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Studies on the Age-Specific Fecundity and Intrinsic Rate of Natural Increase in *Goniozus sensorius* Gordh (Hymenoptera: Bethylidae)

CLEMENT PETER and B.V. DAVID

Fredrick Institute of Plant Protection and Toxicology (FIPPAT), Padappai - 601301.

ABSTRACT

Life table data were calculated for *Goniozus sensorius* Gordh on *Diaphania indica* (Saunders). The ovipositing female survived for a mean period of 8 days and produced a mean progeny of 7.57 individuals each day with a sex- ratio of 1:4.1 (M:F). The intrinsic rate of increase (r_m) was 0.185 per female per day. The net reproductive rate (R_0) was 21.93 and net generation time (T) 16.70 days.

Key words: *Goniozus sensorius*, intrinsic rate of increase, *Diaphania indica*

The pumpkin caterpillar, *Diaphania indica* (Saunders) is a pest of several cultivated cucurbits. During the course of investigation on the natural enemy complex associated with *D. indica* at Padappai, a gregarious bethylid ectoparasitoid *Goniozus sensorius* Gordh was recorded as a major parasitoid. This wasp was described by Gordh (1988) based on the material reared from *D. indica* on *Coccina grandis* (L.) Voight. The genus *Goniozus* is probably the most well studied and has excellent promise for biological control of microlepidoptera (Gordh *et al.*, 1983). The present study was conducted to determine the life table statistics of *G. sensorius* under laboratory conditions in order to make a critical assessment of the biological control potential of this parasitoid.

MATERIALS AND METHODS

A life table study was initiated with ten mated females of *G. sensorius*. Each parasitoid was placed individually in a glass specimen tube (4 x 2 cm) and provided with 20% honey solution. A single fourth instar larva of *D. indica* was introduced into the tube at 2h interval for parasitization until the death of female. Parasitized host were reared day-wise seperately in the insectary until adult emergence to determine the sex of the progeny. The study was conducted at 26.43± 2.53°C and 65.08% R.H. The life table was constructed using methods and terminology of Andrewartha and Birch (1954) and Southwood (1966).

RESULTS AND DISCUSSION

The study indicated that the ovipositing female survived for an average period of 8 days and produced a mean progeny of 7.57 individuals each day. The average sex ratio of the progeny was 1:4.1 (M:F).

The life table incorporating age (X) survivorship (1x) and fecundity (mx) values for *G. sensorius* on *D.indica* is presented in table 1. *G. sensorius* females lived for 11 days and laid the maximum number of eggs during the first 3 to 4 days. The rate of egg laying decreased with the age of the female. The increase per generation was 21.94 (R_o) and the mean duration of the generation 16.70 days (T). The calculated finite rate of increase showed that the population of *G. sensorius* increased by 1.203 (λ) times per female per day. The intrinsic rate of natural increase was 0.1849 (r_m) (Fig.1). The life table statistics calculated for *G. emigratus* (Gordh and Hawkins, 1981) revealed that the generation time was 37.1 days, net reproductive rate 128.03, intrinsic rate of natural increase 0.178 and the finite rate of increase 0.131.

The r_m value calculated for *G. sensorius* on *D. indica* (0.185) is higher than the r_m values for *Goniozus legneri* on *Pectinophora gossypiella* and *Amyelois transitella* (0.157 and 0.162) (Gordh *et al.*,1983) and for *G. emigratus* on *Amyelois transitella* (0.178) (Gordh and Hawkins, 1981).

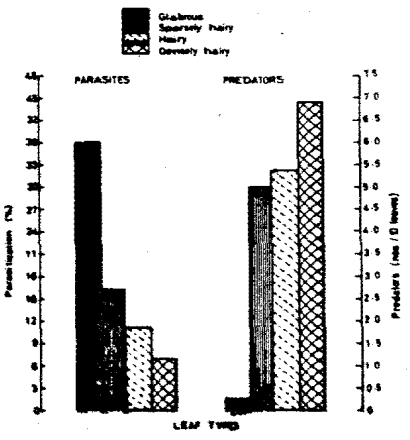

Table 1. Life-table statistics of *G. sensorius* under laboratory conditions

X	l_x	m_x	l_xm_x	l_xm_xX
1-13	Immature stages			
14	Preoviposition day			
15	1.0000	4.8364	4.8364	72.5460
16	1.0000	6.6546	6.6546	106.4736
17	1.0000	4.6364	4.6364	78.8188
18	0.9636	3.2000	3.0835	55.5030
19	0.8000	2.3818	1.9054	36.2026
20	0.6000	0.6909	0.4145	8.2900
21	0.4909	0.6546	0.3213	6.7473
22	0.2727	0.1636	0.0446	0.9812
23	0.1818	0.2000	0.0364	0.8372
24	0.0727	0.0909	0.0066	0.1584

Particulars	Value
R_o	21.94 (female/generation)
T_c	16.7075
r_c	0.1848
T	16.7025
r_m	0.1849
λ	1.2031 (female/day)

This indicated that *G. sensorius* is capable of rapid increase in population size under favourable conditions.

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