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SUCCESSFUL CONSERVATION BIOLOGICAL CONTROL BY SOIL ACARINE PREDATORS DEPENDS ON THE AVAILABILITY OF THEIR 'TRUE PREY'

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Species of soil predatory mites feed on a diverse diet making them excellent biocontrol candidates for conservation biocontrol programs. Astigmatina species have been used in a few studies as alternative prey to conserve populations of soil mites. As factitious prey these mites are very cost effective for rearing predators but they may not be the best choice for conservation biocontrol of soil pests as they are rarely frequent in soil or litter, except for some pest groups, mainly *Rhizoglyphus*. In contrast, free living non parasitic nematodes (FLNPN) are commonly found in soils and serve as prey for many soil predatory mites. Some species of the families Ascidae and Macrochelidae must feed on nematodes to lay eggs. Immatures of *Parasitus bituberosus* complete development when fed nematodes but not on prey that are exclusively fed upon by adults. Surprisingly, as far as we know, FLNPNs have never been used as alternative prey to enhance the efficacy of soil predatory mites for conservation biological control. Our goal in this case study was to determine whether the FLNPN *Rhabditella axei,* provisioned as complementary prey, would improve the efficacy of *Macrocheles embersoni* as a biocontrol agent of the housefly *Musca domestica*. Two experimental setups differing temporally and spatially were conducted. The first performed in small sealed Petri dish arenas (3cc) over 10 days, assessed *M. embersoni* fecundity and predation of L1 *M. domestica* (offered daily), with or without supplementation of *R. axei*. The second carried out in plastic containers (200cc) over four weeks, was provisioned three times a week with *M. domestica* eggs and fresh larva diet, with or without nematode supplementation. The efficacy of fly immature predation was estimated by counting the adult flies that emerged. In the short-term experiment in small arenas, nematode supplementation reduced predation. Similarly, in the long-term experiment in the plastic containers, in the 3rd week (the 1st week of fly emergence), more flies emerged in the nematode supplement treatment. However, in the 4th week, fly emergence dropped dramatically in that treatment, whereas in the treatment that received only fly eggs, fly emergence continued to escalate and *M. embersoni* abundance was about a third of that in the nematode supplement treatment. In summary, complementing the diet of *M. embersoni* with nematodes resulted in higher predator abundance and better biological control. The open research questions pertaining to the application of this case study to conservation biological control of plant soil pests by acarine predators are presented.

Keywords: conservation biological control, alternative food sources, Macrochelidae, free living non parasitic nematodes, Rhabditidae.