

Alternative prey on the soil increases density of *Amblyseius swirskii* and *Neoseiulus cucumeris* on the plant and improves thrips control

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Abstract: Establishment of predators in ornamentals such as rose, chrysanthemum and potted-plants is a bottle-neck for successful biological control of thrips and whitefly. Due to limited damage tolerance in ornamentals, prey densities should typically be low, resulting in low availability of food for predators. Several types of alternative food are known that can enhance predator establishment in crops. Yet, the application of alternative food in practice remains limited due to low availability, high costs and because pests may also profit from this food. Surprisingly, the possibility of using astigmatid mites as alternative prey to support predatory mite populations in crops has received little attention, whereas these species are frequently used for mass production of predatory mites. We explored the possibility of boosting populations of the predatory mites *Amblyseius swirskii* Athias-Henriot and *Neoseiulus cucumeris* (Oudemans) on crops with astigmatid mites in the soil. A preliminary study showed the possibility to establish populations of astigmatid mites in a mulch layer applied on the soil and *A. swirskii* was observed foraging in the mulch. Here, we aimed to test the effect of mulch inoculated with astigmatid mites on *A. swirskii* and *N. cucumeris* and on control of thrips [*Frankliniella occidentalis* (Pergande)] in potted plants and in cut flowers. In potted chrysanthemum (experimental set-up), *A. swirskii* densities on the plant were higher and thrips damage on leaves was lower when the predators were introduced with mulches. The presence of alternative prey in the soil did not affect the distribution of *A. swirskii* on lower and upper plant parts, but did increase predator numbers. In cut-alstroemeria grown in the soil (commercial greenhouse), mulch application resulted in higher densities of *A. swirskii* and *N. cucumeris* in the soil and on the crop and in improved control of thrips. Mulch application also boosted the density of soil-dwelling predatory mites and staphylinid predatory beetles. This study demonstrates the potential of supporting above-ground predator populations through alternative prey in the soil to improve biological control.

Key words: Alternative prey, astigmatid mites, apparent competition, *A. swirskii*, *N. cucumeris*, mulch, thrips, ornamentals