Aphid conservation biological control in arable crops via flower strips: the predominant role of plant resources over diversity effects Oral

A Gardarin

00013
Aphid conservation biological control in arable crops via flower strips: the predominant role of plant resources over diversity effects

Oral

A. Gardarin [1]

[1]**Inrae-Agroparistech - Thiverval-Grignon (France)**

Abstract

The implementation of habitats to improve functional biodiversity is known to increase natural enemies of pests, but it does not necessarily lead to a significant reduction in pest populations. The performance of flower strips and natural enemies in terms of biological control depends on many factors and we need to understand why some mixtures of plant species perform better than others.
In a field experiment, we compared the effect of contrasting floral mixtures comprising native and perennial plant species. In these mixtures, we have varied the proportion, the species and functional diversity of plant species providing resources towards natural enemies. Each flower mixture was sown on a 6 × 45 m strip and replicated on three blocks. In the adjacent oilseed rape crop, at 5 and 20 m from the strip, we recorded aphids, their predators and parasitized aphids in all the crops at rotation scale (wheat, maize, barley, pea-barley intercrop, faba bean and oilseed rape). We investigated the effects of the plant mixtures on aphid infestation, predator-prey ratios and parasitism rates. The observed plant composition of the different mixtures was characterized by the species richness and the functional diversity of the plant traits involved in plant–insect interactions.
In general, the percentage of plant cover providing trophic resources to natural enemies (nectar resources and alternative prey hosted by legumes) increased predator-prey ratios as well as aphid parasitism, and it decreased aphid population growth rates. Species richness and the functional dispersion of traits involved in plant-arthropod interactions had a lower importance and the direction of their effect was crop specific.
These results provide useful insights into the design of perennial plant mixtures for creating or restoring habitats supporting a range natural enemies. Plant communities providing large amounts of nectar and alternative-prey resources are the best able to enhance the biological control of aphids over a crop rotation.