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# Influence of *Eocanthecona furcellata* (Wolff) (Heteroptera : Pentatomidae) egg age on the progeny production of its parasitoid *Psix striaticeps* (Dodd) (Hymenoptera : Scelionidae)

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**ABSTRACT** : The age of *Eocanthecona furcellata* (Wolff) eggs influenced the progeny production of *Psix striaticeps* (Dodd). Twenty four hour old eggs were most suitable and resulted in 19.6 per cent parasitisation and 91.83 per cent female parasitoids. Sixty hour old eggs were parasitised lest (8.4%). However, the age of the parasitoid did not affect parasitisation or progeny production.

**KEY WORDS** : *Eocanthecona furcellata*, host age, progeny production, *Psix striaticeps*

Biological studies of *Psix striaticeps* (Dodd) (Hymenoptera : Scelionidae) revealed its importance as a promising biological control agent against the stink bug, *Eocanthecona furcellata* (Wolff) (Heteroptera : Pentatomidae), a wide spread predator of tasar silkworm in temperate and tropical regions of India (Singh and Thangavelu, 1992, 1995; Singh *et al.*, 1992, 1994 and 1995). The ability to find and oviposit on the hosts are the key factors in the mass production of the parasitoids.

However, mass production also depends to a great extent on the age, ratio and density of the host and parasitoid used. The present study aims to determine the optimum age of the host and parasitoid for mass production of *P. striaticeps* using *E. furcellata* eggs as host.

## MATERIALS AND METHODS

*Psix striaticeps* was collected from the field by placing egg masses of *E. furcellata* and later bred in the laboratory (24±2°C) on eggs of the bug and used for these experiments. Only experienced female parasitoids (those which have been in contact with the hosts) parasitoids were used in the experiments. To obtain such females, freshly emerged one day old, mated and fully fed (with 30% honey) females were individually placed in 100 ml plastic cups each having about 25 (1-3 days old) eggs of *E. furcellata* on oviposition cards for one hour. Thereafter, the females were withdrawn and treated as experienced ones.

To determine the effect of host age, twenty five eggs of *E. furcellata* of each age group (12, 24, 36, 48 and 60 h old) were glued on to egg cards (6 x 3.5 cm). The egg cards were enclosed in a plastic petri dish (7.5cm dia) and five experienced female parasitoids were introduced for 12 h. After 12 h the parasitoids were removed and the egg cards were left undisturbed until the parasitoids emerged. The experiment was replicated five times for each age of the host.

To determine the influence of the parasitoid age, 12 h old egg masses (25 eggs/ egg mass) were exposed separately to 1, 2, 3, 4, and 5 days old mated females. Egg masses and parasitoids were contained in a plastic petri dish for 12 h. After exposure the egg cards were removed and placed in plastic cups (100 ml) for adult emergence. The emerged parasitoids were sexed and counted.

An experiment was conducted to determine the best parasitoid to host ratio. Different ratio of 1:20, 1:30, 1:40 and 1:50 were tried. The experiment was replicated thrice.

## RESULTS AND DISCUSSION

The ageing of host eggs altered the rate of parasitism. Per cent parasitisation was low in 60 h old eggs in comparison to 12-24 h old eggs (Table 1). Maximum parasitization (19.6±1.14) was recorded on 24 h old eggs. Progeny production was

affected when 60 h old eggs were exposed to the parasitoids. The ageing of the stink bug eggs affected the acceptability by the scelionid parasitoid and oviposition was more in 24 h old eggs. The present study was in conformity with the observations of Alphen and Vet (1986) and Yeargan (1979).

Table 1. Effect of *E. furcellata* egg age on the progeny production of *P. striaticeps*

| Host age (hour) | Host egg parasitised (Mean±S.D.) | Progeny production (Mean±S.D.) | Female progeny (%) |
|---|---|---|---|
| 12 | 15.6±1.14 | 10.6±1.34 | 84.90 |
| 24 | 19.6±1.14 | 19.6±1.12 | 91.83 |
| 36 | 16.2±1.48 | 13.2±1.30 | 57.00 |
| 48 | 11.0±1.00 | 9.4±0.83 | 34.04 |
| 60 | 8.4±1.14 | 6.0±0.70 | 20.00 |

Age of the parasitoids had no apparent affect on the rate of parasitism and progeny production. The per cent progeny produced by the parasitoids of different ages is not very different (Table 2). It is also evident from Table 2 that there is little difference in the total number of adults emerged after parasitization by parasitoid of different ages. It is probably because the parasitoid's rate of oviposition is unaffected by her age (Yeargan, 1982).

Table 2. Effect of *Psix striaticeps* female age on parasitisation of *E. furcellata*

| Age of female parasitoid (days) | Parasitised eggs (Mean±S.D.) | Female progeny (%) |
|---|---|---|
| 1 | 18.8±1.30 | 75.00 |
| 2 | 19.6±1.67 | 80.00 |
| 3 | 20.0±2.73 | 81.25 |
| 4 | 19.8±1.92 | 81.17 |
| 5 | 19.0±1.00 | 79.31 |

The maximum progeny was obtained when one day old parasitoids and 24 h old host eggs were exposed in the ratio of 1:40. But even at this ratio some stink bug nymphs were obtained due to a few eggs remaining unparasitised (Table 3). Parasitoid : host ratio of 1:30 was found to be the best to obtain maximum progeny of the parasitoid and also highest proportion of females. The present study revealed that the ageing of host eggs influences the progeny production, whereas, parasitoid ageing does not influence it.

Table 3. Effect of different parasitoid : host ratios on the parasitisation and progeny production of *P. striaticeps*

| Parasitoid : Host | Host eggs parasitized (Mean±S.D.) | Parasitization (%) | Parasitoid no. (Mean±S.D.) | Female progeny (%) |
|---|---|---|---|---|
| 1:20 | 90±4.50 | 72.0 | 77±1.63 | 84.40 |
| 1:30 | 117±3.00 | 78.0 | 106±3.51 | 86.79 |
| 1:40 | 160±5.00 | 80.0 | 120±4.50 | 82.50 |
| 1:50 | 158±2.51 | 63.2 | 139±4.50 | 61.15 |

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## REFERENCES

ALPHEN, J. J. M.VAN and VET, L. E. M. 1986. An evolutionary approach to host finding and selection. In: J. K. Waage and D. J. Greathead (Eds.) *Insect parasitoids*. Academic press, London, pp.23-61.

SINGH, R. N., KULSHRESTA, V. and SINHA, S. S. 1994. Sex ratio of Stink bug parasitoid wasp in tasar culture. *Nat. Acad. Scien*, **64**:17-21.

SINGH, R. N., SINHA, S. S. and THANGAVELU, K. 1995. Life table studies of the scelionid egg parasitoid, *Psix striaticeps* (Hymenoptera : Scelionidae) on the silkworm predator *Canthecona furcellata* (Pentatomidae, Heteroptera). *J. Biol. Control*, **9**:5-8.

SINGH, R. N. and THANGAVELU, K. 1992. Record of new egg parasites of *Canthecona furcellata* (Pentatomidae, Hemiptera). *Entomon*, **17**:65-66.

SINGH, R. N. and THANGAVELU, K. 1995. Host discrimination ability in parasitic wasp, *Psix striaticeps* (Hymenoptera : Scelionidae). *Ann. Entomol.*, **12**:27-31.

SINGH, R. N., THANGAVELU, K., MISHRA, P. K. and JAYASWAL, J. 1992. Reproductive strategy and sex ratio of the stink bug parasitoid *Psix striaticeps* (Dodd) (Hymenoptera : Scelionidae) in tasar ecosystem. *G. it. Ent.*, **6**:151-155.

VINSON, S. B. 1976. Host selection by insect parasitoids. *Ann. Rev. Entomol.*, **21**:109-133.

YEARGAN, K. V. 1979. Parasitism and predator of stink bug eggs in soybean and alfalfa fields. *Environ. Entomol.*, **8**:715-719.

YEARGAN, K. V. 1982. Reproductive capability and longevity of the parasitic wasp, *Telenomus podisi* and *Trissolcus euschisti*. *Ann. Entomol. Soc. Am.*, **75**:181-183.