

Short description of project funded by CORE Organic II partners in the first call of CORE Organic II

Project short name and title

Softpest Multitrap

Management of strawberry blossom weevil and European tarnished plant bug in organic strawberry and raspberry using semiochemical traps

Project summary

In the absence of effective control measures, the strawberry blossom weevil (*Anthonomus rubi*), the European tarnished plant bug (*Lygus rugulipennis*) and the raspberry beetle (*Byturus tomentosus*) cause large (10 - >80%) losses in yield and quality in organically grown strawberry (*A. rubi* and *L. rugulipennis*) and raspberry (*A. rubi* and *B. tomentosus*). In this project the natural semiochemical mechanisms of sexual attraction and host plant finding of these key pests will be exploited to develop effective semiochemical traps for their management through mass trapping. Attractive lures will be combined into a single multitrap for economic management of these pests simultaneously in each crop. This will be one of the first approaches to pest management of non-lepidopteran insect pests of horticultural crops using semiochemicals in the EU, and probably the first to target multiple species from different insect orders. Growers of organic raspberry and strawberry crops currently have few options for effective control of these pests and development of semiochemical-based, non-pesticidal management techniques will make a major contribution to reduction of significant economic losses.

Aim, objectives and hypotheses

The aim: To develop knowledge about how to manage populations of strawberry blossom weevil (*Anthonomus rubi*), European tarnished plant bug (*Lygus rugulipennis*) and the raspberry beetle (*Byturus tomentosus*) in organic strawberry and raspberry so that these two soft fruit crops can be grown without significant economic losses by these pests.

The overall objective of the project is to develop effective semiochemical based non-pesticidal management techniques for *A. rubi* and *L. rugulipennis*, two key pests of organic raspberry and strawberry. In raspberry this includes integration with the existing commercially available traps for *B. tomentosus*. Component sub-objectives of the overall objective are thus:

1. To develop optimized lures and cost effective trap designs for mass trapping of blossom weevil and European tarnished plant bug in organic strawberry and raspberry crops
2. To determine the optimum density and spatial and temporal patterns of deployment of the optimized traps for controlling these pests by mass trapping in versus around strawberry and raspberry crops
3. To determine whether the two mass trapping approaches can be effectively and economically combined into a single mass trapping systems for each crop, and, in raspberry, in combination with the existing mass trapping system for raspberry beetle (*B. tomentosus*)

4. To identify volatiles from unhealthy/dying strawberry plants and determine if these compounds can act as repellents against *A. rubi*.

The main hypothesis for the study of host plant volatiles of *A. rubi* and *L. rugulipennis* is that the flower volatiles present in the original host plants in combination with the insect's respective pheromones are the most effective in attraction of the weevils and the bugs. Conversely, volatiles from unhealthy host plants infested with fungi might deter the pests from feeding and hence provide a source of candidate repellent compounds. We further hypothesizes, based on previous work done by us, that the natural semiochemical mechanisms of these pests and their host plants can be exploited in highly effective semiochemical traps which can be used for their management by control through mass trapping and that the attractive mechanisms for these two species are independent so that attractive lures can be combined into a single multitraps.

Expected results and their impact/application

The target pests are among of the most damaging in organic strawberry and raspberry crops in Europe. Even with regular use of pyrethrum sprays, they cannot be effectively controlled to a high standard in organic cropping systems currently. Pyrethrum is a broad-spectrum insecticide which is not compatible with biocontrol of mites and other important pests on the two crops. These problems will be overcome. Effective, pest-specific mass trapping in strawberry and raspberry will be developed and combined into single multitraps for the target crops. The work will target organic soft fruit growers in all countries in Europe where these pests are damaging. i.e. throughout central and northern Europe.

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