

**NATURAL ENEMIES OF BANANA LACEWING BUG,  
*STEPHANITIS TYPICA* (DISTANT) IN INDIA, INCLUDING  
FIRST REPORT OF *ANAGRUS* SP. (HYMENOPTERA:  
MYMARIDAE) AS ITS EGG PARASITOID**

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**ABSTRACT:** Natural enemies of the banana lacewing bug, *Stephanitis typica* (Distant) (Hemiptera: Tingidae) in India are documented. Diagnostic notes on *Stethoconus praefectus* (Distant), an obligate predator of *S. typica* with details of its other tingid hosts and host plants are provided. Two egg parasitoids, *Erythmelus panis* Enock and *Anagrus* sp. (Hymenoptera: Mymaridae) are reported as egg parasitoids of *S. typica* from Tamil Nadu and Manipur, respectively, the latter being the first record of this host association in the world.

**KEY WORDS:** Banana tingid, natural enemies, biological control

*Stephanitis typica* (Distant) (Hemiptera: Tingidae), commonly known as banana lacewing bug and coconut lacewing bug, is distributed in India, Sri Lanka, much of South-East Asia and the tropical west Pacific (CABI, 2017). Though it was originally recorded from banana (Distant, 1903), it is a major pest of coconut (Mathen et al., 1983) and also infests other host plants like turmeric, ginger, cardamom, etc. It is considered as only a minor, but common pest of bananas and plantains throughout India. It is found almost throughout the year on banana, but causes extensive leaf damage during the summer season. The extent of infestation ranges from mild to severe, but economic damage assessment of this pest has not been done on banana.

Adults and nymphs of *S. typica* feed on the lower surface of leaves on either side of the midrib and extensive feeding results in whitish to chlorotic spots on the corresponding upper surface of leaves, resulting in a very characteristic stippling pattern. On the lower surface, extensive dark brown to black marks due to the feeding marks and excreta of the bugs are seen. Mathen et al. (1983, 1988) and Tigvattnanont (1990) described the feeding sites of *S. typica* and its nature of damage on bananas and coconuts.

Domestic market for banana leaves in India is worth about Rs. 100 crores annually with very limited exports to Southeast Asian countries like Singapore and Malaysia (NRCB, unpublished data). As banana leaves are widely used for serving food and / or as disposable plates, use of chemical insecticides is not advisable if sufficient care is not taken to ensure residue-free produce. Spraying of systemic insecticides remains the only management option for this pest at present and its management on banana cultivated exclusively for leaf purpose remains a major problem during summer months. Mohanasundaram (1987) found only eight out of 73 varieties screened for resistance against the lacewing bug showed low levels of infestation. During our surveys for natural enemies of *S. typica* in

south and northeast India, two parasitoids and one predator were recorded, the details of which are presented in this paper.

## MATERIAL AND METHODS

Surveys were carried out in different banana growing regions of India during 2015–17 for banana lacewing bug and its natural enemies. Alternate host plants of the lacewing bug in banana ecosystem were monitored and documented. Lacewing bug infested leaves of banana were examined in the field for presence of natural enemies and leaves containing eggs of the pest were brought to the laboratory for further observations. Predators and egg parasitoids were collected, preserved and identified.

## RESULTS AND DISCUSSION

In this study, one predator and two parasitoids of the banana lacewing bug were recorded from different parts of India. A brief account of these species is given below with notes on their diagnosis, distribution, and hosts.

### 1. Predatory mirid, *Stethoconus praefectus* (Distant) (Fig. 1)

*Stethoconus praefectus* (Distant) (Heteroptera: Miridae: Deraeocorinae) was found feeding on *S. typica* in the banana fields at NRCB farm, Trichy. It is known to be an obligate tingid predator and it has been recorded earlier as feeding on *S. typica* on coconut in India (Mathen & Kurian, 1972), but its occurrence in banana ecosystem has not been studied in detail. Hoffmann (1935) recorded an unidentified mirid attacking *S. typica* nymphs on bananas in China, which “was almost certainly *S. praefectus*” (Schaefer & Panizzi, 2000). Cheng (1967) made observations on the same mirid on *S. typica* in Taiwan. Mathen and Kurian (1972, 1980) studied the life history of *S. praefectus* and its predation on *S. typica*. Livingstone (1968) mentioned that the mirid predator cited as *Appolodotus* preying on *Tingis buddleiae* in India probably also was *S. praefectus* and found *Corythauma ayyari*, *S. typica*, and *Naochila sufflata* to be its common hosts. Ganga Visalakshy and Jayanth (1994) reported it as a predator of lantana tingid, *Teleonemia scrupulosa* (Stal). *Stephanitis subfasciata* is preyed by *S. praefectus* in Japan (Yasunaga et al., 1997). Recently it was accidentally introduced in North America and recorded as a predator of avocado lacewing bug, *Pseudacysta perseae* (Heidemann) (Henry et al., 2009; Holguin et al., 2009).

**Diagnosis:** General coloration dark brown mottled with pale yellowish brown and white on pronotum and hemelytra. Body form somewhat spindle shaped, widest around middle and narrowed at both ends, females with broadly rounded hemelytra, males narrower. Head quadrate with prominent eyes. Antenna 5-segmented, segment I brown, II yellowish-white with apical fourth dark brown, segment III white, apically dark brown, segment IV dark brown. Scutellum strongly conical to nearly pyramidal, posteriorly curved. Legs white except all femora darker yellowish brown. Nymphal stages whitish with reddish brown antennae. Henry et al. (2009) described and illustrated this species in detail.

**Alternate hosts:** In our surveys, *Abutilon indicum* and *Solanum* sp., which are host plants of two other common lacewing bugs, *Urentius euonymus* (Distant) and *U. hystricellus* (Richter) (Tingidae), respectively, were found to support small populations of *S. praefectus*. *Abutilon indicum* is a common weed in the banana

plantations at NRCB and nearby places and it apparently serves as a reservoir of the predator. Most of the available information on *S. praefectus* in India is on coconut and there is hardly any information on its efficacy against *S. typica* in banana ecosystem and more studies are needed to evaluate its potential in banana ecosystem.

## 2. Parasitoids of *S. typica*

In our surveys, two egg parasitoids of *S. typica*, namely, *Erythmelus panis* Enock and *Anagrus* sp., were recorded from Tamil Nadu and Manipur, respectively.

### (a) *Erythmelus* spp.

We recorded *Erythmelus panis* Enock from NRCB farm, Trichy, Tamil Nadu and the levels of parasitism were very low. *Erythmelus panis* is distributed in the Oriental, Palaearctic and Afrotropical regions and is known to be a parasitoid of *S. pyri* (Noyes, 2017).

Yacoob & Livingstone (1983) recorded *Erythmelus teleonemiae* (Subba Rao) (as *Paralleleptera polyphaga* Livingstone & Yacoob, 1988) as an egg parasitoid of *S. typica*, but this host record is not listed in the Universal Chalcidoidea Database (Noyes, 2017). The Universal Chalcidoidea Database (Noyes, 2017) lists the parasitoids of three other species of *Stephanitis*, namely, *S. pyri*, *S. pyrioides* and *S. takeyai*. *Erythmelus teleonemiae* is known only from India and Iraq. It is claimed to be the only mymarid egg parasitoid of tingids that has the largest number of host species. About 22 species belonging to 16 genera of tingids recorded on about 30 species belonging to 16 families of host plants, are known to be attacked by this species (Yacoob & Livingstone, 1983). *Urentius euonymus* on *Abutilon indicum* serves as a host of *E. teleonemiae* as well as *S. praefectus*. It is quite probable that *A. indicum* in banana plantations is a reservoir host for both *S. praefectus* and *E. teleonemiae*, though we could not collect *E. teleonemiae* in our surveys.

### (b) *Anagrus* sp. (Fig. 2)

Specimens of an indeterminate species of *Anagrus* were reared from the eggs of *S. typica* on banana leaves collected from Manipur in 2017. This constitutes the first record of *Anagrus* as an egg parasitoid of *S. typica*. It was not possible to identify the species as Indian species of *Anagrus* are in dire need of revision and available keys are not reliable to identify the species. *Anagrus takeyai* Gordh has been recorded on *S. pyrioides* and *S. takeyai*, mainly from America, Japan and Hawaii (Noyes, 2017).

Conservation of natural enemies appears to be a good strategy to control the pest, but detailed studies are required on the pest-natural enemy dynamics. Biocontrol and other alternate eco-friendly strategies for the management of *S. typica* need to be worked out to boost the export prospects for banana leaves from India.

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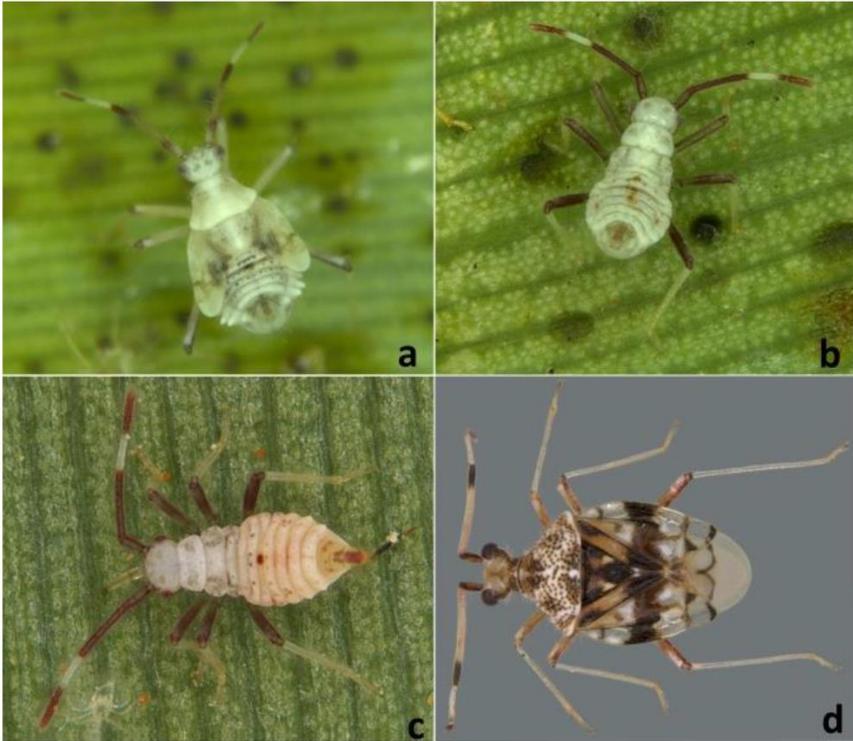


Figure 1. *Stethoconus praefectus* Distant, predatory on banana lacewing bug: a–c. nymphal stages; d. adult.



Figure 2. a, b, c. Eggs of banana lacewing bug covered by faecal matter; d. Lacewing bug eggs with emergence holes of *Anagrus* sp.; e. *Anagrus* sp.