

# **SURVIVAL TO ACUTE COLD STRESS AND SUPERCOOLING CAPACITY OF THREE MEDITERRANEAN FRUITFLY POPULATIONS**

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The Mediterranean fruit fly, *Ceratitis capitata* (Diptera: Tephritidae), is an invasive species that has recently expanded its distribution in colder regions in Europe. However, the cold tolerance of the wild flies is poorly elucidated. In the frameworks of the Horizon 2020 “818184 FF-IPM” project, we examined the survival to acute cold stress and the supercooling (SCP) capacity of three wild *C. capitata* populations from Greece (Volos, Central Greece; Thessaloniki, Northern Greece) and Croatia (Zaton, Dalmatia region). For assessing acute cold stress response, males and females (10-day-old) were distributed in 10 replicates of 10 individuals (5 males and 5 females) in each vial, and subjected to an acute cold stress at  $-5.5^{\circ}\text{C}$  for 1h. After exposure, flies from each population were allowed to recover at  $25^{\circ}\text{C}$ . Survival was assayed 24, 48 and 72h after cold shock, based on the coordinated response to mild stimulation. Moreover, SCP, the lowest temperature before an exothermic reaction took place, was determined for the a) immature stages (larvae L3, pupae 1-day-old, pupae 5-day old) and b) adults (males and females 5-day-old) from each population. Our results shown that: a) survival probabilities of flies after the acute cold stress did not differ among populations (50% of flies remained alive after 72h), and b) pupae 5-day-old had the lowest SCP for all three populations, whereas SCP for larvae from Zaton ( $-21^{\circ}\text{C}$ ) was significant lower than SCP of larvae from Thessaloniki ( $-17^{\circ}\text{C}$ ) population. Thus, population response to cold tolerance may be stage-specific for *C. capitata* populations.

**Keywords:** cold survival, cold tolerance, *Ceratitis capitata*, SCP