement of High-and the procurement of high-cost research equipment grant" (Project Number: 4289)"