

Parasitoid efficiency: when is it advantageous to use more than one species?

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The use of parasitoids in biological control programs for the fruit flies is widely used worldwide. It is known that the control efficiency can depend on various factors, such as, species of parasitoids, its host, and host fruits. In Brazil, the exotic parasitoids, *Fopius arisanus* and *Diachasmimorpha longicaudata* (Hymenoptera: Braconidae), of eggs and larva, respectively, could be used to control *Ceratitis capitata* (Diptera: Tephritidae). However, its effectiveness may vary according to the host fruits, and the use of two species should be evaluated. In guava, the parasitism by *F. arisanus* (51.04%) was higher than by *D. longicaudata* (25.54%), with 39.96 and 46.94% of emergency flies, respectively, lower than the control (87.57%). When were used both species, parasitism by *F. arisanus* and by *D. longicaudata* remained similar (54.72% and 13.38, respectively), but the control of *C. capitata* was higher, since its emergency decreased to 20.41%. In barbados cherry, parasitism by *F. arisanus* (36.42%) was lower than by *D. longicaudata* (65.39%), with 53.46% and 22.94% of emergency flies, respectively, lower than the control (82.28%). With the two species, the parasitism by *F. arisanus* (29.83%) was similar and by *D. longicaudata* (35.15%) decreased, and emergence of *C. capitata* remained similar (26.23%). On the other hand, in guava, although *F. arisanus* was more efficient than *D. longicaudata*, with parasitism 25.50% higher, the use of the two species is recommended, since the total parasitism increased to 65.31% and the pest emergence decreased to 20.41%. In the case of barbados cherry orchard, it is recommended to release only *D. longicaudata*, because its parasitism was superior than by *F. arisanus*, and when both parasitoids species were used, there was no increase in parasitism (64.99%), and did not decrease the emergence of flies compared to the use of only *D. longicaudata*.

Keywords: Biological control, *Diachasmimorpha longicaudata*, *Fopius arisanus*, guava and barbados cherry.