

BIOLOGY AND PREDATORY HABITS OF THE LADY BIRD
BEETLE *STETHORUS KERALICUS* KAPUR
(COLEOPTERA: COCCINELLIDAE), PREDATORY ON THE
PALM MITE*

MARIAMMA DANIEL

Central Plantation Crops Research Institute, Regional Station,
Vittal 574 243, Karnataka State, India

ABSTRACT

Biology and predatory habits of the lady bird beetle *Stethorus keralicus* Kapur were studied. The beetle required 12-14 days to complete the life cycle from egg to adult. Eggs hatch out in 3.0-4.0 days. The larvae moult three times in 5.0-6.0 days. The pupal stage is completed in 3.5-4.0 days. The adults and larvae feed on all stages of the host mite. An adult consumes 2.41-6.46 mites per hour during a period of 24 hours.

INTRODUCTION

THE false spidermite *Raoiella indica* Hirst (Acarina: Tenuipalpidae) is a pest of the areca palm especially during summer months (Puttarudriah and Channa-Basavanna, 1953). It infests also the ornamental palm *Livistonia chinensis* (Kanta, Rai, and Lal, 1963), the date palm *Phoenix* (Gupta *et al.*, 1971), and the coconut palm. Puttarudriah and Channa-Basavanna (1956) had mentioned about some of the arthropod predators of areca mites which included *Stethorus parcepunctatus* and *S. tetranychii*. Though *Stethorus* species have been reported as predators of the main groups of mites, their predatory habits have been recorded on mainly tetranychid mites only (McMurtry, Huffaker, and van de Vrie, 1970; Moutia, 1956).

In 1961, Kapur described from south Kerala (India) a new *Stethorus* species, *S. keralicus*, as a predator of *Raoiella indica*, a false spider mite. *S. keralicus* is allied to *S. pauperculus* Weise, but is distinguished from the latter by the uniform punctations on the pronotum and by the structure of the genitalia of *S. keralicus*. In *S. pauperculus* the puncture are coarse and navel-like at the sides of body. It is the smallest in size

in the genus (Kapur, 1961). In our laboratory we have found *S. keralicus* to be the most important of the six predators observed on *R. indica*.

MATERIALS AND METHODS

The observations were made in our laboratory during February-March (26-34°C temperature and 64-85% relative humidity). The predator was reared in microcages made of cork sheet and glass sheet (5 × 5 cm size) into which a portion of the mite-infested areca leaflet could be inserted. Observations on the development of the different stages, feeding habits, etc., were made on them.

RESULTS AND DISCUSSION

The adult beetles measure 0.996 × 0.618 mm (Table I) and possess shining black colour and rounded oval and convex body. The body is covered with a greyish coloured suberect pubescence 0.010-0.015 mm long. For the first one hour after emergence from the pupal case, the whole body excepting the head is pale white in colour; it then turns light brown, and finally black. Antennae, tibiae, and tarsi are pale yellow in colour.

*Contribution No. 112, CPCRI Regional Station, Vittal.

TABLE I
Measurements of *S. keralicus* (in mm)

Stage		Range	Mean*
Adult	length	0.919—1.073	0.996
	width	0.521—0.674	0.618
Egg	length	0.316—0.367	0.356
	width	0.166—0.183	0.179
I instar larva	length	0.505—0.650	0.573
	width	0.137—0.199	0.170
Head capsule (I instar larva)	width	0.091—0.133	0.110
Pupa	length	0.983—1.100	1.026
	width	0.650—0.816	0.698

* Of 10 observations.

Eggs are cream coloured and elongate oval in shape with 0.356×0.179 mm in size. They are laid singly in a vertical position, generally among the host eggs. The number of eggs varies from 6–23 per leaflet depending on mite density. The incubation period is 3.0–4.0 days long (average 3.6 days). Eggs are transparent and granular in appearance in the first two days of development. Later, they become opaque. The two eye spots of the larva can be seen through the egg shell at this stage.

The larvae emerge with the head first through a longitudinal slit made on the upper surface of the egg shell. The first instar larvae are white in colour and measure 0.573×0.170 mm. The later instars are pale white in colour. The surface of the body is covered with black tubercles with four rows on the dorsal side. The dark coloured contents of the alimentary canal are visible through the larval body. The larvae move about in search of food immediately after their emergence. The prey is detected by actual contact. The larvae puncture the egg shell or body wall of the mites and suck the fluid by alternate sucking and regurgitation till the egg/body contents are exhausted. Second stage larva can consume one egg or nymph in 3–5 minutes. First instar larvae consume about 30 host eggs or 8–16 prey mites of all stages in a day. The second and third instar larvae consume 13–17 and 30–64 mites per day, respectively.

The larval period lasts 5–6 days during which time the larvae moult three times. The fully grown ones attach themselves to the leaf surface by their abdominal end and remain quiescent for 10–15 hr before pupation. The final instar larvae measure 1.533–2.039 mm in length.

The pupae are black in colour and possess fine hair-like setae all over the body. The legs and wing pads of the adults are discernible in the pupae also. The last larval skin is seen to be attached to the posterior end of the pupal body. The pupal stage lasts 3.5–4.0 days. The pupae measure 1.026×0.698 mm. An infested leaflet may contain upto 45 pupae.

Both adults and larvae of this predator feed on all the life stages of the host mite. Adults are active fliers and they concentrate in areas where the prey occurs in plenty. More than 100 beetles may be found on a single heavily infested areca leaflet. An adult requires only 1–3 min to prey on a mite and less than one minute to feed on an egg. An adult consumes 2.41–6.46 mites per hour during a period of 24 hr (mean of 15 observations).

Generally, the population of the predator builds up during October–May when the pest occurs in serious proportions. The pest is virtually absent during monsoon months as is the predator. The lady bird beetle *S. keralicus* appears to be specific to *R. indica* in its food preference. It does not prey on the tetranychid mite, *Oligonychus indicus*, which often occurs in areca palm in association with *R. indica*.

ACKNOWLEDGEMENTS

I thank the Director, Zoological Survey of India, Calcutta, for confirming the identification of *Stethorus keralicus*.

REFERENCES

1. GUPTA, S. K., SIDDHU, A. S., DHOORIA, M. S., AND SINGH, G. 1971. Preliminary note on the phytophagous and predatory mite fauna of the Punjab and Himachal Pradesh. *Sci. and Cult.* 37: 296–299.
2. KANTA, S., RAI, B. K., AND LAL, R. 1963. Laboratory evaluation of the toxicity of pesticides to palm mite *Raoiella indica* Hirst. (Tenuipalpi).

- dae = Phytoptipalpidae = Acarina). *Indian Coconut J.* 16: 63-66.
3. KAPUR, A. P. 1961. A new species of *Stethorus* Weise (Coleoptera: Coccinellidae) feeding on arecanut palm mites in Kerala, Southern India. *Entomophaga* 6: 35-38.
 4. McMURTRY, J. A., HUFFAKER, C. B., AND VAN DE VRIE, M. 1970. Ecology of tetranychid mites and their natural enemies. A Review: I. Tetranychid enemies. Their biological characters and the impact of spray practices. *Hilgardia* 40: 331-390.
 5. MOUTIA, A. L. 1958. Contribution to the study of some phytophagous acarina and their predators in Mauritius. *Bull. Ent. Res.* 49: 59-75.
 6. PUTTARUDRIAH, M. AND CHANNABASAVANNA, G. P. 1953. Some new insect and mite pests of areca palm in Mysore. *Month. Bull. Indian Central Arecanut Committee* 4(5): 71-74.
 7. PUTTARUDRIAH, M. AND CHANNABASAVANNA, G. P. 1956. Some new insects and mites on areca palm in Mysore. II. *Arecanut J.* 7(1): 9-10.