



## ENTOMOVECTORING

Franco-Finnish Workshop



Research topic: **Biology**

Place: **Virtual workshop**

Institutions involved: **University of Eastern Finland**

Dates: **03/11/2021 to 05/11/2021**

Program: **Maupertuis Programme**



## PRESENTATION

This international virtual workshop, curated by [Heikki Hokkanen](#) and [Ingeborg Menzler-Hokkanen](#), intended to highlight advances in the study of insect-plant interactions as basis for entomovectoring. The term “entomovectoring” was created by them in 2006. They introduced it to specify the technique of using insects to vector beneficial organisms or substances (usually biocontrol agents for crop protection) to specific targets. These include flowers, other plant parts such as leaves, or other organisms (e.g., mosquitoes to vector myxomatosis virus to rabbits). As presented in this workshop on 3 November by the [Pest Free Fruit](#) consortium, entomovectoring can be used to disseminate biocontrol organisms between insects as well (fruit flies as an example). Using insects as vectors has great potential to help develop sustainable, pesticide free production systems, but is grossly underutilised and poorly understood. This workshop explored the scientific foundation and insights necessary for exploiting the potential of insects as vectors of beneficial organisms or substances. They discussed some of the latest knowledge required for understanding how potential entomovectors can be managed, deployed, and enhanced to optimally perform their beneficial functions. Novel approaches were presented that will stimulate the development and uptake of entomovectoring as a tool in pest management, such as fruit fly control, to substitute for chemical pesticide use, to complement ecostacking techniques, to help in engineering sustainable ecosystem management schemes, and to boost the quality and quantity of agricultural production. They further presented the current situation of utilizing entomovectoring in leading countries and discussed obstacles to the uptake of this technology and possible solutions to overcome any hurdles. Basic research on entomovectoring is scattered. They wished to encourage underlying research for this area as a basis to engage in exploiting this powerful technology for the purpose of safe, targeted biological crop protection, and improved pollination. Fundamental research such as on olfaction and taste are crucial pillars in constructing functioning entomovectoring systems. Spill-over effects of the present climate change with weather extremes, and their effects on entomovectoring systems had to be included. The contributions in the [Arthropod-Plant Interactions](#) virtual special issue “Pollinator-plant interactions as basis for entomovectoring” are an attempt to compile research results reflecting some of the bottlenecks and challenges in this area.

## ACTIVITIES AND OUTCOMES

During the virtual workshop twenty-three experts from 11 different countries participated. Twenty review presentations were given with associated discussions over the workshop period of three days, covering fundamental, applied, and forward-looking aspects concerning entomovectoring. To enhance using insects to deliver beneficial organisms, substances or devices numerous new and exciting ideas were presented (e.g., electrostatic enhancement, advances in formulation, multiagent applications, robotics and cyborg insects). A case concerning ecological dangers was highlighted when exotic insects have been used either for pollination or for entomovectoring: spread of devastating pollinator diseases following commercial use of exotic pollinators. Best known case from South-America was reviewed based on popularizing sources and scientific sources. As an outcome from the workshop, they have commissioned a review article concerning biological invasions by pollinators, their parasites, and mechanisms by leading world experts on the topic. Further outcomes included the signing of a book contract with [CABI](#), to publish the reviews presented at the workshop, with some additional chapters, as a book within about one year after the workshop. In addition, a contract to publish a book series on “Ecostacking” by CABI was also signed. Limitations to successful use were presented and discussed including hive health, environmental contaminants such as pesticides, difficulties to steer insects to the desired targets, and possible environmental impacts. It was presented that the Virtual Special Issue (VSI) in the Springer Journal Arthropod-Plant-Interactions was a necessary step in preparing the forming of this workshop.