

Latitudinal variation in survival and immature development of *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae) populations reared in two key overwintering hosts

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The Mediterranean fruit fly, *Ceratitis capitata* (medfly), is a major agricultural pest, expanding its geographic distribution to cooler, more temperate areas of Europe. In coastal Mediterranean regions, high population densities during summer and autumn and overwintering are accomplished mainly in bitter oranges as larvae. In cooler, more temperate areas, peak population densities occur in autumn with apples as the overwintering host of larvae. Following a common garden experimental approach, we assessed the overwintering capacity of different medfly populations obtained from a wide latitudinal range of the northern hemisphere. Survival and development of immature stages were assessed in two overwintering hosts (apples, bitter oranges) under laboratory conditions. Eggs from six populations, spanning a latitudinal range, from Southern Europe (Crete, Greece) to Central Europe (Vienna, Austria), were artificially inserted in the flesh of the two hosts. Infested fruits were kept at 15, 20, and 25°C, and relative humidity 60±5%, until pupation and adult emergence. Analysis revealed combined effects of origin-latitude, host, temperature, population and microclimatic conditions on survival rates and developmental duration of immatures. Immature stages exhibited higher survival rates and prolonged developmental duration when reared in apples compared to bitter oranges. In medflies originating from southern latitudes (warmer areas), developmental duration was longer than those originating from northern regions, demonstrating differential plastic responses to constant temperatures. Lower temperatures decreased adult emergence rate and delayed developmental duration regardless of the host and population. Our results contribute to understanding invasion dynamics of medfly, deciphering biological traits that influence invasion success, with emphasis on range expansion to northern, more temperate areas of Europe. Funding was provided by projects FF-IPM (HORIZON 2020, GA818184) and the MEDFLY (HFRI-FM 17-4289).