

**OBSERVATIONS ON THE INDIGENOUS PREDATORS OF THE LACE BUG  
*STEPHANITIS TYPICA* (D.) (HETEROPTERA: TINGIDAE)  
THE VECTOR OF ROOT (WILT) DISEASE OF COCONUT PALM\***

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Searches for the natural enemies of the lace bug, *Stephanitis typica* were carried out from July 1997 to June 1998 at three locations in Kerala. Fifteen insect and twenty eight spider species were found feeding on *S. typica*. Among the insect predators, *Endochus inornatus* (Stal.), *Euagoras plagiatus* Burmeister, *Occamus typicus* Dist., *Rhinocoris fuscipes* Fabr., *Geocoris* sp., *Stethoconus praefectus* D. and *Ankylopteryx octopunctata octopunctata* (Fabr.) were the important ones. All these, except *S. praefectus* are new records of predators of *S. typica*.

### INTRODUCTION

The lace bug, *Stephanitis typica* (Heteroptera: Tingidae) a pest of coconut palm in India, is one of the proved vectors of coconut root (wilt) disease caused by phytoplasma (Mathen *et al.*, 1990). The nymph and adult stages of the bug suck the contents of leaf tissue from the abaxial surface resulting in the formation of yellow spots on the upper surface. The bug completes its life cycle in about 25 days with an average incubation period of 12 days and a total nymphal period of 13 days with five distinct instars. March to May and September to October are the two peak periods of abundance of *S. typica* in the field (Mathen *et al.*, 1968). Many natural enemies have been found associated with lace bugs under field conditions. Detailed studies were

carried out on the biology and feeding potential of the dominant predators so as to utilize them for the biological suppression of *S. typica*.

### MATERIALS AND METHODS

Searches for the natural enemies of *S. typica* were carried out at three locations viz., Ayiramthengu, Krishnapuram and Thottappally in Kerala for a period of one year from July 1997 to June 1998. Monthly collections were made, at random, from each of these centres and all the fauna associated with lace bug colony/lace bug infested leaves of coconut palms were isolated. The isolated fauna comprised mostly predators which were further tested for their feeding potential. Those with predaceous habits were then tested for their predator potential and biology in the laboratory at a temperature 26 to 33°C and relative humidity of 77 to 93 per cent.

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## RESULTS AND DISCUSSION

Thirty four species of insects and thirty eight species of spiders associated with the lace bug were collected. Among these, fifteen insects and twenty eight spider species were found feeding on *S. typica*. The important insect and spider predators are listed in Table 1. Among the insect predators *Endochus inornatus* (Stal.), *Euagoras plagiatus* Burmeister, *Occamus typicus* Distant, *Rhinocoris fuscipes* Fabr. and *Ankylopteryx octopunctata octopunctata* (Fabr.) were studied in detail for their biology and feeding potential.

Nymphs and adults of *Endochus inornatus* (Stal.) were collected from

Ayiramthengu and Thottappally. *E. inornatus* completed its development in 48 to 91 days. Females started egg laying 16 to 23 days after emergence (Table 2). Eggs were laid in groups of 10 to 38. Eggs are cylindrical and brown in colour with white operculum bearing a hair like structure. The feeding rates of the first three nymphal instars are given in Table 2. Fourth and fifth instar nymphs, fed on lace bugs, did not moult into adults. Hence, these two instars were fed on *Corcyra* larvae.

Nymphs and adults of the reduviid predator, *Euagoras plagiatus* Burm. were collected from Krishnapuram. Adult bugs are dark brown in colour with two conspicuous spines

**Table 1. Insect and spider predators associated with *S. typica* on coconut**

Order/sub order	Family	Species	Predaceous life stage	Location
Heteroptera	Miridae	<i>Stethoconus praefectus</i> (D)	Nymphs, Adults	Ayiramthengu Krishnapuram Thoottappally
	Reduviidae	<i>Enochus inornatus</i> (Stal.)	Nymphs, Adults	Ayiramthengu Thottappally
		<i>Euagoras plagiatus</i> Burmeister <i>Occamus fuscipes</i> Distant	Nymphs, Adults Nymphs, Adults	Krishnapuram Thottappally
		<i>Rhinocoris typicus</i> Fabr.	Nymphs, Adults	Krishnapuram
	Lygaeidae	<i>Geocoris</i> sp.	Nymphs, Adults	Thottappally
Neuroptera	Chrysopidae	<i>Ankylopteryx octopunctata octopunctata</i> (Fabr.)	Larvae Adults	Ayiramthengu Krishnapuram
Dermoptera	Chelisochidae	<i>Chelisoches morio</i> (Fabr.)	Nymphs, Adults	Krishnapuram
Araneae	Salticidae	<i>Phidipps</i> sp.	Adults	Krishnapuram
	Teragnathidae	<i>Tetragnatha andmanensis</i> Tikader	Nymphs Adults	Ayiramthengu Thottappally
		Unidentified	Nymphs Adults	Ayiramthengu Krishnapuram Thottappally

**Table 2. Longevity and fecundity of reduviid predators**

Species	Egg to adult period (days)	Fecundity (Eggs laid/female)	Oviposition period (days)
<i>Endochus inornatus</i>	75.0 ± 26.91 (48 - 91)	291.0 ± 45.88 (230 - 355)	87.2 ± 6.05* (80 - 96)**
<i>Euagoras plagiatus</i>	59.2 ± 5.38 (44 - 70)	258.0 ± 69.40 (176 - 319)	71.6 ± 23.86 (46 - 96)
<i>Occamus typicus</i>	56.4 ± 5.03 (49 - 62)	Not known	Not known
<i>Rhinocoris fuscipes</i>	36.0 ± 4.5 (31 - 42)	115.75 ± 15.67 (98 - 135)	39.75 ± 4.65 (35 - 46)

\* mean value ± S.D.; \*\* figures in the parenthesis denote the range

on the dorsal side of thorax in both sexes. *E. plagiatus* completed its development between 44 and 70 days in the laboratory (Table 2). Females started egg laying five to eight days after emergence. A single female laid 176 to 319 eggs within an oviposition period of 46 to 96 days. Eggs, laid singly were triangular in shape, golden brown in colour and with a cap like white operculum. The first four instars consumed about 240 lace bugs (Table 3). During fifth instar, in order to complete development, *Corcyra* larvae (3.0 per predator) were provided. Adult *E. plagiatus* consumed eight to 10 lace bugs per days in the laboratory.

*Occamus typicus* Distant was collected from coconut palms at Thottappally. Adult bugs are brownish green in colour. Development was completed in 49 to 62 days with an egg period of six to seven days (Table 2). There were five

nymphal instars lasting for 43 to 55 days. Eggs brown coloured and cylindrical in shape were laid in groups. The nymphs consumed lace bugs during first to fourth instars and fifth instar consumed *Corcyra* larvae and readily moulted into adults. The adult bugs consumed three to five lace bugs per day in the laboratory (Table 3).

Eggs and nymphs of *Rhinocoris fuscipes* Fabr., a reduviid predator, were collected from coconut palms at Krishanapuram. Adult bugs are orange-red in colour. Developmental period of this predator, ranged between 31 and 42 days (Table 2). There are five distinct nymphal instars with a duration of 25 to 34 days. Female bugs laid 98 to 135 eggs within an oviposition period of 35 to 46 days (Table 2). Eggs were laid in batches of six to 38 and were seen cemented to the leaves. Eggs are brown in colour with white

**Table 3. Feeding rate of insect predators on *Stephanitis typica***

Predator	Number of <i>S. typica</i> consumed during nymphal and adult stages					
	I instar	II instar	III instar	IV instar	V instar	Adults
<i>E. inornatus</i>	24.58 ± 4.63 (20 - 28)	53.24 ± 14.58 (40 - 68)	103.67 ± 26.58 (74 - 130)	4.5 ± 0.0* (4 - 5)	5.0 ± 1.87* (5 - 7)	7.25 ± 0.96 (6 - 8)**
<i>E. plagiatus</i>	15.67 ± 5.25 (10 - 21)	32.15 ± 12.38 (20 - 44)	64.25 ± 14.75 (52 - 78)	127.47 ± 38.28 (91 - 163)	3.0 ± 0.0* (2 - 4)	9.0 ± 0.89 (8 - 10)
<i>O. typicus</i>	12.75 ± 2.5 (10 - 16)	26.0 ± 8.68 (15 - 36)	28.0 ± 8.04 (19 - 38)	56.75 ± 5.38 (50 - 63)	3.0 ± 0.0* (2 - 4)	4.0 ± 0.89 (3 - 5)
<i>R. fuscipes</i>	9.5 ± 4.20 (5 - 15)	21.5 ± 5.80 (15 - 29)	57.5 ± 25.0 (20 - 80)	185.0 ± 16.83 (165 - 205)	5.0 ± 0.0* (4 - 6)	5.2 ± 1.30 (4 - 7)

\* Larvae of *Corcyra cephalonica*; \*\* mean value ± S.D. and figures in parenthesis denote range

operculum. First to fourth instars consumed 205 to 329 lace bugs. For completing development they consumed four to six *Corcyra* larvae during fifth instar (Table 3). Adult *R. fuscipes* consumed four to seven lace bugs per day.

Larvae of *Ankylopteryx octopunctata octopunctata* (Fabr.) were collected from all the three locations. They were seen in the field throughout the year with a peak in April. The predator completed its developmental period in 22 to 30 days. Larval period was 14 to 18 days and pupal period lasted for five to seven days. Females laid pedunculate eggs in batches of 20 to 25 on coconut leaves. It is predaceous on all stages of lace bug. The larvae of the predator consumed six to 39 lace bugs per day in the laboratory. It also consumed 11 to 185 *Corcyra* eggs per day.

The above mentioned predators are new records on *S. typica* except *Stethoconus praefectus*. Combined with the already recorded mirid predator, *S. praefectus*, these can play a

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vital role in the suppression of *S. typica* populations in coconut plantations.

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