Abstract Topic: Advances in Plant Diseases and Arthropod Pest Management

Title: Nectar-inhabiting bacteria: Effects on egg parasitoids of invasive stink bugs

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Abstract

Pests and diseases account for 40% of the food crop losses worldwide [1]. In the era of climate change and global trade, pest occurrence is projected to rise, subsequently increasing the losses in crop production [2]. In this gloomy scenario, it is more than ever crucial to reinforce the resilience of our agroecosystems [3]. Increasing plant diversity in the agricultural landscape leads to a rise in the diversity and abundance of natural enemies of pests [4, 5], such as predators and parasitoids, which are involved in biological control of insect pests. However, the increased occurrence of these natural enemies does not necessarily translate into reductions in pest occurrence [6, 7]. There may be various factors behind this discrepancy. Flowering plants are assumed to improve parasitoid performance by providing food resources, such as nectar, which is a sugar-rich solution on which adult parasitoids rely for their energetic and nutritional needs [8]. However, we still do not understand how floral provisioning contributes to the efficiency of pest suppression by parasitoids. A hidden component may be the colonisation of nectar by microbes, which alter its quality [9].

In this study, the performance of the following three parasitoids was observed: *Trissolcus basalis*, *Ooencyrtus telenomicida* and *Anastatus bifasciatus*. These parasitoids are important in terms of pest control [10] since they attack the eggs of the invasive stink bugs, which have gained a global importance as plant health threats [11, 12]. Nectar was provided ad libitum to female adults that remained in vials. The nectar provided was either fermented by different microbes or non-fermented nectar (control). All microbes were bacteria, which had been previously isolated from the nectar of *Fagopyrum esculentum*, and belonged to the phyla Firmicutes, Proteobacteria and Actinobacteria. The parasitoids performance was assessed in terms of the number of days during which the insects remained alive. Moreover, the attraction of parasitoids to the bacteria- fermented nectar versus non-fermented nectar was studied by using a four-chamber static olfactometer [13]. The olfactometer consisted of an arena for the insect to walk on and, below the arena, it was divided equally into four chambers, in which the nectar solution was kept on a filter paper. The parasitoids attraction was assessed in terms of their residence time on top of the chambers.

Overall, this work highlights the importance of considering the role of nectar-inhabiting microbes in shaping the interactions between parasitoids and their food resources. The results will be discussed in terms of biological control.

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