



Natural egg parasitism of litchi stink bug, *Tessaratomia javanica* (Thunberg) (Hemiptera: Pentatomidae) in India

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ABSTRACT: The egg masses of litchi stink bug, *Tessaratomia javanica* (Thunberg) were found parasitized by two very interesting egg parasitoids viz, *Anastatus colemani* Crawford (Hymenoptera: Eupelmidae) and *Ooencyrtus phongi* Tryapitsyn, Myartseva and Kostyukov (Hymenoptera: Encyrtidae). The two parasitoids offer great potential for the biological control of litchi bug *T. javanica*. *Ooencyrtus phongi* is being reported for the first time from India. The egg parasitization by *A. colemani* and *O. phongi* ranged from 12.9 to 52.9 per cent and 20.6 to 55.7 per cent, respectively during the study period. The sex-ratios of the *A. colemani* and *O. phongi* ranged from 1:1.83 to 1:4.14 and 1:1.35 to 1:3.83, (male: female), respectively.

KEY WORDS: *Anastatus colemani*, *Ooencyrtus phongi*, *Tessaratomia javanica*

Litchi is one of the most important fruit crops of India. About 17,000 metric tonnes of litchi are produced from approximately 10,000 ha area of UP/ Uttaranchal and the productivity of litchi in the state is thus merely 1.7 metric tonnes per ha. (17kg/tree). The newly constituted state Uttaranchal has also been declared as the litchi export zone of the country, where mandate is to produce pesticide free quality product. There are several insect pests which attack litchi but one of the most devastating is the pentatomid bug, *Tessaratomia javanica* (Thunberg) (Hemiptera: Pentatomidae). The litchi stink bug prefers feeding on flowering and tender branches (Liu *et al.*, 2000a). The chemical control of this pest cannot be recommended at fruiting stage; therefore alternative method of control is advocated. In this scenario the biological control through the egg parasitoids is the possible answer for minimizing

the attack of *T. javanica*. In the present investigations the eggs of litchi stinkbug, *T. javanica* were collected during the season to ascertain parasitoids associated with them. The study was carried out to identify important egg parasitoids to explore the possibility of biological control of litchi stink bug.

To study the extent of egg parasitization of litchi stink bug (*T. javanica*), observations were made during the egg laying period from April to May 2004. For the study, 5 egg masses of litchi stink bug, *T. javanica* were collected at weekly interval from Horticulture Research Centre (HRC), Pattharchatta, Pantnagar (29°N, 79.3° E). Each of the egg masses were kept in separate vials at room temperature (28-29°C) in the Biological Control Laboratory, Department of Entomology, Pantnagar

to record the extent of natural parasitisation. After emergence of the parasitoids to determine their identity, per cent parasitisation, total parasitisation, and sex-ratio (male: female) were observed.

Observations on the egg parasitoids of *T. javanica* revealed the phenomenon of multiple egg parasitisation by two chalcid parasitoid *viz.*, *Anastatus colemani* Crawford (Hymenoptera: Eupelmidae) and *Ooencyrtus phongi* Tryapitsyn, Myartseva and Kostyukov (Hymenoptera: Encyrtidae). A record of observations on 150 samples of egg masses revealed that the eggs were laid in a very characteristic feature and always 14 in number. *Ooencyrtus phongi* is being reported for the first time from India on *T. javanica* on litchi, which may offer good promise in the biological control of this pest in future. Natural mean egg parasitisation by two different chalcid parasitoids and their sex ratio is presented in Table 1.

Perusal of the data (Table 1) revealed that the mean egg parasitisation by *A. colemani* was 44.3 per cent in the 1st week of April and declined to 20 per cent in the 4th week of the same month. The

parasitisation by *A. colemani* in the 1st week of May was observed as 12.9 per cent, which sharply increased to 51.4 per cent in the 4th week of the same month. The sex-ratio of *A. colemani* ranged from 1:1.83 to 1:4.14 (male/female) throughout the season.

The presence of encyrtid egg parasitoid *O. phongi* was not observed till the 2nd week of April. The per cent parasitisation by this parasitoid was observed as 55.7 in the 3rd week of April, followed by 23.6 per cent in the 4th week of the same month and parasitism increased to 43.6 per cent in the 1st week of May. No parasitisation by *O. phongi* was recorded in 3rd and 4th weeks of May. The sex-ratio ranged from 1:1.35 to 1:3.83 (male: female) throughout the present investigation.

The cumulative parasitisation by *A. colemani* and *O. phongi* ranged from 68.6 to 43.6 per cent in the 3rd week and 4th week of the April 2004. In the month of May the total parasitisation was 56.4 per cent in the 1st week and 51.4 per cent in the last week.

Table 1. Mean egg parasitism of *T. javanica* by different parasitoids and their sex-ratios

Date/week	Egg masses sampled (14 eggs in each mass)	Egg parasitism (%) and sex-ratio				Total egg parasitisation (%)
		<i>Anastatus colemani</i>		<i>Ooencyrtus phongi</i>		
		Egg parasitism (%)	Sex ratio (Male: Female)	Egg parasitism (%)	Sex ratio (Male: Female)	
08.04.04/1 st	5	44.3	1:3.42	-	-	44.3
15.04.04/2 nd	5	52.9	1:3.11	-	-	52.9
22.04.04/3 rd	5	12.9	1:3.75	55.7	1:2.00	68.6
30.04.04/4 th	5	20.00	1:2.50	23.6	1:1.35	43.6
07.05.04/1 st	5	12.9	1:3.50	43.6	1:2.38	56.4
15.05.04/2 nd	5	24.3	1:1.83	20.7	1:3.83	45.0
23.05.04/3 rd	5	48.6	1:3.85	-	-	48.6
31.05.04/4 th	5	51.4	1:4.14	-	-	51.4
Mean (\bar{X})		33.3	1:3.32	49.8	1:2.23	51.4

The present investigations are in accordance with the earlier work reported by Liu *et al.* (2000b) from China who observed that the eggs of Litchi stink bug, *T. javanica* are destroyed by *Anastatus japonicus* and *Ooencyrtus phongi* and parasitisation ranged from 30.6 to 47 per cent of the host eggs. Zhou and Xian (1994) also made similar observations on these two parasitoids on the eggs of litchi stink bug and reported 66.8 per cent parasitisation on an average. Thus, it can be concluded that these two egg parasitoids have a potential to regulate the population of stink bug. Further studies on their mass production need to be done.

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