

“Super-Wasp” selection for biocontrol: potential of natural enemies to adapt to a new invasive pest

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Almost a decade ago, a new pest species invaded Europe and North America: the spotted wing *Drosophila* (*Drosophila suzukii*). This fruit fly is a major concern for farmers of soft fruits since it is able to lay its eggs in soft ripening fruits such as strawberry, blueberry, and blackberry. There is however a lack of environmental friendly control methods to manage the pest. This project focuses on the question how we can use the pests' natural enemies to manage the pest population, as a means of biological control.



The main natural enemy of fruit flies are parasitic wasps (parasitoids). These are small insects that lay their eggs in the developing fly larvae or pupae. The problem is that most parasitoids in the invaded areas seem to have a low ability to kill the *D. suzukii* fly. This project aims to investigate the relationship between native parasitoids and the *D. suzukii* pest, to understand to what extent natural enemies can adapt to the new pest species and select a “Super-Wasp” that can be used by farmers to protect their crops.

We are currently investigating whether the pest killing of a promising parasitoid species can be improved by artificial selection. There are a number of questions to be answered. To what extent can we direct the parasitoid's evolution? Which genetic and environmental factors influence pest killing success? Is pest killing success heritable, and/or influenced by experience (learning ability) and the environment? Does selection for one trait influence other important life-history traits (trade-offs)? If pest-killing success can be improved, what are the underlying genetic or behavioural changes, and can this knowledge be applied to control *D. suzukii* populations in the field?

Methods: behavioural and life-history analysis, (semi-)field work, genetic crosses and insect culturing

Starting date: February 2019 or later