

# Studies on the Growth Rate of *Trichogrammatoidea eldanae* Viggiani (Trichogrammatidae: Hymenoptera) Population

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*Trichogrammatoidea eldanae* Viggiani is an important parasitoid of the sugarcane borer, *Eldana saccharina* Walker in South Africa (Conlong and Hastings, 1984). It has recently been introduced into India (Anon., 1987) and is being mass multiplied and tested against *Chilo auricilius* Dudgeon, in the Punjab. The growth rate and population of this parasitoid has not been studied so far. The present studies were, therefore, undertaken to study the growth rate of the parasitoid.

Three hundred eggs of *Corcyra cephalonica* (Stainton) were sparsely mounted on a card (10 cm x 2.5 cm) with the help of gum acacia. The egg card was exposed for 24 h in a test tube to 50 adults of *T. eldanae*. Five such cards were prepared and got parasitized. The parasitized eggs were segregated singly in small glass vials and reared up to the emergence of adults. The parasitoids which developed singly were used in the experiment. Twenty five pairs (male and female) were allowed in glass vials. The parasitoids were provided with 50 per cent honey solution as food on a small strip of paper. The open ends of the vials were plugged

with surgical cotton. The males were removed after 24h. Each female was provided with 50 eggs of *C. cephalonica* mounted on a small card having food at one end. The eggs were removed after 24 h and fresh eggs were provided to the females. This process continued till all the females died. The parasitized eggs of each day were reared separately at  $26 \pm 1.3^\circ \text{C}$  and  $70 \pm 3.2$  per cent relative humidity. The number of females dying on successive days and the age-specific fecundity were recorded and the data were analysed statistically. The abbreviations and formulae employed in this paper are as under:

 $x$  = pivotal age in days $l_x$  = age specific longevity $m_x$  = age specific fecundity $R_o$  = net reproductive rate ( $\sum l_x m_x$ ) $T_c$  = approximate duration of generation ( $\sum l_x m_x / R_o$ ) $r_c$  = approximate value of  $r_m$  ( $\log_e R_o / T_c$ )

Table 1. Life table (for females) : age specific fecundity for *Trichogrammatoidea eldanae* at  $26.0 \pm 1.3^\circ \text{C}$  and  $70 \pm 3.2$  per cent relative humidity

Pivotal age in days (x)	Age specific longevity ( $l_x$ )	Age specific fecundity ( $m_x$ )	$l_x m_x$	$\sum l_x m_x$
1 - 9		Immature stages		
10	1.00	20.39	20.39	203.90
11	0.96	7.25	6.96	76.56
12	0.88	9.42	8.29	99.48
13	0.84	5.58	4.69	60.97
14	0.68	6.06	4.12	57.68
15	0.52	3.88	2.02	30.30
16	0.32	5.41	1.73	27.68
17	0.12	1.42	1.17	2.89
18	0.04	0.71	0.03	0.54

$$l_x m_x (R_o) = 48.40 \times l_x m_x = 560.00$$

Table 2. Life table statistics of *T. eldanae*

Particulars	Value
$R_0$	48.40
$T_c$	11.57
$r_c$	0.335
$r_m$	0.348
$T$	11.14 days
$\lambda$	1.416
Average longevity	5.36 days
Minimum longevity	1 day
Maximum longevity	9 days
Sex ratio	1 : 2.5

$r_m$  = intrinsic rate of natural increase  
( $e^{r_c \times l_{xm}} = 1$ )

$T$  = net generation time ( $\log_e R_0/r_m$ )

$\lambda$  = finite rate of increase ( $e^{r_m}$ )

The data on the age-specific longevity and fecundity are presented in Table 1 while life-table statistics are presented in Table 2. The females lived for 1 to 9 days (mean = 5.36 days). The maximum fecundity was observed during the first day, thereafter the egg-laying capacity was reduced. The age-specific fecundity was reduced considerably after 7 days.

The rate of multiplication per generation was found to be 48.40, while the mean duration of a generation was 11.57 days. The intrinsic rate of natural increase was found to be 0.348 at  $26.0 \pm 1.3^\circ\text{C}$  and  $70 \pm 3.2$  per cent relative humidity. The observed finite rate of increase showed that the population of parasitoid multiplied 1.416

times/female/day. The rate of increase of *T. eldanae* is more than *Trichogrammatoidea* sp. near *guamensis* which was 1.31 times/female/day (varma *et al.*, 1980).

The rate of increase in *Trichogramma chilonis* (Nagarkatti and Nagaraja) was 0.2824 at  $26 \pm 1^\circ\text{C}$  and 50% relative humidity (Nagarkatti and Nagaraja, 1978). So *T. eldanae* was superior to *T. chilonis* while it was inferior to *Trichogramma exiguum* Pinto and Planter where the corresponding figure was 0.3822 at  $25.1^\circ\text{C}$  and  $81.8 \pm 4.6$  per cent relative humidity (Maninder and Varma, 1982). These studies were carried out under identical conditions while Nagarkatti and Nagaraja carried out the studies at 50% relative humidity.

Key words: *Trichogrammatoidea eldanae*, growth rate

#### LITERATURE CITED

- ANONYMOUS, 1987. *Proc. Seminar-cum-sixth Workshop Biol. and Cont. Crop pests weeds*, held at G.A.U. Anand, June 29 to 2nd July, 1987.
- CONLONG, D.E. and HASTINGS, H. 1984. Evaluation of egg parasitoids in the biological control of *Eldana saccharina* Walker, (Lepidoptera : Pyralidae). *Proc. 58th Ann. Cong.*, held at Durban and Mount Edgecombe, 25th to 28th June, 1984.
- MANINDER and VARMA, G.C. 1982. The growth of population of *Trichogramma exiguum* Pinto & Planter. *Indian J. Ent.*, 44 179-181.
- NAGARKATTI, S. and NAGARAJA, H. 1978. Experimental comparison of Laboratory reared v/s wild type *Trichogramma confusum* (Hym: Trichogrammatoidea) I. Fertility, fecundity and longevity. *Entomophaga*, 23, 29 - 36.
- VARMA, G.C., MANINDER and SINGH, B. 1980. Studies on the growth of the population and distribution of *Trichogrammatoidea* sp. near *guamensis* Nagaraja. *J. Res. Punjab agric. univ., Ludhiana*, 17, 38-40.