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Biology of the Predatory Thrips, *Scolothrips indicus* Priesner

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ABSTRACT

The life history of the predatory thrips (*Scolothrips indicus* Priesner) was studied in laboratory during August and December, 1981. The egg of the thrips was inserted into the intervenal leaf tissue, the larva had two developmental stages. A pre-pupal period was observed before pupal stage. The male and female were demarcable at this stage. The male had a narrow or spinose abdomen and was shorter than female, The developmental period from egg to adult was 8.24 and 12.41 days during August and December respectively. The newly emerged adult was translucent white in apperance. The red pigmentation of the body was distinct after two days of ecdysis. The reproduction of the thrips was found to be parthenogenetic as well as bisexual. The effect of a lower temperature prevailing in December was responsible for increasing the longevity of the thrips.

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INTRODUCTION

Thrips are also known to predate on phytophagous mites. Ananthakrishnan (1969) reported that larva of *Scolothrips indicus* Priesner could consume 55 eggs, 34 larvae, 7 nymphs and 6 adults of the spider mite, *Panonychus ulmi* in 3 days. Lal (1977) found *S. indicus* to feed on the mite, *Eutetranychus orientalis* (Klein). Dhooria (1980) reported that the larvae of the predatory thrips fed on eggs, larvae and protonymphs of citrus mite and adults fed on all stages of mites. The predatory thrips *S. indicus* are very wide spread among the spider mite, *Tetranychus macfarlenai* B & P of cotton. The paper deals with an attempt on the study of bionomics of this species of predatory thrips.

MATERIALS AND METHODS

The biology of *Scolothrips indicus* was studied in laboratory at the Gujarat Agricultural University Campus of Navsari (South Gujarat) during August and December, 1981. The study was carried out in small plastic containers (3.4 cm in diameter and 2.3 cm in height). The absorbent cellucotton was

put circularly to fit into the container. This was moistened with water and a cowpea leaf was cut circularly to fit on the cotton disc. Fifty individuals were studied from larva to the death of the adult separately. Eggs, nymphs and adults of *T. macfarlanei* were supplied to the thrips. The durations of incubation, stage I larva, stage II larva, pupa, adult and longevity were observed. The morphometrics of all the stages were measured. The results are discussed below.

RESULTS AND DISCUSSION

Egg : The egg of *S. indicus* was inserted in the intervenal area of leaf tissue. The egg in the tissue measured 190.46 ± 17.27 μ in length and 101.57 ± 15.70 μ in breadth (Table 1). The colour of the egg was white, transparent and the shape was oval. The incubation period was observed to be 3.26 ± 0.22 days at mean room temperature 31.64°C (31–34°C) and a relative humidity of 85.31% (77–92) during August and 4.56± 0.50 days at 25.60°C (22–28°C) and 56% R. H. (42–69) during December, 1981 (Table 2). Earlier Gilstrap and Oatman (1976) reported the incubation period of *S. sexmaculatus* Pergande as 7.20 days at 26.70°C and 50% R. H.

Larva : The larva reptured the wall of the chorion of egg transversely and emerged by means of peristaltic contractions of the abdomen. The larva had only two developmental stages as there was ecdysis between the two. The larva was found to feed on all stages of the spider mite.

(i) The first stage larva : The larva was translucent white in appearance measuring 506.83 ± 52.25 μ in length and 243.99 ± 41.0 μ in breadth (Table 1). The duration of this stage was 1.69 ± 0.16 days at 31.64°C (31–34°C) and 85.31% (77–92) R. H. during August and 3.07 ± 0.54 days at 25.50°C (22–28) and 56% (42–69) R. H. during December (Table 2). Gilstrap and Oatman (1976) observed it as 2.80 days at 26.70°C and 50% R. H. with *S. sexmaculatus*.

(ii) The second stage larva : The ecdysis was initiated with a transverse rupture of the dorsal integument of the prothorax with the shedding of cuticle with the help of peristaltic contractions of the thorax and abdomen. After moulting the size was considerably increased. The feeding activity also increased. The

TABLE 1

Morphometric differences of various instars of predatory thrips (*Scolothrips indicus* Priesner).

Stages	*Scolothrips indicus Priesner*	
	Length (μ)	*Width* (μ)
Egg	190.46±17.27	101.57±15.70
First stage larva	506.83±52.21	155.99±28.98
Second stage larva	850.81±89.00	243.99±41.00
Pupa	778.24±52.00	223.99±25.00
Adult : Male	759.95±46.00	139.42±15.00
: Female	1117.09±108.02	252.56±23.00

stage measured 850.81 ± 89 μ in length and 243.49±41.0 μ in breadth(Table 1). The gut colouration of the larva turned slightly red for some time after feeding on the spider mite. The nymphal stage showed a greenish tint. The nymph fed on all stages of the mite. There were no discernible morphological differences between sexes in the larval stage. The larger ones were generally females. The feeding stopped before a few hours of moulting.

The duration of the instar was 1.59 ± 0.16 days at 31.64°C (31–34) and 85.31% (77–92) R. H. during August and 2.48 ± 0.57 days at 25.60°C (22–28°C) and 56% (42–69) R. H. during December (Table 2). The results showed that the effect of varying temperature of the two seasons *i.e.*, August and December had a vital influence on the larval development of the thrips. Gilstrap and Oatman (1976) reported a similar finding of the second stage larval period to be 2.50 days at 26.70°C and 50% relative humidity.

Pre pupa : A pre-pupal period was observed between the second stage larva and the pupa. The pre-pupa looked translucent in appearance. It possessed wing pads posterior to the metathoracic coxae. The antennae were oriented anteriorry. The pre-pupa did not feed, but was mobile. The male had a narrow or spinose abdomen and was shorter than female.

The pupa : The pre-pua moulted to pupa. The wing pads further more extended. The antennae were oriented posteriorly. The female was bigger than male. The size of the pupa was 778.24 ± 52 μ in length and 223.99 ± 25 μ in breadth (Table 1). The duration of the pupal stage was 1.70 ± 0.16 days at 31.64°C (31–34) and 85.31% (77–92) R. H. during August and 2.30 ± 0.46 days at 25.60°C (22–28) and 56% (42-69) R. H. during December (Table 2) Gilstrap and Oatman (1976) reported the pupal period of *S. sexmaculatus* as 2.50 days at 26°C and 50% R. H.

Developmental period : The egg to adult developmental period was worked out as 8.24 days at 31.64°C (31–34) and 85.31% (77–92) R. H. during August and 12.41 days at 25.60°C (22–28) and 56% (42–69) R.H. during December (Table 1). The data clearly indicated that higher temperature and humidity enhance total development. Glistrap and Oatman (1976) reported that the egg to adult development was 16.0 days at 26.70°C and 50% R. H.

Adult : The pupae turned slightly brown and lost its transluscent appearance before a few hours of moulting. The moulting was initiated with thoracic and abdominal peristaltic contractions so that a transverse rupture of the pupal cuticle developed at the posteroir edge of the prothorax. The head was oriented in an episthognathus position and the body was arched with its apex at the pronotum. The newly emerged adult was transluscent white in appearance with wing bristles initially oriented anteriorly but were appressed to the wing structure. The characteristic three dark grey spots on each of the wings became visible after a period of two hours of moulting. Antennal segments, parts of tibia and tarsus of each leg as well as two circular areas on the dorsum of the prothorax developed a dusky grey colouration within a day or two after ecdysis. Similarly, each abdominal tergite was also having a

distinct red pigmentation two days after ecdysis. These transverse bands of pigmentation further darkened to an amber colour in advancement of age. The adult male thrips measured 759.95 ± 46 μ in length and 139.42 ± 15 μ in breadth, while a female measured as 1117.09 ± 108.02 μ in length and 252.56 ± 23 μ in breadth (Table 1).

Mating of the thrips was observed after 5 to 10 hours of final ecdysis of male and a short quiescence period of the female after moulting. The genital opening of the female was found to be situated in the postereoventral area. The male intromitent organ was protrusible from the tip of the abdomen. Males were found to be polygamous as they were observed mating with many females. Unmated females generally produced male progeny. It was thus a case of facultative arrhenotoky.

The average adult period was 12.18 ± 4.01 days at 31.64°C (31–34) and 85.31% (77–92) R. H. during August and 16.25 ± 5.16 days at 25.60°C (22–28) and 56% (42–69) R. H. during December (Table 2). A prolonged adult period was observed during the period of December which is due to the low temperature and humidity prevailing during the season.

Oviposition : The female arched her abdomen slightly and brought the tip of the ovipositor into contact with the leaf. Then the eggs were discharged and inserted into the intervenal leaf tissue. The fecundity and oviposition could not be worked out because of the peculiar habit of egg laying.

Life longevity: The longevity of the thrips was worked out as 19.58 ± 3.46 days at 31.64°C (31–34) and 85.31% (77–92) R. H. during August and 28.38 ± 6.48 days at 25.60°C (22–28) and 56% (42–69) R. H. during December (Table 2). The total

TABLE 2

Life history of the predatory thrips, *Scolothrips indicus.*

Particulars	*Duration (days)*	
	August	*December*
Mean temperature (°C)	31.64 (31–34)	26.34 (22–29)
Mean relative humidity (%)	85.31 (77–92)	61.26 (42–76)
Incubation period	3.26±0.22	4.56±0.50
Larval period : Stage I	1.69±0.16	3.07±0.54
Stage II	1.59±0.16	2.48±0.57
Pupal period	1.70±0.16	2.30±0.46
Developmental period	8.24	12.41
Adult period	12.18±4.01	16.25±5.16
Longevity	18.58±3.46	28.38±6.48

longevity of the thrips was also governed by the effect of temperature and humidity. There was 10 days increase in longevity when the temperature reduced by 6°C and humidity by 29%.

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