

Attraction of *Aphidius ervi* (Hymenoptera: Braconidae) and *Aphidoletes aphidimyza* (Diptera: Cecidomyiidae) to Sweet Alyssum and Assessment of Plant Resources Effects on their Fitness

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Abstract

The green peach aphid *Myzus persicae* (Sulzer) (Hemiptera: Aphididae) is one of the most economically important aphid species affecting crops worldwide. Since many natural enemies of this aphid have been recorded, biological control of this pest might be a viable alternative to manage it. Selected plant species in field margins might help to provide the natural enemies with food sources to enhance their fitness. This study aimed to investigate if sweet alyssum, *Lobularia maritima* (L.) (Brassicaceae), is a potential food source for the parasitoid *Aphidius ervi* Haliday (Hymenoptera: Braconidae) and the predator *Aphidoletes aphidimyza* (Rondani) (Diptera: Cecidomyiidae), and whether this flower could contribute to enhance the biological control of *M. persicae*. Volatiles produced by alyssum, with and without flowers, attracted both natural enemies. This attractiveness to alyssum flowers was disrupted when compared with peach shoots recently infested with a relatively low number of aphids. When aphids were absent, parasitoids exposed to alyssum survived longer than those that fed on a sugar solution or on water. In the case of the predator, alyssum flowers did not benefit longevity since the nectaries were inaccessible to females. However, our results provide evidence that *A. aphidimyza* would be able to feed on nectar if accessible. The floral resource did not improve the reproductive capacity of the two natural enemies, but the 10% sugar solution increased the egg load of the predator. Provision of other sugar resources, such as flowers with exposed nectaries and extra floral nectar may also be a viable option to improve the biological control of *M. persicae*.

Key words: egg load, floral nectar, longevity, olfactory response, sweet alyssum

The green peach aphid *Myzus persicae* (Sulzer) (Hemiptera: Aphididae) is one of the most economically important aphid affecting crops worldwide. It is extremely cosmopolitan and highly polyphagous and the hosts are in more of 40 different plant families including many economically important crops (Blackman and Eastop 2007). The green peach aphid, is a severe pest of peach and nectarine, vegetable, and greenhouse crops (Rabasse and van Steenis 1999, Blümel 2004, Barbagallo et al. 2007). In a recent survey conducted in the Ebro Valley (Spain), a very important area of peach and nectarine production, pest advisors ranked this aphid as one of the most important pest problems (authors' unpublished data). The survey also revealed that pest management is currently mainly achieved using insecticides.

Biological control might be a viable alternative to manage *M. persicae*. Several predators and parasitoids of this species have been recorded, and this entomofauna might play an important role in the

reduction of the aphid population (Völkl et al. 2007). The parasitoid *Aphidius ervi* Haliday (Hymenoptera: Braconidae) and the predator *Aphidoletes aphidimyza* (Rondani) (Diptera: Cecidomyiidae) are among the most important natural enemies of this pest (Rabasse and van Steenis 1999, Blümel 2004). These natural enemies have been recorded in spring in the production areas where orchards coexist with arable crops (Pons and Stary 2003, Miñarro et al. 2005, Pons et al. 2011) and both have been repeatedly found on *M. persicae* colonies in *Prunus* orchards early in spring (authors' unpublished data). However, *M. persicae* attacks *Prunus* sp. in spring when the population of natural enemies is still low and, therefore, effective biological control of this aphid is difficult to achieve. The inclusion of floral resources close to the orchards might help to enhance the biological control by providing natural enemies with nectar and pollen as food sources, thereby contributing to increase their survival and reproduction (Landis et al. 2000, Gurr et al. 2005).