
The effect of contrasted perennial flower strips on the parasitism of oilseed rape and faba bean herbivores

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Abstract

The implementation of habitats to improve functional biodiversity generally benefits to natural enemies, but it does not always improve biological control. To understand why some plant mixtures perform better than others, we compared the effect of eight contrasting floral mixtures comprising native and perennial plants during a four-year field experiment. We have varied the proportion, the species and functional diversity of plants providing resources towards natural enemies. These mixtures were compared with control strips sown with the crop species. In the adjacent crop, we evaluated parasitism levels of (1) larvae of *Meligethes aeneus* collected from rapeseed flowers, (2) *Dasineura brassicae* collected in the soil after the rapeseed harvest and (3) *Bruchus rufimanus* within faba bean seeds. These parasitism rates were also compared to those found in control fields at 250m away from our experiment. Parasitism of *M. aeneus* larvae was 8% on the control plots. It varied between 8 and 19% at 5m from each flower strip and was positively related to the proportion of flowering species in April providing easily accessible nectar. For *D. brassicae*, 55% of pupae were parasitized without any effect of flower mixtures or distance to the strip. In faba bean seeds, parasitism of *B. rufimanus* was 25% in the control field, 33% in the control plots and 47% in front of the flower strips, without any distance effect. The parasitism rate increased with the amount of flowering species providing easily accessible nectar in May. The proportion of seed damaged by *B. rufimanus* was lower at 5 than 20m from the flower strips (54 vs 70%). For two of the three herbivores studied, we demonstrate that the composition of plant communities near crops influences their parasitism rate and that this biological control can be strengthened by flower strips providing food resources during the parasitoid activity period.

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