Interactions between the omnivorous bug *Orius laevigatus* and the entomopathogenic nematode *Steinernema feltiae,* natural enemies of the western flower thrips (*Frankliniella occidentalis*)

Bishnu K. Bhandari and Moshe Coll [2]

[1] Institute of Plant Diseases and Plant Protection, Leibniz Universität Hannover, Germany, [2] Department of Entomology ,The Robert H. Smith Faculty of Agriculture, Food and Environment , Hebrew University of Jerusalem

Introduction

Multiple use of bio-control agents is the most promising way to control the insects pests. However use of the multiple biological control agents can have both synergistic or additive as well as antagonistic effect. Intraguild predation (IGP) may occur when two or more than two species share common host or prey and there would be trophic interaction (parasitism or predation) among different species. If intraguild predation exists between the natural enemies, it results in higher mortality of natural enemies and lower mortality of the pest. It is considered to be an extreme form of competition that may affect the distribution, abundance and evolution of the species. The predatory bug, *Orius laevigatus* and entomopathogenic nematode *Steinernema feltiae* are widely used to control western flower thrips (WFT). Possible interaction between these two natural enemies was studied.

Materials and Methods

1. Predation of *Steinernema feltiae* by *Orius laevigatus* and parasitism of *Orius laevigatus* by nematodes

Adult *Orius* females and fifth instars were exposed to the nematode (suspension of 5000 nematode/ml of water) in petridish and predator survival rate was recorded twice a day.

2. Habitat preference of Orius

Tests were conducted to determine how nematode presence affects the *Orius* preferences for different habitats. The habitat included *Ephestia kuehniella* Zeller egg and maize pollen as food sources.

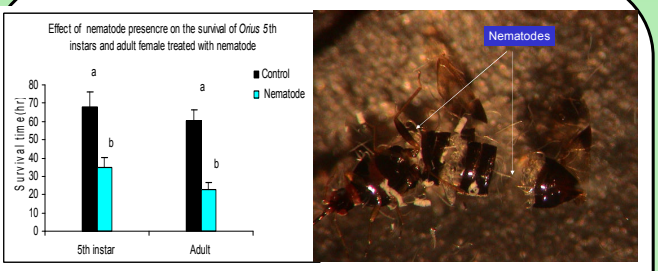
3. Ability of *Orius* to detect infected nematode

Female adult Orius was allowed to prey on nematode infected thrips and non infected thrips to find out the ability of *Orius* to detect nematode infected thrips.

4. Population density of western flower thrips and *Orius* on nematode treated and untreated sweet pepper plants

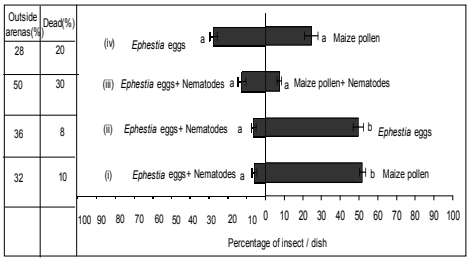
A field test was carried out in paper grown tunnel with application of *Steinernema feltiae* @150 / cm2 at the Arava valley to find out effect of the nematode on population density of *Orius* and western flower thrips.

Results

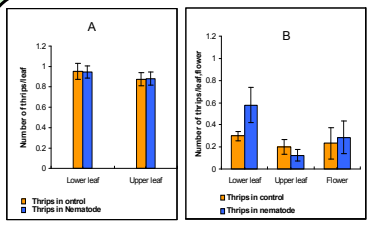


1.Survival time of *Orius* adult females and fifth instars with nematodes suspension was significantly lower than control. About 80% of the *Orius* were observed infected by nematodes.

3. *Orius* were unable to distinguish nematode infected thrips and healthy thrips.

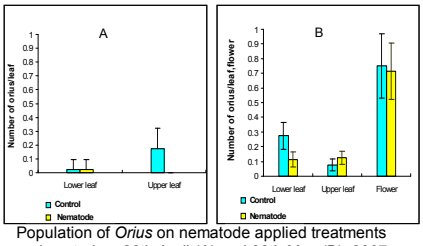


2. Significantly less preference of the habitat with nematode by *Orius* was observed in each combination without any significant difference in choice between maize pollen and *Ephestia* eggs.



Population of WFT on nematode applied and control treatments. Insects on 26th April (A) and 08th May (B),2007

4. No significant difference in population of both *Orius* and western flower thrips was observed in nematode treated and untreated net cages.



Population of *Orius* on nematode applied treatments and control on 26th April (A) and 08th May (B) ,2007

Conclusion

Unidirectional intraguild predation was observed between *Orius* and *Steinernema feltiae*. *Orius laevigatus* was found to be infected with nematode. Results of the choice experiment are in agreement with the negative impact of nematodes on the predator. The predator clearly avoided nematode-infected habitats. *Orius* randomly preyed on nematode infected and healthy thrips. Presence of nematode had no significant impact on the population of western flower thrips and *Orius*.

Contact – bhandari@ipp.uni-hannover.de