

Host searching capacity of laboratory reared and field collected populations of *Trichogramma chilonis* Ishii

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ABSTRACT: In cotton field *Trichogramma chilonis* could disperse as far as 9 metres to search its host, but the maximum parasitization was observed up to 2 metres. The performance of the Muktsar population was better than all other populations. The laboratory reared population was significantly inferior to all field collected populations.

KEY WORDS: Cotton, host searching capacity, populations, *Trichogramma chilonis*

Among the twelve indigenous species of *Trichogramma*, only *Trichogramma chilonis* Ishii is predominant in India and has the distinction of being the highest produced and most utilised biocontrol agent (Manjunath, 1991). Singh *et al.* (1994) reported that adults of *T. chilonis* were able to easily locate host eggs within a distance of 5m radius. Higher per cent parasitism was observed at 1m radius towards the direction of the wind. Sohi *et al.* (1996) reported that the maximum distance of dispersal of *T. chilonis* in cotton was 10m. Wang *et al.* (1990) observed that *T. ostrinae* dispersed as far as 6m off the releasing point in the field of corn plants, but was found more within the distance of 2m. Singh and Jalali (1993) reported that the host searching ability of *T. chilonis* strains collected from various parts of the country was different. Anand and Ludhiana strain gave significantly higher parasitism than others. Similarly, Mandal and Somchaudhry (1991) found that ecotypes of *T. chilonis* collected from different

plants displayed different search behaviour. Therefore, the present studies were undertaken to find out the host searching capacity of different field collected populations of *T. chilonis*.

MATERIALS AND METHODS

The populations of *Trichogramma chilonis* were collected from three districts namely Ludhiana, Sangrur and Muktsar from the eggs of *Helicoverpa armigera* (Hübner) during October, 1996. The populations were reared in the laboratory on the eggs of *Corcyra cephalonica* (Stainton). The comparison of the performance of these three field collected populations were made with the laboratory reared population.

To study the host searching ability of different populations of *T. chilonis*, the cards containing 100 eggs of *C. cephalonica* were stapled on the underside of cotton leaves 1m apart in all the four directions in a cotton field at Regional Research

1. Nahar Sugar and Allied Industries, Ltd., Amloh, Fatehgarh Sahib, Punjab.
2. Regional Research Station, Bathinda, Punjab.

Station, Bathinda, Punjab. Tricho-card having about 10,000 parasitized eggs (7 days old) was stapled in the centre. The stapled *Corcyra* egg cards were removed after two days and were kept in test tubes in the laboratory to observe the per cent parasitism. The experiment was conducted once in each month during July to October, 1998.

RESULTS AND DISCUSSION

During July, 1998 parasitoid could search effectively up to a distance of 4m (Table 1). The mean parasitization at 1m from release point was 14.9 per cent and it was significantly higher than at 2m (9.9%), which in turn was higher than that at 3m (5.6%). The mean parasitization of Muktsar

population was 5.4 per cent and it was significantly higher than all other populations.

Irrespective of the different populations, the parasitization during August, 1998 was again maximum at 1m (23.6%) from the release point and it was significantly more than all other distances (Table 2). The parasitization was recorded up to a distance of 9m, however, the parasitization from 6 to 9m was very low (0.1 to 0.9%) and was on par with each other. The host searching ability of Muktsar population was better significantly than all other populations. The mean parasitization by Sangrur (6.3%) and Ludhiana population (6.1%) was significantly more than laboratory population (4.0%).

Table 1. Host searching ability of different populations of *T. chilonis* during July, 1998

Range (Metre)	Mean per cent parasitization of <i>Corcyra cephalonica</i> eggs			
	Muktsar	Sangrur	Ludhiana	Laboratory reared
1	22.80 (28.77)	18.40 (25.75)	12.60 (21.08)	5.60 (13.23)
2	15.20 (23.32)	12.10 (20.67)	6.40 (14.14)	6.00 (13.63)
3	11.40 (20.15)	4.70 (12.42)	4.60 (11.85)	1.60 (7.98)
4	4.20 (12.52)	0.80 (6.20)	3.20 (10.29)	0.00 (4.05)
5-10	0.00 (4.05)	0.00 (4.05)	0.00 (4.05)	0.00 (4.05)
Mean	5.40 (10.91)	3.60 (8.94)	2.70 (8.17)	1.30 (6.32)

Figures in parentheses are percentage + 0.5 arcsine transformation.

CD (P = 0.05)

Populations : 1.15
Range : 1.83

Table 2. Host searching ability of different populations of *T. chilonis* during August, 1998

Range (Metre)	Mean per cent parasitization of <i>Corcyra cephalonica</i> eggs			
	Muktsar	Sangrur	Ludhiana	Laboratory reared
1	36.2 (37.18)	22.6 (28.62)	21.8 (28.12)	13.7 (21.66)
2	24.0 (29.61)	15.4 (23.32)	15.2 (23.23)	13.4 (21.57)
3	13.9 (22.30)	13.9 (22.14)	11.5 (20.29)	6.0 (14.45)
4	9.1 (17.58)	7.3 (18.35)	6.8 (15.42)	4.3 (12.46)
5	5.1 (13.60)	2.0 (7.78)	4.5 (12.08)	3.0 (8.76)
6	2.3 (8.50)	0.8 (5.86)	0.0 (4.05)	0.0 (4.05)
7	0.0 (4.05)	0.3 (4.89)	0.0 (4.05)	0.0 (4.05)
8	0.0 (4.05)	0.7 (5.66)	0.9 (5.90)	0.0 (4.05)
9	1.1 (6.24)	0.0 (4.05)	0.0 (4.05)	0.0 (4.05)
10	0.0 (4.05)	0.0 (4.05)	0.0 (4.05)	0.0 (4.05)
Mean	9.2(14.72)	6.3 (12.47)	6.1 (12.26)	4.0 (9.92)

Figures in parentheses are percentage + 0.5 arcsine transformation.

CD (P = 0.05)

Populations : 1.49 1.49

Range : 2.36

Table 3. Host searching ability of different populations of *T. chilonis* during September, 1998

Range (Metre)	Mean per cent parasitization of <i>Corcyra cephalonica</i> eggs			
	Muktsar	Sangrur	Ludhiana	Laboratory reared
1	17.1 (24.46)	15.4 (23.10)	13.0 (21.34)	8.7 (17.50)
2	11.9 (20.56)	9.9 (18.48)	7.6 (15.66)	5.1 (12.57)
3	9.2 (17.48)	5.1 (12.70)	5.1 (11.95)	2.3 (8.27)
4	5.5 (13.94)	2.3 (8.31)	5.0 (11.64)	1.6 (7.74)
5	6.3 (13.49)	1.0 (6.07)	2.0 (7.87)	0.6 (5.57)
6	0.9 (5.99)	0.3 (4.94)	0.8 (5.80)	0.0 (4.05)
7-10	0.0 (4.05)	0.0 (4.05)	0.3 (4.90)	0.0 (4.05)
Mean	5.1 (11.25)	3.4 (8.98)	3.4 (9.13)	1.8 (7.19)

Figures in parentheses are percentage + 0.5 arcsine transformation.

CD(P = 0.05)

Populations : 1.75

Range : 2.77

In the month of September, 1998, the mean host searching range of different populations was up to 7m (Table 3), although the parasitization between 6 and 7m was very low (0.1 to 0.5%). The parasitization at 1m was 13.5 per cent and it was significantly more than at all other distances. The Muktsar population with mean parasitization at 5.1 per cent was significantly superior to all other.

During October, 1998, the dispersal of different populations was up to 8m although it was very low (0.2 to 0.4 %) between 6 to 8m. The performance of Muktsar population (8.1%) was again superior to all other populations. The mean parasitization by Sangrur (4.5%) and Ludhiana (4.5%) was significantly better than laboratory

reared (3.2%) population (Table 4).

It can be generalised that the dispersal of *T. chilonis* in cotton field was up to 8m but the parasitization was significantly higher up to 5 m. Singh *et al.* (1994) also reported the searching range of *T. chilonis* was 5 m. and also higher parasitism was observed at a distance of 1m. Similarly, the sugarcane, *T. chilonis* dispersed to 10 m and the parasitization in *Corcyra* trap cards (9.0 to 56.5% at distances of 2-10 m (Anonymous, 1999). The performance of Muktsar population was superior to other populations with respect to parasitizing ability. Singh and Jalali (1993) reported that searching ability of Anand and Ludhiana strain was better.

Table 4. Host searching ability of different populations of *T. chilonis* during October, 1998

Range (Metre)	Mean per cent parasitization of <i>Corcyra cephalonica</i> eggs			
	Muktsar	Sangrur	Ludhiana	Laboratory reared
1	25.0 (30.19)	17.5 (24.97)	16.9 (24.20)	12.0 (20.25)
2	21.1 (27.55)	11.7 (20.28)	12.7 (20.94)	11.3 (20.00)
3	15.1 (23.07)	8.1 (16.25)	7.3 (16.19)	4.9 (12.54)
4	11.9 (20.42)	4.9 (12.34)	4.3 (10.70)	2.2 (8.27)
5	5.7 (13.16)	2.7 (9.49)	1.7 (8.09)	1.5 (6.70)
6	0.9 (5.90)	0.3 (4.88)	0.6 (5.40)	0.0 (4.05)
7	0.3 (4.93)	0.0 (4.05)	1.0 (6.10)	0.0 (4.05)
8	0.6 (5.40)	0.0 (4.05)	0.3 (4.89)	0.0 (4.05)
9-10	0.0 (4.05)	0.0 (4.05)	0.0 (4.05)	0.0 (4.05)
Mean	8.1 (15.87)	4.5 (10.44)	4.5 (10.46)	3.2 (8.80)

Figures in parentheses are percentage + 0.5 arcsine transformation.

CD (P = 0.05)

Populations : 1.63

Range : 2.58

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