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## Effect of host age on the parasitising potential of four different *Trichogramma* species

**S Asha, V Chinna Babu Naik, PS Neharkar and Swati S Sant**

### Abstract

The experiment was conducted to determine the effect of host age on parasitising efficacy of four *Trichogramma* species viz *Trichogrammatoidae bactrae*, *Trichogramma brasiliensis*, *Trichogramma japonicum* and *Trichogramma chilonis*. Pink bollworm *Pectinophora gossypiella* (Saunders) was used as host. The host eggs of different ages (1,2,3 and 4 days old) were exposed to four gravid females of the all the four different parasitoid in four glass tubes separately with constant 75% relative humidity and 27 °C temperature. It was observed that under the conditions of the test all the four species of *Trichogramma* species showed maximum per cent parasitisation when they were exposed to one day old eggs followed by two days old eggs.

**Keywords:** Host age, Pink bollworm, *Trichogrammatoidae bactrae*, parasitisation

### Introduction

Among different insect pests attacking cotton, bollworms are major concern among them pink bollworm, *Pectinophora gossypiella* (Saunders) is the most destructive. It was a problem 30 years ago which was first described in 1842 (Ingram, 1994) [5] and is considered as a key pest of cotton (Dastur and Asana, 1960) [3]. In financial terms, pink bollworm is one of the worst and most quality damaging pests of cotton. *Trichogramma* being egg parasitoid have a great potential to control this pest most effectively than any other parasitoids as it terminates at the earliest stage (egg) itself. Host age plays very important role in increasing its efficiency even further by identifying the most appropriate egg age preferred by the parasitoids. Hence, the following study is under taken to see the effect of the host egg on parasitising potential of four *Trichogramma* species to under laboratory conditions in order to identify the most preferred host egg age for maximum parasitisation so that timely operations could be taken up for monitoring as well as controlling the pest.

### Materials and Method

Experiment was conducted in Insect Biocontrol laboratories at ICAR-CICR, Nagpur, India. The following species of *Trichogramma* were used *Trichogrammatoidae bactrae* (Nagaraja), *Trichogramma brasiliensis* (Ashmead), *Trichogramma japonicum* (Ashmead) and *Trichogramma chilonis* (Ishii). *Corcyra cephalonica* were used as factitious host for maintaining the culture. Host culture (*Pectinophora gossypiella*) was maintained on artificial diet recommended by Naik *et al.*, 2017 [8]. Each species of *Trichogramma* was reared in glass vials as described by (Morison, 1970) [6]. 27 °C temperature and 65 per cent relative humidity was maintained while rearing. Twenty per cent honey solution was used as adult diet of *Trichogramma*. Initially 100 *Pectinophora gossypiella* eggs of same age i.e. (24hr) old were glued on paper cards were exposed to 4 gravid females of each of the *Trichogramma* species in glass vials separately. In a similar manner the second, third and four days old eggs were also exposed to 4 gravid females of all the *Trichogramma* species used in the experiment separately. The experiment was replicated six times and data was recorded daily till the death of last female adult i.e. after 5 days of parasitoid release and the number of parasitised eggs were counted under stereo microscope and per cent parasitisation was worked out using following formula.

$$\% \text{ parasitisation} = \frac{\text{Number of eggs parasitised}}{\text{Total number of eggs exposed}} \times 100$$

Male and female were identified on the basis of type of antennae Pinto *et al.* (1978) <sup>[9]</sup>. Completely randomized design was used to analyse data.

### Results and Discussion

The results revealed that, among the different age groups tested for parasitisation, the maximum per cent parasitisation was recorded in 24 hrs old eggs *i.e* one day old eggs (87.66 %) followed by 48 hrs old eggs (73.50 %) and minimum per cent parasitisation was recorded in 72 hrs old eggs (58.33%) for *T. bactrae*. Tiwari and Khan (2003) <sup>[12]</sup> who reported freshly laid eggs (0 hr old) of *Spilosoma obliqua* were most preferred with mean per cent parasitisation of 71.03 while 24 and 48 hrs old eggs had insignificant differences regarding parasitism level.

A similar trend was seen with all the remaining *Trichogramma* species where *T. chilonis* recorded 84.83, 66.83 and 48.16 per cent parasitisation on one day, two days and three days old eggs of pink bollworm, respectively. Miura and Kobayashi (1998) <sup>[7]</sup> also revealed that, *Trichogramma*

*chilonis* mostly preferred the first day eggs of *Plutella xylostella* for oviposition and showed higher emergence from first day old eggs which considerably decreased as the age of the eggs were increased or decreased and progeny failed to complete development on the 3 day old DBM eggs. Budhwanth *et al.* (2008) <sup>[2]</sup> reported that, the per cent parasitisation by *Trichogramma chilonis* on first, second and third day old eggs was 60.30, 49.50 and 37.30 per cent respectively, but found to have no effect on adult emergence (Takada *et al.*, 2000; Hutchison *et al.*, 1990) <sup>[11, 4]</sup>.

*T. brasiliensis* and *T. japonicum* also recorded a quite similar trend where per cent parasitisation on one day old eggs was (59.16% and 42.83%) followed by 38.33 and 28.16 per cent on two days old eggs but both of them showed lowest parasitisation on three days old eggs (21.83 % and 13.66%) respectively.

Singh *et al.* (2001) <sup>[10]</sup> also reported that, per cent parasitisation by *Trichogramma brasiliensis* and *Trichogramma exiguum* decreased as the age of the host eggs increased.

**Table 1:** Effect of host age on per cent parasitisation by *Trichogramma* species

Treatment No.	Treatment Detail	Parasitisation (%)		
		One day old PBW eggs	Two days old PBW eggs	Three days old PBW eggs
T <sub>1</sub>	<i>Trichogrammatoidae bactrae</i>	87.66 <sup>a</sup> (69.47 <sup>*</sup> )	73.5 <sup>a</sup> (59.02 <sup>*</sup> )	58.33 <sup>a</sup> (50.08 <sup>*</sup> )
T <sub>2</sub>	<i>Trichogramma brasiliensis</i>	59.16 <sup>c</sup> (50.26)	38.33 <sup>c</sup> (38.22)	21.83 <sup>c</sup> (27.77)
T <sub>3</sub>	<i>Trichogramma japonicum</i>	42.83 <sup>d</sup> (40.83)	28.16 <sup>d</sup> (38.12)	13.66 <sup>d</sup> (21.56)
T <sub>4</sub>	<i>Trichogramma chilonis</i>	84.83 <sup>b</sup> (67.103)	66.83 <sup>b</sup> (61.23)	48.16 <sup>b</sup> (43.93)
	F test	Sig	Sig	Sig
	S.E.(m) ±	0.68	0.66	1.00
	C.D.5%	2.00	1.94	2.95

\* Values in parentheses are arc sin transformed

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