
Mustard covers around cereal crops: Increasing winter parasitism of aphid pests

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Abstract

Management of flower strips in or surrounding crop fields presents an interesting potential in agriculture for enhancing biological control. Indeed it has been shown that natural enemies such as parasitoids live longer if they have access to flower nectar, especially when the climatic conditions are harsh. In winter, temperate climate in Brittany maintains aphid-parasitoid activity in cereal crops and we analyzed how their community responds to mustard flowering covers. We hypothesized that (i), aphid parasitism rate increases in cereal crops areas close to the flowering mustard cover. (ii) Higher parasitism rate observed in winter aphid populations contributes to lower aphid spring density. The mustard flower effect on parasitoid longevity was verified in laboratory experiment. In the field, we sampled parasitized and unparasitized aphids on two delimited areas in cereal crops, one area adjacent to a mustard cover and another area at the opposite edge of the field. We compared these areas during winter and following spring. Longevity experiments showed that mustard flowers only slightly increased parasitoid longevity. In the field, there were a higher proportion of parasitized aphids close to the mustard flowering cover and a higher proportion of unparasitized aphids in the opposite area. Small difference of parasitism rate observed between areas could be explained by the low quality of mustard nectar as a food resource. To increase biological control all year round, combining agricultural practices such as winter covers and an optimal selection of flower species may potentially be complementary to spring flowering programs in temperate oceanic regions.

Keywords: Aphid pest, Parasitoid community, Biological control, Winter flowering cover

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