

## Biology and Feeding Potential of Predatory mite, *Amblyseius longispinosus* (Evans) on Cotton Red Spider Mite, *Tetranychus macfarlanei* Baker and Pritchard

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The phytoseiid predator, *Amblyseius longispinosus* (Evans) has been proved to be a very good predator of Tetranychid mites (Mallik, 1974). Biology of *A. longispinosus* has been studied on *Tetranychus ludeni* Zacher (Mallik, 1974) and *Oligonychus indicus* Hirst (Manjunatha, 1988; Anil, 1990). The feeding preference and feeding potential of the predator has been studied by Anil (1990) only on *O. indicus*. However, information on its biology, feeding potential and feeding preference on the red spider mite, *Tetranychus macfarlanei* Baker and Pritchard is not available and so experiments were conducted under laboratory conditions to study these parameters.

Study on the biology of *A. longispinosus* was conducted under laboratory conditions. Two mated females of *A. longispinosus* were left on each of 20 cotton leaf bits kept upside down on wet cotton in Petri dishes. As soon as an egg was laid by any one of the two females, the females were removed and the egg was alone left on the leaf bit for studying the developmental stages. Observations were recorded once in 6h initially and later twice a day till the phytoseiid completed its development to adult. The mid point between two observations was considered as the time of moulting whenever the mite moulted to the next instar. When the phytoseiid reached adult stage, the sex was determined and the opposite sex was released in the leaf bit and the other biological informations were recorded. Measurements of different stages of *A. longispinosus* were recorded. Feeding preference of the different stages of the predator was determined by exposing equal numbers of all the stages of *T. macfarlanei*. Feeding potential of different stages of predator was studied by ex-

posing to equal number of eggs of prey under laboratory conditions of 23.47 to 29.60°C and relative humidity of 49.96 to 79.78 per cent.

The incubation period of eggs, duration of larval, protonymphal and deutonymphal stages lasted for 2.21, 0.93, 1.02 and 1.93 days, respectively at 23.47 to 29.60°C (Table 1). These observations are slightly different from those of Anil (1990) who observed 2.33, 0.90, 1.06 and 2.06 days for eggs, larvae protonymphs and deutonymphs respectively when it was reared on *T. macfarlanei* at temperature ranging from 23 to 27°C. This decrease in duration of development might be due to difference in temperature. Mallik (1974) observed that males completed the development faster (ca 95 h) than females (ca 99 h). The egg, larval, protonymphs, deutonymphs, adult females and males measured 0.18 to 0.19 mm, 0.26 to 0.27 mm, 0.29 to 0.31 mm, 0.33 to 0.37 mm, 0.42 to 0.44 mm and 0.35 to 0.37 mm, respectively. This was in accordance with the observations of Manjunatha (1988).

The preoviposition, oviposition and post-oviposition periods lasted for  $1.34 \pm 0.23$ ,  $17.48 \pm 2.71$  and  $2.08 \pm 0.68$  days, respectively. The reduction in duration might be due to increased temperature as opined by Manjunatha (1988) who observed that the preoviposition, oviposition and postoviposition lasted for 1.26, 16.88 and 2.9 days at temperature range of 24.5 to 28.7°C and humidity 69 to 88 per cent. Anil (1990) found that preoviposition, oviposition and post oviposition lasted for  $1.44 \pm 0.08$ ,  $18.87 \pm 0.23$ ,  $1.90 \pm 0.14$  days respectively at a temperature 23 to 29°C. The adult female lived on an average for  $21.00 \pm 2.69$  days, whereas males lived for  $8.55 \pm 0.98$  days. This

**Table 1. Biology of *A. longispinosus* on *T. macfarlanei* under laboratory condition.**

Stage of <i>A. longispinosus</i>	* Duration in days Mean $\pm$ SD
Egg	2.21 $\pm$ 0.269
Hexapod larvae	0.93 $\pm$ 0.069
Protonymph	1.02 $\pm$ 0.142
Deutonymph	1.93 $\pm$ 0.124
Pre-oviposition period	1.34 $\pm$ 0.233
Oviposition period	17.48 $\pm$ 2.707
Post-oviposition period	2.08 $\pm$ 0.168
Fecundity per female	37.80 $\pm$ 3.840
Adult longevity	
Female	21.00 $\pm$ 2.690
Male	8.55 $\pm$ 0.985

\* Mean of 20 observations

comparatively shorter female and male longevity might be due to the variation in environmental condition under which the study was carried out and also to difference in prey host. The fecundity per female was  $37.8 \pm 3.84$  eggs. Reduction in the fecundity was mainly due to reduced ovipositional period.

The larvae were hardly found to be feeding while protonymph fed on an average  $3.2 \pm 0.63$  eggs and  $0.3 \pm 0.48$  larva and deutonymph fed an average of  $8.37 \pm 0.73$  eggs,  $0.88 \pm 0.60$  larva,  $0.71 \pm 0.71$  nymphs and  $0.55 \pm 0.52$  adults of the prey per day. The adult female fed on an average  $14.22 \pm 0.66$  eggs,  $2.41 \pm 0.87$  larvae,  $1.72 \pm 0.57$  nymphs and  $1.05 \pm 0.97$  adults of the prey. The adult males fed on an average of  $3.86 \pm 0.98$  eggs,  $0.71 \pm 0.95$  larva and  $0.5 \pm 0.84$  nymph within 24h. All stages of the predator preferred to feed on the eggs of the prey. The other stages of *T. macfarlanei* were also fed by the predator but at very low number, mostly when they accidentally came in contact with them when eggs were distributed sparsely. The findings of Mallik (1974), Akimov and Kolodchka (1986), Manjunatha (1988) and Anil (1990) confirm the present findings and lead to the conclusion that *A. longispinosus*, was primarily an egg predator though it fed on all other stages of the prey.

The protonymph and deutonymph fed on an average  $4.22 \pm 0.53$ , and  $14.22 \pm 0.83$  eggs respectively during their development and adult female and male destroyed on an average  $17.22 \pm 0.97$  and  $7.11 \pm 0.75$  eggs in a day. The findings of Mallik (1974) and Anil (1990) regarding the feeding potential of larvae, nymphs and adults differed slightly with the present investigation. These differences might be due to difference in the prey species.

A striking feature observed in the present study was a slight reduction in developmental periods of all stages when compared to studies conducted by Anil (1990). The preference of different stages of the predator to feed on the prey eggs confirms that *A. longispinosus* is primarily an egg predator. The adult female predator devoured more prey than other stages of the predator.

**KEY WORDS :** *Amblyseius longispinosus*, *Tetranychus macfarlanei*, biology, feeding potential, preference

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