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Using semiochemical traps to study the occurrence of strawberry blossom weevil in strawberry and raspberry – what did we learn?

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The strawberry blossom weevil (*Anthonomus rubi*) oviposits in flower buds of strawberry and raspberry, causing substantial damage in organic crops. This small weevil is also increasingly difficult to control with pesticides in conventional crops. *A. rubi* is univoltine, overwintering as an adult, and therefore lends itself to mass trapping for control. As part of an international project aiming to develop multispecies traps for insect pests in strawberry and raspberry ("Softpest Multitrap", 2012-2014), we studied the phenology of *A. rubi* catches in different habitats and crops in Denmark, Norway and Switzerland, the sites ranging from 46 to 63º N.
In strawberry we used green unitraps equipped with green cross-vanes (Fountain *et al.*, this volume), and in raspberry green unitraps with white cross-vanes and a bee excluder grid. Each trap had a lure with an odour blend known to attract both sexes of *A. rubi* in strawberry, consisting of aggregation pheromone and a plant volatile (Wibe *et al.*, 2014). Traps were deployed 50 m into the crop, in the field margin, and 50 m into the forest.

An identical approach was used to study the occurrence of European tarnished plant bug (*Lygus rugulipennis*) in strawberry (traps baited with commercially available sex pheromones), and raspberry beetle (*Byturus tomentosus*) in raspberry (traps baited with the commercially available attractant for this species). Trapping was carried out from April to October 2012 in three sites per country, captures being checked every fortnight and lures changed every 4-6 weeks. Most sites were conventionally grown crops. The Swiss sites were at high altitudes (1000 m.a.s.l.) and did not include strawberry.

We found that *A. rubi* catches in raspberry crops were considerably smaller than in strawberry crops. This meant either fewer weevils or lower trap efficacy in raspberry than in strawberry. Catches in the raspberry boundary habitats (margin or forest or both) tended to be of the same magnitude as catches in the crop. In strawberry, catches were larger in the crop than in the two non-crop habitats and especially in the summer when the new generation of adult weevils emerged from the buds. The summer peak period lasted through July and August in strawberry (data from Denmark and Norway) whilst in raspberry (data from Norway and Switzerland; Danish catches were low) this peak period was shorter and varied more among sites (also within each country). Judging from the catches in this study,

strawberry blossom weevil was more numerous in Norway, at least in the study year, than in the other two countries.

Comparing the *A. rubi* catches with those of *L. rugulipennis* in strawberry and *B. tomentosus* in raspberry, we found the relative abundances and phenology to vary considerably, reflecting regional differences in true abundances, voltinism and maybe also trap efficacy. In Danish strawberry, *L. rugulipennis* was more numerous in the traps than *A. rubi*, especially during the summer. In Norwegian strawberry, *L. rugulipennis* captures exceeded those of *A. rubi* in the spring, but after June very few plant bugs were found in the traps, and *A. rubi* greatly outnumbered them in total. In Norwegian and Swiss raspberry sites, *B. tomentosus* catches in the forest displayed a sharp peak in May or June, and the total catches had more raspberry beetles than blossom weevils (except in the northernmost Norwegian site). Most of the Swiss captures of raspberry beetle were made in the crop traps, whereas in Norway this species was distinctly more common in forest and margin traps than in crop traps. In Denmark, raspberry beetle was found in crop traps only, but very sparingly (0-5 beetles per site).

This study has improved our understanding of the phenology of the three species, which is of key importance to determine the timing and positioning of traps. Lure duration is one of the bottlenecks in designing commercially viable insect traps for monitoring or mass trapping. Our results emphasize that traps intended for more than one species and region either need long-lasting lures to cover all possibilities, or detailed knowledge about local conditions (e.g. prevalence of pest and surrounding host plant species etc.) to apply lures at the right time.

Key words: *Anthonomus rubi, Byturus tomentosus, Lygus rugulipennis*, organic farming

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References

Fountain, M. T., Shaw, B., Trandem, N., Storberget, S., Baroffio, C., Ralle, B., Rendina, P., Richoz, P., Sigsgaard, L., Borg-Karlson, A.-K., Hall, D., Cross, J. V., Wibe, A. 2015: The potential for mass trapping *Lygus rugulipennis* and *Anthonomus rubi*; trap design and efficacy. IOBC-WPRS Bull. 109: 95-97.

Wibe, A., Borg-Karlson, A.-K., Cross, J., Bichao, H., Fountain, M., Liblikase, I., Sigsgaard, L. 2014: Combining 1,4-dimethoxybenzene, the major flower volatile of wild strawberry *Fragaria vesca*, with the aggregation pheromone of the strawberry blossom weevil *Anthonomus rubi* improves attraction. Crop Protection 64: 122-128.