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Biocontrol of *Megalurothrips distalis* (Karny) (Thripidae: Thysanoptera) by using *Orius maxidentex* ghauri (Anthocoridae: Heteroptera), A predatory bug

O Dwijamani Singh[1], M Suresh Singh[1], P Devjani[1], O K Monoroma[2], L Joymati Devi[3]
[1] Department of Zoology, G.P. Women's College, Imphal, Manipur, India
[2] Department of Zoology, Manipur College, Imphal, Manipur, India
[3] Nematology Laboratory, Department of Zoology, D. M. College of Science, Imphal, Manipur, India

Abstract
Thrips are one of the important group of insect pests causing significant damage to a wide variety of economically important plants by way of feeding, breeding and transmitting plant diseases. Among the thrips species, *Megalurothrips distalis* (Karny) may be controlled by using other insect predator like anthocorid bug, *Orius maxidentex* Ghauri. The anthocorid bug when reared on *Megalurothrips distalis* at 24±1º C in laboratory condition showed an average feeding efficiency of about 150 thrips larvae per individuals during the life cycle period of about 30 days. Besides the predatory potential, certain observations on the biology of predatory species have been discussed.

Keywords: thrips anthocorid bugs, predatory efficiency

Introduction
Megalurothrips distalis (Karny) is a common insect pest infesting on a wide variety of leguminous plants. They feeds on pollen, nectar and cell contents of the foliage by means of piercing and sucking mechanism. They also damage plant tissue by oviposition with the help of saw-like ovipositor. In an attempt to study the seasonal abundance of *Megalurothrips distalis* on the leguminous host plants, *Dolichos lablab* L. and *Cajanus cajan*, it was observed that the predatory insect, *Orius maxidentex* was found to suppress the population density of thrips. Keeping this in mind, studies have been undertaken here on the predatory efficiency and duration of development of the said predator by rearing them on *Megalurothrips distalis* in the laboratory.

Material and Methods
Various stages of predatory insect, *Orius maxidentex* collected from the field were reared in enclosed glass chimneys by providing thrips infested leaves or flowers in it. The narrow end of the chimney was covered with a double layered muslin cloth and other end is used as base to prevent the escape of insect from the rearing chamber. After attaining last moult, the adults (male and female pair) were further sub-cultured with a pair, each in a chimney in order to get sufficient number of I instar of the predatory bug. The young larvae were reared individually by providing known number of sufficient I, II instars and adult thrips separately in their respective rearing chamber. To obtain sufficient number of pre-pupa and pupa of *Megalurothips distalis* would be generally inconvenient as these stages occurs for a short duration. Hence this experiment was conducted by taking only larvae and adult thrips. The cultures were maintained at 24 ±1ºC and 50 ± 5% R.H and data on the duration of life cycle of the predator as well as their consumption rate of various stages were also recorded.


Megalurothrips distalis (adult)


Orius maxidentex predating thrips larvae


Rearing of Thrips and Anthocorid bug inside the glass chimneys

Fig 1

Results and Discussion

Biology of *Orius maxidentex*, an anthocorid bug

The life cycle of *Orius maxidentex* consists of five developmental stages of instars. They are distinguishable from one another on the basis of their colour and body size. The following are the details of observation of each instar in 5 replicates.

Table 1

Stages of *Orius maxidentex*	Body Length (mm)	Rostrum length(mm)	Prothoracic width (mm)	Duration (days)	Body Colour
1st Instar	1.3±0.025	0.407±0.015	0.370±0.005	3.8±0.025	Yellowish
2nd Instar	1.4±0.011	0.428±0.002	0.438±0.003	4.7±0.350	Light reddish
3rd Instar	1.5±0.016	0.460±0.005	0.470±0.020	5.9±0.440	Reddish brown
4th Instar	1.78±0.017	0.485±0.004	0.480±0.050	6.9±0.500	Black
5th Instar	1.93±0.020	0.530±0.006	0.480±0.030	10.5±0.520	Black

*Value given above is mean of 5 replications.

The above data indicated that among the five stages, the duration of development of the V instar was comparatively more than that of other stages. In this experiment, it was also observed that with the incubation period of about 5 days, the predatory bug could complete its development from I instar to V instar at about 35 ± 1.15 days.

Predatory efficiency *Orius maxidentex*, an anthocorid Bug:

The data related with their prey consumption rate indicates that there is an increasing trend from I to V instar of the bug irrespective of the stages of the prey. (as shown in Table – 1). In this experiment, significant high positive correlations have been obtained between the body size and prey consumption of the predatory bug (as shown in Table –2). It also indicates that with the advance of stages of instar, more number of prey are needed for feeding. This observation also revealed that there is more preference to 2nd instar of thrips in terms of their feeding rate. During the entire life stages of this predatory bug, they consumed about 100 first instar or 150 second instar or 24 adult thrips. The bug preferred least number of adult thrips. It also indicated that the I and II instar of the bug usually avoid adult thrips but III to V instar of bugs attack them and consumed under laboratory condition.

Table 2: Predatory efficiency of anthocorid bug on *Megalurothrips distalis*

Stages of predatory bug, *Orius maxidentex*	Number of thrips consumed by different stages of bug		
	I instar	II instar	Adult
1st Instar	5.4±0.57	7.5±0.55	-
2nd Instar	11.5±0.55	17.5±0.74	-
3rd Instar	18.5±0.40	32.0±1.30	5.6±2.50
4th Instar	29.0±0.54	43.5±1.10	7.5±0.40
5th Instar	35.6±0.32	49.8±0.87	12.8±1.03
Total	100.0±0.45	150.3±0.91	24.9±1.35

*mean of 5 replications.

Table 3: Correlation between prey consumption and body size of anthocorid bug, *Orius maxidentex*

Stages of prey	Body length	Width of Prothorax	Rostrum length
1st Instar	0.97	0.89	0.96
2ndInstar	0.96	0.91	0.93

The result found from the rearing of instars of this anthocorid bug have shown that external features, duration of development, feeding efficiency etc are in agreement with that of *Carayonocoris indicus* (Sureshkumar and Ananthakrishnan, 1994) and some other species of anthocorid bugs predating on thrips (Muraleedharan and Ananthakrishnan, 1977) [5]. Niemczyk (1978) [6] has also observed that there was an increasing trend in the prey consumption pattern / rate of *Orius minutus* L. as it further progressed from I instar to V instar. In the present study, this aspect appears to be a common feature in many predatory insects which are correlated with the further growth of their body size. *Orius maxidentex* preferred more young thrips larvae than adult thrips regarding their prey selection. The less preference given to the adult thrips (prey) seems to be due to the quick movement of adult thrips so as to escape from the predatory bug. As an example, Isenhour and Yeargan (1981) [3] while studying the predatory efficiency of *Orius insidiosus* on *Sericothrips variabilis* noticed that the rate capturing adult thrips by *Orius insidiosus* was only 50% as the prey (thrips) tried to escape from the predator.

Conclusion

In the present study, all the five instars of anthocorid bug, *Orius maxidentex* showed high rate of attacking with young thrips larvae. So, the biotic interaction between prey and predator in the field condition would also be expected at higher level. In view of the above observations, *Orius maxidentex* appears to play a major role in the regulation and controlling of field population of insect pest species particularly *Megalurothrips distalis* (Karny) by virtue of its more frequency of incidence and prey specificity.

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