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Host-instar selection, interspecific competition, and reproductive capacity of extant and novel Hymenoptera: Braconidae on Egyptian cotton leafworm

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Abstract

Cotesia marginiventris (Cresson) and *Microplitis rufiventris* Kok. (Hymenoptera: Braconidae) are larval endoparasitoids of *Spodoptera frugiperda* (Smith) and *S. littoralis* (Boisd.), respectively. *Cotesia marginiventris* was introduced in Egypt to control the recent invasive pest, *S. frugiperda*, and local one, *S. littoralis*. Therefore, competition between the two parasitoid species may occur. When single females of *C. marginiventris* (Exp. 1), single females of *M. rufiventris* (Exp. 2), and one female each of *C. marginiventris* and *M. rufiventris* (Exp. 3) were offered a choice of 60 1st, 60 2nd, and 60 3rd instars of the tested host species, *S. littoralis*, different parasitisation levels were obtained.

In the non-competitive context (Exps. 1, 2), all instars were parasitised, but *C. marginiventris* and *M. rufiventris* parasitised primarily 2nd and 3rd instar host larvae, respectively. In the competitive context (Exp. 3), the same preference pattern emerged, but the percentage of parasitism was lower than in each of the two non-competitive contexts. *M. rufiventris* appears to be a superior competitor when simultaneously exploiting the host with the other parasitoid species.

The knowledge of this work can be used to predict and/or understand possible outcomes of a biological control programme using the two biocontrol agents against one or the two pest species, and to gain insight into possible biotic interference between species at the same trophic level exploiting the same host. The knowledge generated from this work may increase our understanding of the performance of a new biocontrol agent in Egypt if released with the extant parasitoid *Microplitis rufiventris*. If the study was conducted with *S. frugiperda*, probably *C. marginiventris* would be the winner for that pest, as they originate from the same area.

We do not know how the two parasitoids will interact with *S. frugiperda* and *S. littoralis* in the field, as this study is limited to *S. littoralis* due to strict quarantine measures for *S. frugiperda*.

Keywords: *Cotesia marginiventris*, instar preference, interspecific interaction, *Microplitis rufiventris*, *Spodoptera littoralis*

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