J. Biol. Control, 14(2): 71-74, 2000

Research Note

Effect of storage on the emergence and parasitization efficiency of laboratory reared and field collected populations of *Trichogramma chilonis* ishii

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ABSTRACT: **The parasitoid, *Trichogramma chilonis* could be stored in the refrigerator and successfully utilized for 23 days without adversely effecting their emergence and parasitization efficiency. The mean per cent parasitization decreased with the increase in storage period. Among the four populations studied, Muktsar population was most efficient as it showed maximum mean emergence (60.4%) and mean per cent parasitization (52.1) for 60 days.**

KEY WORDS: Emergence, parasitization, storage, *Trichogramma chilonis*

Trichogramma chilonis Ishii (Hymenoptera: Trichogrammatidae) is an important parasitoid of cotton bollworms and sugarcane borers in India. Storage of parasitized eggs at low temperatures is an essential prerequisite in biological control. This retards the development of parasitoids so as to synchronize their emergence in large numbers with availability of vulnerable stage of the host. Gautam (1986) reported that 7 days old parasitized host eggs *Spodoptera litura* (Fabricius) by *Telenomus remus* Nixon could be stored for 10 days at 10°C. A differential response was noticed when 4 species of *Trichogramma* were stored at 2, 5 and 10°C for 7-49 days. A temperature of 10°C gave a storage period of 49 days (Jalali, 1992). Singh *et al.* (1997) reported that seven days old parasitized eggs (by *T. chilonis*) could be stored for 20 days in the refrigerator without adversely affecting the adult emergence, their parasitization efficiency and sex-ratio. Different populations of *T. chilonis* were collected from the eggs of *Helicoverpa armigera* on cotton in three districts of the state. The present study was conducted to find out the effect of storage on different populations of *T. chilonis.*

The studies were conducted in the Biological Control Laboratory, Department of Entomology, Punjab Agricultural University, Ludhiana during 1998. The populations of *T. chilonis* were collected from three disticts, namely Ludhiana, Sangrur and Muktsar from the eggs of *Helicopvera armigera* (Hübner) during October, 1996. These populations were then reared in the laboratory on the eggs of *Corcyra cephalonica* (Stainton). The comparison of the performance of these field collected populations was made along with the laboratory reared population. Three cards (15 x 30cm) glued with 15,000 eggs of *C. cephalonica* were exposed

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to 2500 *T. chilonis* adults each of four populations for 24 and subsequently kept at 27±2°C. On the seventh day (at pupal stage of the parasitoid) these cards were kept in the refrigerator (8-10°C). One hundred eggs from each card were removed daily and kept in the laboratory in the test tube to record the per cent emergence. Of the parasitoids that emerged, 20 adults were taken and exposed further to 100 eggs of *C. cephalonica* to study the parasitization efficiency of the parasitoid. The experiment was conducted until the adult emergence of the parasitoid stopped. The data were analysed by factorial analysis.

The data presented in Table 1 reveal that the mean percentage of emergence of four populations was very high (96.2%) after one day of storage and it was significantly higher than all other days of storage. The emergence was 88.5 per cent after 7 days and was on par with emergence on 15th day, the latter was on par with emergence on 21st days. The emergence was quite high (> 80%) up

Table 1. Effect of storage on the emergence of different population of *T. chilonis*

Day	Per cent* emergence of different populations				
	Muktsar	Sangrur	Ludhiana	Laboratory reared	Mean
1	97.3(82.74)	94.3(77.56)	96.3(80.45)	97.0(81.43)	96.2(80.54)
7	88.7(70.91)	89.0(71.08)	97.3(81.75)	84.3(67.50)	88.5(70.87)
15	87.3(69.90)	91.7(73.85)	80.0(64.00)	81.3(64.83)	85.1(68.15)
22	78.0(62.43)	79.0(63.14)	80.7(64.50)	87.3(69.72)	81.2(64.97)
29	81.3(64.77)	64.0(53.44)	79.7(63.63)	67.7(55.69)	73.2(59.39)
36	58.3(50.08)	52.7(46.80)	47.0(43.53)	38.3(38.50)	49.1(44.73)
43	40.7(39.89)	30.7(33.98)	31.0(34.10)	32.0(34.73)	33.6(37.54)
50	30.7(33.76)	8.3(16.91)	8.3(17.24)	10.7(19.48)	14.5(21.85)
57	6.7(15.36)	0.0 (4.05)	0.0 (4.05)	0.0 (4.05)	1.7 (6.88)
Mean	63.2(54.42)	56.6(48.96)	57.8(50.36)	55.4(48.43)	58.1(50.54)

* Based on 100 eggs and three replication
Figures in parentheses are arcsine values.

	CD (P=0.05)
Populations	: 0.93
Days	: 3.61
Populations x Days	: 7.22

to 22 days of storage and thereafter it declined considerably and was only 1.7 per cent after 57 days of storage.

The performance of different populations of *T. chilonis* revealed that the four populations showed significant variation. The overall performance of Muktsar population was significantly better than other three populations with an average emergence of 63.2 per cent. The Muktsar population was followed by Ludhiana population which showed an average emergence of 57 per cent which was significantly better than the remaining two populations. The laboratory-reared population, showed significantly least emergence (55.4%) and it was on par with Sangrur population.

The parasitoid that emerged out from the stored parasitized eggs parasitized 80.5 per cent eggs of *C. cephalonica* (Table 2) and it was significantly better than all other days. The parasitization efficiency within 8 to 22 days varied from 62.1 to 67.2 per cent and was on par with each other. Twenty-nine days after storage the parasitization was reduced to 57.1 per cent. After

Table 2. Effect of storage on the parasitization efficiency of different populations of *T. chilonis*

Day	Per cent* emergence of different populations				
	Muktsar	Sangrur	Ludhiana	Laboratory reared	Mean
1	91.3(73.62)	79.3(63.38)	76.7(62.05)	74.7(60.12)	80.5(64.79)
7	67.0(55.22)	61.0(51.71)	67.7(53.83)	73.3(60.29)	67.2(55.77)
15	64.7(54.03)	66.0(54.68)	65.0(54.05)	64.0(53.86)	64.9(54.16)
22	64.3(53.80)	49.0(44.68)	68.3(56.11)	66.7(55.12)	62.1(52.43)
29	59.0(50.46)	47.7(43.93)	59.3(50.70)	62.3(52.43)	57.1(49.38)
36	46.7(45.29)	39.0(38.91)	42.3(40.74)	46.0(42.97)	43.5(41.97)
43	48.7(44.50)	20.7(27.35)	20.3(27.14)	34.7(36.25)	31.1(33.81)
50	24.7(29.95)	3.7(11.63)	18.7(25.94)	13.7(21.93)	15.2(22.36)
57	10.7(19.50)	0.0(4.05)	2.0 (8.46)	0.0 (4.05)	2.7 (9.01)
Mean	53.0(47.37)	40.7(37.81)	48.7(42.11)	48.41(43.00)	47.1(43.74)

* Based on 100 eggs and three replication
Figures in parentheses are arcsine values.

CD (P=0.05)

Populations : 0.86

Days : 3.56

Populations x Days : 6.71

that there was considerable reduction in the parasitization efficiency. It parasitized 43.5, 31.1, 15.2 and 2.7 per cent eggs after 36, 50 and 57 days of storage.

Individual performance of the Muktsar population was the best which had an average parasitiztion efficiency of 53.0 per cent and it was significantly superior to all other populations. The mean parasitization efficiency of the Ludhiana population was 48.7 per cent and it was significantly superior to Sangrur (40.7%) population but was on par with laboratory reared population.

The results suggest that the parasitoid can be stored for 22 days in refrigerator without affecting its emergence and parasitization efficiency. Singh *et al.* (1997) reported this period to be 20 days. Killincer *et al.* (1990), however, reported that storage of the *Trihcogramma* spp. as the parasitized *Sitotroga cerealella* eggs up to 30 days does not adversely affect their emergence. Jalali (1992) observed that at 8°C storage, the parasitoid reached zero emergence after 60 days of storage. This period was found to be 49 days when stored at 10°C.

ACKNOWLEDGMENT

The authors are thankful to Prof. and Head, Department of Entomology, Punjab Agricultural University, Ludhiana for providing facilities.

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