

Biology of *Gynaikothripskarnyi* Bagnall, the marginal gall forming thrips of Pepper*

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One of the important pests affecting pepper in Kerala is *Gynaikothripskarnyi*. It was first recorded by Bagnall (1914) from Ceylon and subsequently by Ananthakrishnan (1952) in India. No information is available on the biology and bionomics of the insect. The present paper embodies results of studies conducted on the biology of the thrips in the Agricultural College, Vellayani, during 1962-63.

The adult thrips required for the studies were collected from the field from leaves showing characteristic marginal galls formed by the thrips. Tender apical shoots of pepper vine bearing leaves with the marginal folds were collected and these folds were cleaned all stages of insect very gently with a soft camel hair brush taking care not to injure the leaves. These apical shoots were kept fresh by steeping the cut tips in water contained in specimen tubes. A few adult thrips, both male and female, collected from the field were put on the leaves for egg laying. The shoots with the thrips were then kept inside hurricane chimney with the top opening

closed with muslin cloth. The eggs laid were counted and removed to separate shoots to observe the biology.

Observations on the biology

Mating and Oviposition

Adults mate 16-24 hours after emergence, copulation lasting for two minutes. Oviposition commences 1-2 days after mating. Eggs are laid singly within the marginal folds or outside. Those laid outside are pushed within the folds subsequently by the mother thrips. The eggs are collected in groups of 10-30 or more at several places within the fold. The female continues to oviposit for 4-5 days, laying on an average 3.07 eggs.

The egg (Fig. 1)

Egg when laid is creamy white in colour, becoming buff coloured at the time of hatching. It is elongated and rounded at both ends, measuring 0.38 mm. in length and 0.15 mm. in width. Surface of the chorion is sculptured with hexagonal markings. Incubation period of eggs varies from 6-8 days.

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TABLE I

Stage	Duration (in days)		Measurements in mm.		
	Range	Average	Length	Width	Antenna
Ess	6-8	7.3	0.38	0.15	
Larva : 1st instar	4-7	5.5	0.68	0.21	0.15
2nd instar	4-7	5.0	0.96	0.32	0.26
Prepupa	2-2	2.0	1.29	0.35	0.13
Pupa	2-3	2.6	1.50	0.40	0.27
Adult	7-9		1.55	0.35	0.36

The immature stages

The duration, body measurements and length of antenna, of the different instars are given in Table I. During metamorphosis the insect undergoes two nymphal instars, a prepupal instar and a pupal instar before becoming the imago, taking on an average 5.5, 5.2 and 2.6 days respectively. The first instar nymph (Fig. 2) is whitish in colour with reddish eyes and sluggish movements and it remains inside the leaf folds. The second instar nymph (Fig. 3) is creamy white in colour with the head, pronotum and last three abdominal segments dark. This is the most active stage in the life cycle and it often comes out of the marginal folds moving on the exposed leaf surface. This nymph moults to give rise to the prepupa. The prepupa (Fig. 4) is uniformly yellowish white in colour with reddish eyes. Antennae are stout, stumpy, and short and are bent outwards with the tip pointed and segmentation indistinct. The prepupa is sluggish in habit and feeds during the earlier part of the instar. On moulting, the prepupa is transformed into the pupa. The pupa (Fig. 5) is whitish in colour. The wing buds which are well

developed also are white in colour in the earlier stage, but turn dark later. The antennae are bent back and held closely around the head as a cap. The pupa is more active than prepupa and is seen moving about on the leaf.

The Imago (Fig. 6)

Immediately on emergence the adult is uniformly white in colour. Gradually head, thorax and tergal plates of abdomen turn black in colour and the scape and pedicel of antenna and femur and lip of thoracic legs, light brown. In a day the adult becomes completely black. The adults are very active in their habitats moving about swiftly. They can fly short distances, which they do generally in the evenings. During the brighter parts of the day, they remain inside the marginal galls. They live for 7-9 days inside the leaf galls.

Damage caused

As a result of the feeding activities of the thrips, marginal galls are formed on the pepper leaves (Fig. 7). The thrips first feed on the underside of the leaf at points slightly interior to the margin. These points lie in a line parallel to the leaf

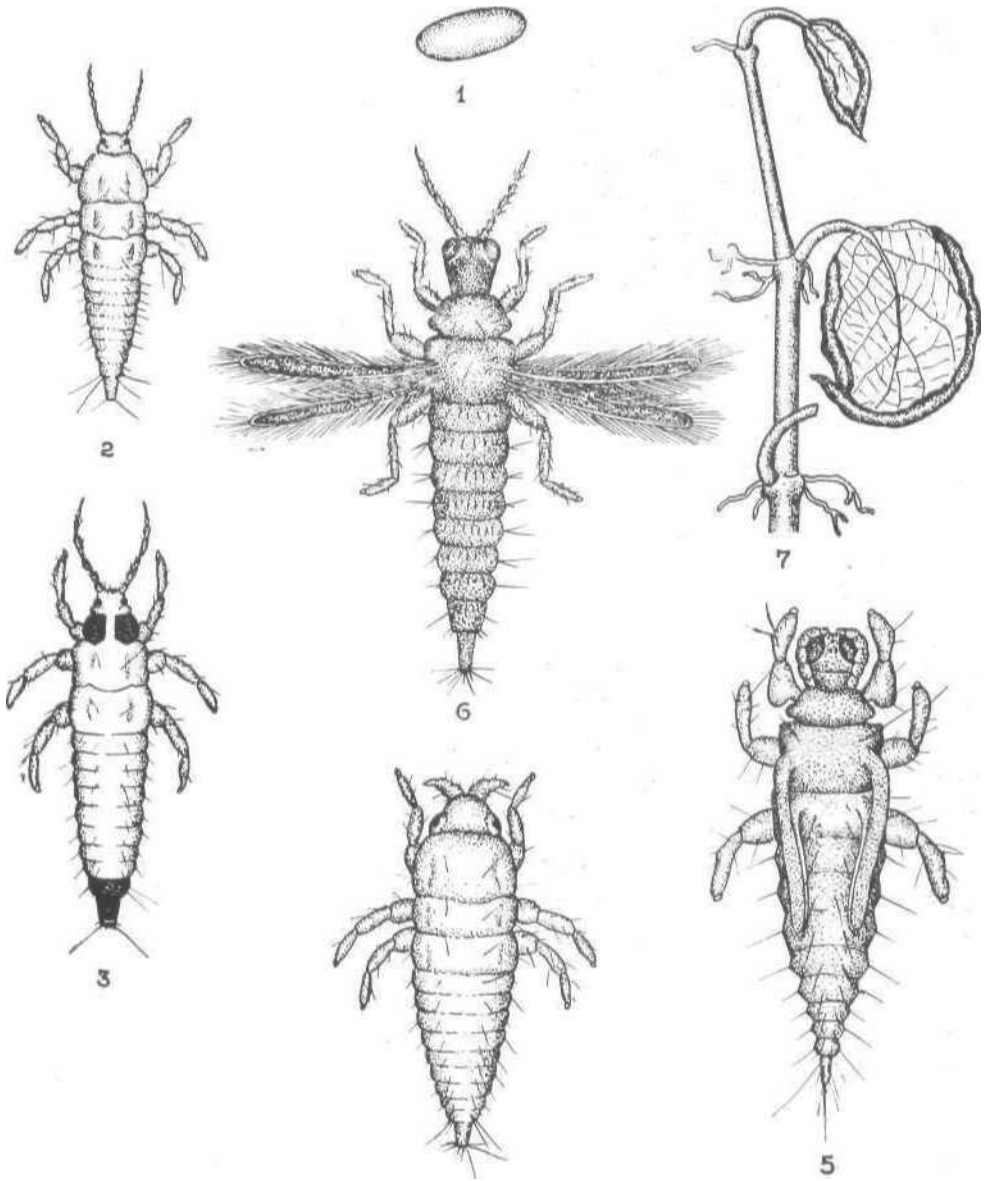


Fig. 1—7 Life stages of *Gynaikothrips karnyi* Bagnall.

Fig: 1—7

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|-------------------------|------------------------------------------|
| 1. Egg. | 5. Pupa. |
| 2. First instar nymph. | 6. Adult. |
| 3. Second instar nymph. | 7. Pepper leaves showing marginal galls. |
| 4. Prepupa. | |

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margin. The points at which feeding has taken place gradually become thickened as a result of which the margin of the leaf gets folded downwards and inwards till it touches the lower leaf surface, enclosing a tubular cavity within. The thrips may also feed on the general leaf surface and these feeding points become thickened areas, concave above and convex below.

Histological studies have shown that the normal healthy portion of the leaf has 2-3 layers of palisade cells while the fed areas have 6-8 layers of cells. The chlorophyll contents get reduced in the affected regions. Thus it appears that some factors, may be a chemical factor, the source of which may be the saliva of thrips, causes hyperplasia or proliferation of the cells. This results in the thickening of the leaves along the line of feeding of the thrips, which in turn causes the formation of the marginal folds.

As a result of attack by thrips, leaves become undersized. In cases of severe attack, whole leaves become completely crinkled, malformed and pale in colour. Both the older and younger leaves are affected and the growth of the plant is arrested and it becomes stunted.

Status as a pest

This is a persistent pest occurring throughout the State, in almost all pepper

growing areas. The damage caused by the thrips to leaves affects the vigour of the growing shoots. In severe cases of attack the whole plant may become stunted, affecting adversely the formation of spikes. The thrips attack both young, as well as grown up vines.

Natural enemies

An anthocoreid bug and a species of mite have been observed as predaceous on this thrips. Both these species of predators are found present within the marginal galls feeding on the larval, prepupal and pupal stages of the thrips and never on adults.

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