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***Bactrocera oleae* (Diptera: Tephritidae) organophosphate resistance alleles in Iberia: Recent expansion and variable frequencies**

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**Abstract.** The olive fly, *Bactrocera oleae* (Rossi, 1790) (Diptera: Tephritidae), is the most important pest of olive trees globally, causing losses that, in the absence of control measures, can exceed 90% of the crop. In the Mediterranean basin, where the overwhelming majority of production is concentrated (~ 98%), organophosphate insecticides (OPs) have been the main tool for *B. oleae* control for the last four decades, leading to the development of resistance to these compounds. Mutations of the *Ace* gene, which codes for acetylcholinesterase, the target enzyme of OPs and other insecticides, have been identified as the underlying cause, with studies reporting mid to very high frequencies of resistance alleles in several countries. Interestingly, no resistance alleles were detected in Portugal, at the Western end of the Mediterranean basin. As the original study was done almost a decade ago and did not include many samples, we decided to re-evaluate the situation, by analysing a larger number of individuals from multiple locations in Western and Southern Iberia (Portugal and Spain). In our present study, resistance-associated *Ace* alleles were found to have become widespread in both regions, but with highly varying frequencies. Together with the observed haplotype distributions, this finding is consistent with previous suggestions of a recent, selection-driven spread and has implications for the importance of *Ace* mutations in organophosphate resistance in the field as well as the importance of gene flow between Mediterranean populations of *B. oleae*.