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Intrinsic competition between extant and novel parasitoids (Braconidae) in the cotton leafworm *Spodoptera littoralis* under laboratory conditions

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Abstract

Parasitoids may compete at the adult stage when foraging hosts (extrinsic competition), or at the larval stage, when supernumerary parasitoids develop in the same host (intrinsic competition). A study including lepidopteran pest *Spodoptera littoralis* and novel (*Cotesia marginiventris*) and extant (*Microplitis rufiventris*) hymenopteran endoparasitoids, was carried out to investigate the effect of single and double parasitism at 2hr and 48hr oviposition times on endo-development of the wasps and competitive interactions between the parasitoid larvae. No significant differences in the endo- development time of the wasps were found between single or superparasitised hosts. Conversely, multiple parasitism increased the endo developmental time of both wasps. Singly parasitised hosts by *M. rufiventris* produced more wasps than those of *C. marginiventris*. Also, the percentage of emergence success by superparasitised M. rufiventris, was, greater than those recorded by superparasitised C. marginiventris. Muliparasitised hosts produced more *C. marginiventris* than *M. rufiventris* wasps. However, the outcome of competition, by both wasp larvae principally depended on the wasp species that was first to attack and on the time interval between two oviposition's by wasp females. The intrinsic and competitive interactions between the parasitoid larvae in multiple parasitism experiments was more intensive than in superparasitism experiments. The novel parasitoid, *C. marginiventris* was intrinsically superior competitor comparing with the extant *M. rufiventris*, so the use of the two species simultaneously may lead to competitive exclusion and influence the stability of the extant parasitoid population. The competition was asymmetrical, meaning one species (the exotic) had a competitive advantage as competitor being the victor whatever the sequence of attack, over the other species. Introducing *C. marginiventris* to Egypt, may be not a good option for biological control of both, the new invasive pest, *S. frugiperda* and local one, *S. littoralis*.

Keywords: *Cotesia marginiventris*, endo-development, intrinsic competition, *Microplitis rufiventris*, single and double parasitism, *Spodoptera littoralis*

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