Traps for *Lygus rugulipennis* and *Anthonomus rubi*: preliminary results from Softpest Multitrap activities in Latvia

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Introduction

Softpest Multitrap (Management of strawberry blossom weevil and European tarnished plant bug in organic strawberry and raspberry using semiochemical traps) is a transnational scientific project, in which scientists from six North and Central European countries, including Latvia, are involved. The project is divided into four work packages (WP). Some activities from WP1 (Chemical analysis of plant volatiles), WP2 (Pest insects in strawberry) and WP4 (Trap design and lure development) have been carried out in Latvia.

Strawberry is not intensively grown in Latvia. Mainly, strawberries are grown in small plantations (less than one hectare) for fresh consumption, selling them locally. Few growers have strawberry plantations larger than one hectare. This means that strawberry plantations in Latvia are often well surrounded by semi-natural landscapes, where a relatively large diversity of insects and plants can be found, including large numbers of major strawberry pests.

There is a lack of appropriate plant protection methods against strawberry blossom weevil (SBW) not only in organic plantations, but also in plantations, where IPM is used. European tarnished plant bug (ETPB) is not currently recognized as a pest in Latvian strawberry plantations, because the visual defects made by bugs are not important for Latvian consumers. There is a high incidence of damage by ETPB and very little research in this country with the exception of diversity studies (Varzinska, 1977; Spuris, Varzinska, 1979; Petrova et al., 2010). High numbers of pests have enabled the participation in Softpest Multitrap project and will enable more plant protection methods to be explored for Latvian strawberry growers.

Methods

Softpest Multitrap is a three year project currently in its second year.

In the first year (2012) Latvia was involved in three activities:

1) improving SBW trap design for strawberry (WP4)
2) improving ETPB trap design (WP4)
3) synergizing ETPB sex pheromone lure with plant volatiles (WP2)

In the first two studies ten trap designs were compared for trapping SBW and ETPB in five strawberry plantations and alfalfa fields respectively. The first experiment was done in May and June and the second in July and August. These experiments were also done in the UK, but both in strawberry plantations.

The third experiment was done in years one and two. In this trial ETPB sex pheromone was combined with PV2 (a plant volatile from strawberry) and compared with ETPB sex pheromone alone, PV2 alone and control (empty trap).

The experiment was done in alfalfa fields in August and September and repeated in Denmark, in strawberry.
In the second year (2013) Latvia was involved in two activities:

1) field testing of repellents for SBW in strawberry (WP2)
2) synergizing ETPB sex pheromone lure with plant volatiles (WP2)

In the first experiment two potential SBW repellents derived from strawberry plants infested with a presumed repellant fungus were tested (both dispensers were placed in one trap). The numbers of SBW damaged strawberry flower buds around the traps with dispensers and without dispensers and around the traps at different distances was compared. The experiment was done in the spring in Latvia and in two strawberry fields in Norway.
In the second experiment ETPB sex pheromone and two plant volatiles (PV2 and PAA) in the different combinations were tested in alfalfa fields in July and August. Numbers of male and female ETPB in different traps were compared. This experiment was repeated in the UK.

Results and discussion
Preliminary results from the first field season are available. Results from second field season are not analyzed yet.
Cross vane bucket traps and sticky stake traps were the most effective for trapping SBW in Latvia. The sticky stake trap was not effective in all of the strawberry plantations, therefore the cross vane bucket trap was deemed the most effective (also the most effective in the UK).
Cross vane bucket traps, where the lure was positioned at the top of cross vanes, were also the most effective for capturing ETPB. Unfortunately, there were more bees in white cross vane bucket traps. Thus green cross vane bucket traps without the excluder grid were the best (as found in the UK).
As the green cross vane bucket trap without the excluder grid is good for both SBW and ETPB, it can be used in further experiments.
In the autumn traps with the plant volatile PV2 alone attracted more ETPB compared to ETPB sex pheromone alone or together with plant volatile PV2. Standard ETPB sex pheromone in early autumn did not attract ETPB males, a result also found in Norway. The changing physiology of ETPB preparing to overwinter could be a reason for this lack of sex pheromone attraction.

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References
Petrova, V., Samsone, I., Jankevica, L., 2010. True bug community on strawberry fields of Latvia. Environmental and Experimental Biology, 8, 71-74.
Spuris, Z., Varzinska, R., 1979. Blaktis Rigas juras lica piejuras zonas zalajos (in Latvian). Latvijas entomologs, 21, 5-23.
Varzinska, R., 1977. Faunistiski materiali par atklata apvidus mikstblaktim Latvijas centralaja dala (in Latvian). Latvijas entomologs, 20, 33-45.