One for all: Mating compatibility among various populations of Olive fruit fly (Diptera: Tephritidae) and with a hybrid strain for sterile insect technique application

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Olive fly is the single key insect pest for olive cultivation, and attempts to eradicate or suppress its populations with the use of the sterile insect technique have been made for the last decades. One of the major obstacles encountered was the inferior quality of the mass reared strains, expressed among others in differential time of mating, and lower mating percentages in comparison with wild counterparts. In this study we examined the mating behaviour of olive flies originating from four countries located in the North Mediterranean (Croatia, Italy, France, Spain), by means of field cage compatibility experiments. Post mating studies measuring the egg hatch from different insect combinations complemented the experiments. Furthermore, we tested the hypothesis that a hybrid strain adopted in laboratory rearing conditions can compete successfully with all the four wild populations. Finally, we examined the effect of colonisation upon the mating compatibility of four newly established populations over 3 consecutive generations.
Our results showed absolute mating compatibility among olive flies from all the Mediterranean regions tested, and effective sperm transfer and egg hatching was observed in all cases. Finally, wild strains undergoing colonization showed almost a stable mating propensity e.g. no assortative mating, over a period of 3 generations. Those findings are discussed under the scope of their potential use for sterile mass releases within an AW-IPM framework.