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Bio-control agents of Chrysocoris. stolli Wolf (Heteroptera : Pentatomidae)

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ABSTRACT

Chrysocoris stolli infests cereal food plants of economic value as well as some medicinal plant such as (Bajra) Pennisetum typhoides, Cassia occidentalies, Brassica compestries, Croton sperisiflorum. For its control point of view its varies predators and parasites were observed during the survey conducted in 2005 to 2007. These are preying mantis (Hierudulla sp.) formacid ants (Componotus compresses and Sloenopsis geninata), fungus (Aspergillus sp.) Herepector marginatus and Leptus species of mite. The later is an ectoparasite and only red coloured larvae are parasite while its nymphs and adults are free living. Mite load per bug was recorded 1 as minimim and 8 as maximum. Parasitization percentage in field has been calculated 3 to 7 during summer months. Among these, the predator, H.marginatus has good potential for controlling the population of this injurious bug. Both nymphal and adult stages of predator feed on the body content of nymphal instars and adults of C.stolli. In laboratory, feeding potential experiment showed that an adults bug on 8 adults or 13 host nymphs of various stages while its 4th or 5th nymph consumed 3 to 6 nymph of C.stolli within 24 hrs. the bugs have high adaptation and capability to face the unfavorable climatic condition as it can live for longer period in starved condition. Thus, the predatory potential of this reduviid bug is very high and it may serve as a good predator for controlling Chrysocoris stolli population in nature. Its mass multiplication and there by release in field is needed.

Keywords: Chrysocoris stolli, H.marginatus, Laptus sp. Ants, fungus, Biocontrol potential, predator.

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INTRODUCTION

Pentatomid bug are often injurious to the agricultural crops and horticultural trees of economic value. Their desapping habite these cause extensive damage and yield of crop is adversely affected Chrysocoris stolli (Heteroptera-Pentatomidae-Scuitellerinae) is a polyphagous phytosuccivorous bug with beautiful metallic green or bluish and black spots. It causes considerable loss to Cassia occidentalies, Pennisetum typhoides, litchi chinensis, croton, sparisiflorum, Brassica compestries etc. (Dhiman and Kumar 2005). On this insect only few studies have been carried so for by chaudhary and Dass(1969), Dhiman and Kumar (2006, 2007a, 2007b, 2007c) and Kumar (2008). An endeavour has been made to record its, biocontrol agents for successful biological control of this injurious bug.

MATERIAL AND METHODS

A population of bugs was maintained in laboratory on the caged potted plants of Cassia occidentalies Croton sparisiflorum, Pennisetum typhoides and Brassica compestries etc. Similarly, predators stages such as adults and nymphs of H.marginatus were also reared in lab. Feeding potential of the necessary R.H. was maintained by irrigating the plants brokely predator was investigated in the lab as well as in field conditions. Some glass hurricane lamp chimneys were also used for the experiments. Each chimney was placed in a petridish and covered at top by fine muslin cloth. A wetcotton swab was kept in each chimney to maintain necessary humidity. In these chimneys I^{st}, II^{nd}, III^{rd}, IV^{th}, V^{th} instar nymphs and adults of Herpector marginatus were introduced separately. These were kept starved for 24 hrs. After that in each chimney 10 numbers of every stage and adults of C.stolli were supplied along with food material. After 24 hours number of dead nymphs and adults bugs was counted in each chimney and noted. Moreover, feeding behaviours of H.marginatus nymphal stages and adults was observed using magnifying hand lones (20x.) The experiments were repeated several time and observation were record.

RESULTS AND DISCUSSION

During present course of investigation are Reduviid predator, Harpector marginatus, Fabr and two ants species Componatus compressus fabr and Solenopsis geminata, fabr and one fungus mycielium are reported which are new records. Among these, H.marginatus has good predatory potential. Hence main studies were focussed on it. Herpector marginatus Heteroptera Reduvidae is found in north western Uttar Pradesh is good number in (Fig: 1).

Fig:1-Male & Female C.stolli

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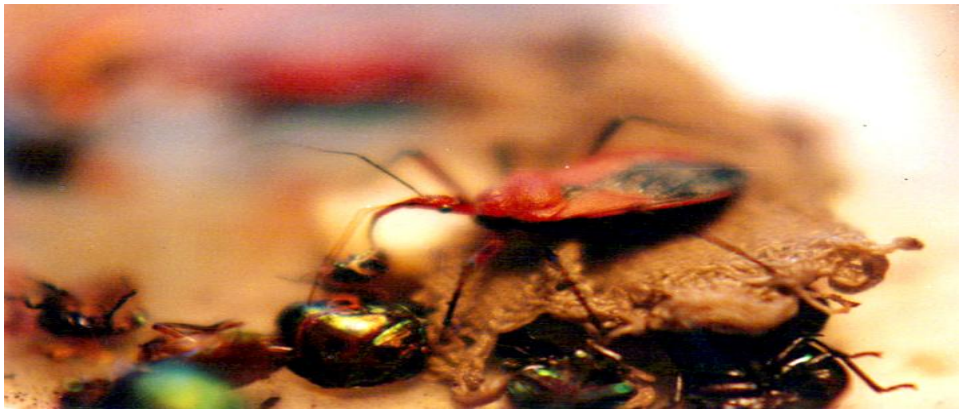
The agricultural field area as well as in forest areas. In nature, this predator is recorded only in those areas where the bug population was high. However, it was not observed where population of the bugs was lower or the establishment of bug was in progress. It is a red coloured active bug having narrow neck. It holds the nymphs or adult of C.stolli by fore legs and then extends its rostrum to pierce its integument by maxillary and mandibular stylets using powerful protector and retract or muscles. It them injects some prololytic or lysing enzymes through saliva with the help of powerful salivary pum. The host is paralyzed and after that the bugs sucks the bodys fluid or dissolved substance by lytic activity of the anzymes with powerful cibarial pump. To test predatory potential of this bug in laboratory, experiment were conducted as described in material and method. There are five nymphal stage of H.marginatus (Fig.: 2)as well as if its host C.stolli. Ist nymphal instar of H.marginatus consumed minimum 1 and maximum 4 nymphal instar with an average of 3 nymphal per day. IInd nymphal instar consumed minimum 2 and maximum 6 nymphs with an average of 4 nymph per day, IIIrd nymphal instar killed minimum 2 and maximum 7 nymphs with an average of 6 nymph per day IVth instar killed minimum 3 and maximim 9 with an average 6 nymphs per day.

Fig.: 2-Herpector marginatus feeding on the nymphs & adults of C.stolli.



In the some duration Vth instar killed 4 to 10 nymph with an average of 8 nymph per day. Male consumed minimum 1 and maximum 5 with an average of 4 adults per day. Female

utilized minimum 1 and maximum 7 with an average 6 adults during the some duration. Mostly, Ist nymphal instar of reduviid bug preferred for food IInd nymphal stage of C.stolli, IInd IIIrd instars also preferred the IInd nymphal instars stage which IVth and Vth nymphal instars preferred fourth and fifth stage nymphs of C.stolli. Adults male and female of H.marginatus preferred the adults female as well as Vth instar nymph of C.stolli (Table–1 & 2). Bug population feed on C.stolli in nature during March to July when the population of C.stolli reaches an peak. Simultaneously , the bug population also increases, many folds. The bug has alarming red colour, high adaptation and capability for unfavourable conditions and it can live upto 2 months in starvation at room temperature and R.H. The bug is polyphagous and has a wid range of prey. It has been also observed showing canablism in absence of other berys. Powerful individual attack the member of it own species and suck their body content Dhiman and Bhargawa (2005) also observed H.marginatus feeding on the maximum beetle Zygogramma bicolorata a potential biocontrol agent of Parthenium weed. The H.marginatus is a good biocontrol agent for C.stolli. It may be mass multifield in lab and its release can be done in field to control the injurious C.stolli population. Fungus Aspergillus sp of has been observed in fecting C.stolli. It is a saprophytic fungus and grown on dead organic substance such as cow dung cheese, June and July, leather etc. Some species of Aspergillus like, Aspergillus flavus, Aspergillus nigar, are found infecting man and animals causing many lung and respiratory disease. The species grow as Parasitic form mycelium of Aspergillus is transparent branched and coenocytic and yellowish brown is colour. It reproduces by vegetative and Asexual means. Infected bugs suffers heavily and dies later on.

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Table 1:Predatory Potential of H.marginatus on adults and nymphs of chrysocoris stolli.

Date of Experiment	A.V. number of nymphs and adults of C.stolli consumed by different stages of H.marginatus (with in 24 hrs)						
	Ist	IInd	IIIrd	IVth	Vth	Adult Male	Adult Female
12-02-08	2	4	7	5	5	2	3
14-02-08	2	5	5	7	4	3	2
16-02-08	1	5	6	5	6	5	1
18-02-08	3	6	5	4	5	4	5
20-02-08	2	6	2	9	7	1	6
22-02-08	4	2	3	3	8	2	7
24-02-08	2	2	6	3	9	1	4
26-02-08	3	3	7	4	10	2	5
28-02-08	2	3	5	5	6	3	2
30-02-08	3	6	4	8	7	4	7
Average	3	4	6	6	8	4	6

Average has been taken of 50 observations.

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Table 2:Feeding Preference of H.marginatus on different stage of C.stolli (in laboratory condition during 24 hrs.).

Different stage of H.marginatus	Average number of different nymphal of stages and adults of C.stolli consumed by H.marginatus per day.							
	Ist	IInd	IIIrd	IVth	Vth	Male	Female	Total Killing
Ist	1	2	2	1	1	-	-	Capacity per day
IInd	2	3	3	1	2	-	-	11
IIIrd	2	3	1	2	1	-	-	9
IVth	1	2	3	1	2	-	-	9
Vth	1	2	3	2	2	2	1	13
Adult	-	1	1	2	1	2	1	8
Female	-	-	2	3	1	1	2	9

Average has been taken of 50 observations.

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