INCIDENCE OF HYMENOPTERAN PARASITOIDS IN CITRUS GREEN STINK BUG *(RHYNCHOCORRIS HUMERALIS)* EGGS

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ABSTRACT

Citrus green stink bug Rhynchocoris humeralis *Rhynchocorris humeralis* Thunberg is one of the major pests and causes fruit drop in mandarin oranges in the western hills of Nepal. Citrus green stink bug eggs were collected from citrus plants from farmer's field at Lohi, Bandipur (550 m) and Horticultural Research Staton, Pokhara (850 m) and incubated at the ambient temperature at Yampaphant (450 m) and Lumle Centre (1650 m). *Trissolcus latisulcus*, *Anastatus sp.* and *Ooencyrtus utitheisae* was associated with the eggs with higher rate of prevalence of the former two species. These naturally occuring bio-control agents could be important in managing citrus green stink bug in this region.

Additional Key Words: Fruits, mandarin orange, parasites, biological control.

INTRODUCTION

Mandarin orange (*Citrus reticulata* Blanco) is an increasingly important enterprise in the hills of Nepal and citrus green stink bug (CGSB) *Rhynchocoris humeralis* Thunberg (Heteroptera: Pentatomidae) has been identified as one of the major causes of premature fruit drops in the low hills. CGSB makes its appearence (possibly from hibernation in the plant debris in the winter) during May and feeds on developing mandarin fruits causing fruit drop particularly when fruits are smaller from June to August although larger fruits withstand attack (Pandey and Rana, 1992). Commercial growers apply chemical pesticides to protect their crops against CGSB damage.

Incidence of the parasitoid *Trisslocus nr. priapus* was first observed during August 1992 (Pandey and Rana, 1992) from the eggs collected from Lohi (Bandipur), Tanahun. This study was carried out to understand the prevalence of egg parasitoids and their role in supressing the pest population under the farmers field conditions in the low hills of Nepal.

MATERIALS AND METHODS

Experiment was conducted at Lohi, Bandipur (550 m), Tanahun District of Nepal during 1993 and 1994. Four field collected adult bugs were reared inside nylon cages made up of mosquito net cloth supported by galvanised iron rod frame (40 cm diameter and 60 cm long) fixed in small mandarin branches enclosing 10-15 intact orange fruits. Three such cages were maintained simultaneously. Cages were transferred to a new branch each month, from July to Sept. in 1993 and May to Sept. in 1994. Eggs laid within the cage were collected at weekly interval and incubated at ambient temperature at Lumle's Off Station Research Site, Yampaphant (450 m). The number of egg parasite and bug nymph emerged and unhatched eggs were recorded daily.

Second experiment was conducted to assess the level of CGSB egg parasitisation under natural condition with time. Eggs laid by CGSB on the mandarin trees (not inside the

cages) were collected from Bandipur (550 m), Tanahun District, and Horticultural Research Station (HRS), Pokhara (850 m), Kaski District, and brought to Lumle Agricculture Research Centre (1650 m). They were incubated at ambient temperature and observed for the emergence of bug nymph and egg parasites. Because three different types of parasitoids were observed number of individual types were recorded separately and identified at the International Institute of Entomology, London, United Kingdom.

RESULTS AND DISCUSSION

CGSB laid eggs mostly on the upper surface of a leaf and commonly in a batch of 14. Eggs were collected from early July to late Sept. in 1993 and from last week of May to the end of Sept. in 1994 indicating that insect continues breeding throughout the rainy season; but Sept. is the peak breeding month. It is possible that the adults developed from Sept. laid eggs hibernate during the winter.

In the first experiment, the egg parasitoids were not recovered from the eggs collected during May but were found from June to Sept. (Table 1). Only *Trissolcus latisulcus* was recovered from the eggs. It could be due to the restriction of Anastatus sp. (recovered from the same site in another experiment) to enter into the cages bacause of its larger size than the *Trissolcus sp*. More than half of the collected eggs turned out to be parasite, but because the eggs were protected inside the cages the level of parasitisation cannot be generalised. However, a higher rate of parasitisation may be expected when they are exposed.

Table 1 Extent of parasite attack to the CGSB eggs laid inside the caged branches of mandarin at Bandipur (Tanahu), Nepal, 1993 and 1994.

Year	Eggs collected (No.)	Nymphs (No.)	Parasite (No.)	Unhatched eggs (No.)
1993				
July	222	180	41	1
Aug.	84	38	42	4
Sept.	362	56	290	16
1994				
May	56	56	0	0
June	169	110	57	2
July	42	14	28	0
Aug.	46	14	32	0
Sept.	294	128	166	0

In the second experiment Hymenopteran parasitoids namely, *Trissolcus latisulcus* (Crauford) (Scelionidae), *Anastatus* sp. (Eupelmidae) and *Ooencyrtus utitheisae* (Risbec) Encyrtidae) were found associated with the eggs (Table 2).

Table 2. Recovery or bug nymph and parasites from the eggs collected from Lohi, Bandipur and HRS Pokhara, 1993 and 1994.

Location/ Year	Collected eggs	Nymphs emerged	Trissolcus latisulcus	Anastatus sp.	Ooencyrtus utitheisae*	Unhatched
Bandipur						
1993	97	39(40.2)	28	26	0	4
1994	41	16(39.0)	17	6	0	2
Pokhara						
1993	301	0(0.0)	29	149	56	107
1994	326	96(15.3)	127	249	107	123

* Four to six adult wasps emerged from a single bug egg.

About 40% of the eggs collected from Bandipur and less than 15% of the eggs collected from Pokhara developed into CGSB nymphs indicating a greater level of parasite in Pokhara. Only one adult wasp of *T. latisulcus* and *Anastatus* sp. emerged from one bug egg whereas four to six wasps of O. utitheisae were recovered from a single egg (54 from 14 eggs). *Trissolcus* was the dominant species at Bandipur whereas the *Anastatus* sp was dominant at Pokhara. The *O. utitheisae* was recovered only from Pokhara showing greater level of insect diversity. *Trissolcus* sp. has been used for inoculative release to control *Nezara viridula*, another pentatomid bug attacking citrus in California (Hoffmann *et al.* 1991). Similarly, *Anastatus* sp. was used to control *Tessarotoma papilosa*, a pentatomid pest of longan after multiplying them in the eggs of castor silk worm (*Philosamia ricini*) in Thailand (Leksawasdi and Kunchu, 1991).

CONCLUSION

Trissolcus and *Anastatus* occurring naturally in the hills of Nepal could be important biological control agents against CGSB. It may be important to conserve and augment the natural population of these parasites against CGSB and studies are in progress at LARC in this direction.

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