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Research Article

THE INVESTIGATION OF MAXIMAL PREDATION OF *ORIUS ALBIDIPENNIS* ON DIFFERENT DEVELOPMENTAL STAGES OF *TETRANYCHUS TURKESTANI*

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ABSTRACT
Orius albidipennis is an important predator of Anthocoridae. This predator reported as a biological control of *Tetranychus turkestani* on strawberry and *Tetranychus* spp in laboratory. In this paper, maximal predation of *O. albidipennis* on *T. turkestani* investigated. Maximal predation obtained on different developmental stages of *T. turkestani*, with prey replacing every 3 hours, respectively: egg 321.17, larva 219.09, protonymph 137, deutonymph 116.27 and female 76.73**.**

Keywords: *Acari, Maximal Predation Rate, Orius Albidipennis*

INTRODUCTION
The role of natural enemies, on herbivores population changes is undeniable. These factors play an important role as a deterrent to herbivores damage and in some cases they are the key factor. *Orius* spp are important and economic species in Anthacoridae (Schuh and Slater 1995) and they are generalist predators that attack eggs and immature stages of various arthropods, or small soft-bodied adult arthropods, including numerous important agricultural pest species (Bush *et al.,* 1993, Riudaverts 1995, Reitz *et al.*, 2006, Butler and O'Neil 2007). *Orius albidipennis* is one of the most important species in this family. Otman and Mc Murity 1966 reported that this species is as a biological control agent of two spotted spider mite on strawberry in California. High efficiency and predation rate of the predator on *Tetranychus* spp. In laboratory condition, is proven (Salim *et al.*, 1987). *O. albidipennis* does not have a photoperiod induced reproductive diapause, therefore it can be active in greenhouse conditions in all seasons (Chyzik *et al.*, 1995). Due to the large capacity, increased population during lifetime and lack of photoperiod it could be an ideal candidate for biological control of greenhouse pests (Chyzik *et al.*, 1995). *Tetranychus turkestani* is a widespread pest of many agricultural crops. It has a wide host range and have been reported of more than 300 plant species (Popove *et al.*, 1983, Nemati *et al.*, 2005). Feeding and web production affect the quantity and quality of yield (Jeppson *et al.*, 1975). The objective of this study was to evaluate the maximal predation of *Orius albidipennis* on different developmental stages of *Tetranychus turkestani* (egg, larva, protonymph, deutonymph and adult).

MATERIALS AND METHODS
Stock colony of *T. turkestani* was maintained on common bean (*Phaseolus vulgaris*) plants were kept in a growth chamber at 25±1°c, 70±5% Rh and a 16:8 (L:D) photoperiod.
Protonymph, deutonymph and adult of mite were collected from mite's colony. some mite females were placed on leaf discs (4.5 cm diameter) in experimental unites and were allowed to lay eggs for 24h. Then females were removed and the eggs were counted to prepare 800 eggs on each leaf disc then 11 experimental units were used for egg treatment and 11 experiment unites were kept in growth chamber until eggs hatched and then larvae were used in larva treatments(Larvae are very sensitive and we couldn't collect them from mite colony).
Stock colony of *O. albidipennis* was maintained in Plexiglas containers (7.8 cm in diameter, 14 cm high) with two ventilation holes (5 cm in diameter) covered with a nylon mesh of 120 µm aperture. Inside each container a green bean pods, as a source of moisture and an oviposition substrate, frozen flour moth eggs (*Ephestia kuehniella*) and corn pollen, as food, were placed. All containers were lined with crumpled

tissues to provide hinding places and thus reduce cannibalism. Bean pods with predator eggs were removed and replaced daily and kept in a new container. Cultures were maintained under the same invironmental conditions described above.

The 8 emerged females of *O. albidipennis* were collected from rearing unites and were used in laboratory experiments. These females were starved for 24 hours before using in experiments to standardize their level of hunger, then added singly to experiment unites.

An experimental unite was a plaxiglas container (7.5 cm in diameter, 4.5 cm high) with a hole on top of container covered with a nylon mesh of 120 µm aperture.

In each experimental unit, bottom was covered with a layer of wet cotton, onto which a leaf disc (4.5 cm) of common was palced and 800 individuals of single prey stage placed on the lower surface of leaf disc. The amount of prey provided was based on preliminary experiments to ensure that more prey available to predators than they would consume within 24 h.

All experiments were conducted in a growth chamber at 25±1°c, 70±5% Rh and a 16:8 (L:D).

The number of prey attacked was recorded every 3 h and preys were replaced for a period of 24 h. The entire experimental array consisted of 11 replicates of each of different developmental stages of prey.

RESULTS AND DISCUSSION

The data collected in this study indicates that *O. albidipennis* is a gobbler predator so one it can suppress their prey. Average number of prey eaten after 24 h. showed in table 1. Maximum number of prey eaten related to eggs and minimum related to female. Infact with increasing size of prey, number of prey eaten decreased. One explanation for the reduction of predator feeding of moving prey is that moving prey can resist and escape from predator by walking, compared with constant prey thus predator consume more energy and the number of prey declined (Fritsche and Tamo, 2000). Large stages (Deutonymph and adult) were much better than at avoiding capture than small stages (Larva and protonumph). Lichtenaure and Sell (1993) showed that in a no-choice test, *O. insidiosus* and *O. minutes* consumed more thrips larvae than adult thrips. Gitonga *et al.*, (2002) found that adult *M. sgostedti* are more mobile than the larvae, and thus may escape attack by the predators, thereby resulting in more larvae being attacked. Adult and Deutonymph can produce more web campared with larvae and protonymph, these web can prevent mobility and feeding of predator.

Table 1: Mean and standard error of maximal predation rate of *Orius albidipennis* on different developmental stages of *Tetranychus turkestani*

stage	Mean of Maximal predation rate	Standard error
Egg	**321.17**	**9.83**
Larva	**219.09**	**9.75**
Protonymph	**137**	**7.38**
Deutonumph	**116.27**	**5.13**
Female	**76.73**	**6.14**

One of the possible explanation for increasing in predation with decrease in size of prey could be that, the size of different stages (from adult to egg) decrease, so one small stages provide less food than large stages. Therefore mobility, produce of web and defense inceased with increase in size of prey so one predator's handling time increased with increase in size of prey then predation rate decreased.

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