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Alessia Iacovone, Nicolas Ris, Marylène Poirie, Jean-Luc Gatti. The spotted wing drosophila: interactions between *Drosophila suzukii* and native versus local parasitoid species. Colloque International des Entomophagistes, Université Catholique de Louvain (UCLouvain). BEL., 2014, louvain la neuve, belgique, Belgium. hal-02740903

HAL Id: hal-02740903

<https://hal.inrae.fr/hal-02740903>

Submitted on 3 Jun 2020

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The Spotted Wing *Drosophila*: interactions between *Drosophila suzukii* and native versus local parasitoid species

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Drosophila suzukii, a pest fly from Asia, had recently invaded USA and Europe and poses an important threat to fruit production. Indeed, larvae develop in a wide range of ripening fruits and the physical damage caused by the female serrated ovipositor facilitates pathogens infections. To check for natural enemies and develop a biological control method, we have characterized the outcome of interactions between *D. suzukii* and parasitoid species either local (two *Leptopilina boulardi* Mediterranean lines, Lbm and Lby and one French strain of *L. heterotoma*) or from the fly origin area (Asian: one Japanese strain of *L. heterotoma*, one strain of *L. japonica*, one strain of *Asobara japonica*). We first determined the host suitability, showing that only *A. japonica* and *L. heterotoma* strains develop in *D. suzukii* larvae. *A. japonica* has the highest parasitism level, as previously reported. Interestingly, although parasitism by *L. boulardi* was unsuccessful, infested *D. suzukii* larvae suffered a high mortality rate. Finally, a large percentage of emerged adult flies contained encapsulated parasitoids (except for *A. japonica*). We then tested host acceptance for oviposition : the French strain of *L. heterotoma* and *L. japonica* parasitized up to 80% of larvae, the infestation rate of the other wasp strains ranging between 40% and 55%. Almost no encapsulated eggs were found inside host larvae 48h post-parasitism, whatever the parasitoid strain. However, almost all *L. boulardi* larvae were dead 72h post-parasitism and partially encapsulated, whereas 80% of *L. japonica* larvae and about 50-60% of *L. heterotoma* larvae were alive, only surrounded by a thin coat of light-colored cells.

These results raised interesting questions such as: i) why encapsulation occurred so late and differently for parasitoid species (immune response occurring later in *D. suzukii* compared to *D. melanogaster*? longer protection of the parasitoid egg?); ii) Which mechanism (behavioral and/or physiological) determines the outcome of each wasp-fly interaction?

* A. Iacovone post-doctoral stay is supported by a grant from the PACA region. This work is supported by grants from the French PACA region and FP7 KBBE DROPSA.