Incidence of parasitic mite, *Bochartia* sp. on zoophytophagous mirid bug, *Nesidiocoris tenuis* Reuter (Heteroptera: Miridae) at tetra-trophic level on tomato in India

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ABSTRACT: Incidence of larvae of parasitic mite *Bochartia* sp. (Acarina: Erythraeidae) on zoophytophagous mirid bug, *Nesidiocoris tenuis* Reuter (Heteroptera: Miridae) is reported at fourth (tetra-) trophic level in the food chain comprising of tomato crop (first trophic level), insect pests viz., neonate larvae of *Spodoptera litura* and *Helicoverpa armigera* (second trophic level), predatory mirid bug, *N. tenuis* (third-trophic level).

KEY WORDS: *Nesidiocoris tenuis*; *Bochartia* sp; tomato; tetra-trophic level

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The structure, dynamics and function of food webs are influenced by parasites (Lafferty *et al*., 2008) and parasitism is more common than traditional predation as a consumer lifestyle (De Meeus and Renaud 2002). However, parasites are generally not represented in food webs due to incorporation of easy-to-observe species only and lack of interdisciplinary integration, propelling the need for a parasitic inclusive food web concept (Lafferty *et al*., 2008; Sukhdeo, 2012). Also, parasites are expected to drive an increase in species richness, trophic levels, and trophic chain length of the food web there by stabilizing community structure (Huxham *et al*., 1995; Thompson *et al*., 2005).

The present article reports the incidence of the parasitic mite, *Bochartia* sp. (Acarina: Erythraeidae) (Fig. 1A) on a zoophytophagous mirid bug, *Nesidiocoris tenuis* (Reuter) (Heteroptera: Miridae) in tomato agro-ecosystem. *N. tenuis* is a predator of several agriculturally important pests including *Bemisia tabaci*, *Frankliniella occidentalis*, *Tetranychus urticae*, *Spodoptera litura*, *Ephestia kuehniella* and *Tuta absoluta* (Sancheza, 2009). Despite its reputation as a predator, it is reported as a pest on different crops in India viz., sesame, tobacco, bottle gourds, tomatoes and cucurbits (Raman *et al*., 1984; Perdikis *et al*., 2009; Sridhar *et al*., 2012) in the absence of its insect hosts. Various hosts on which the parasite is reported include *Clavigralla gibbosa* Spinola in pigeon pea (Hemiptera: Coreidae) (Rawat *et al*., 1969), *Amrasca biguttula biguttula* (Shir.) in brinjal (Ghai and Ahmed, 1975), mango mealy bug, *Drosicha mangiferae* Green (Margarodidae: Hemiptera) (Tandon and Lal, 1976), citrus psylla, *Psylla murrayi* Mathur (Homoptera: Psyllidae) (Lahiri  and Biswas, 1982), Sorghum shoot bug, *Peregrinus*

![A](image1) ![B](image2) ![C](image3) ![D](image4)

Fig. 1. A. *Bochartia* sp.; B. *Bochartia* sp. on *N. tenuis*; C. On *O. oneratus*; D. On *Oxyopes* sp.
N. tenuis (Ashmead) (Homoptera: Delphacidae) (Kumar and Prabhuraj, 2006).

The incidence of parasitic mite, Bochartia sp. and N. tenuis was recorded from December 2011 till March 2013 at weekly intervals at the Indian Institute of Horticultural Research, Bangalore (N 12°58’ E 77°34’). Direct counting of the nymphs and adults of N. tenuis and its predation on the neonate larvae of H. armigera and S. litura whenever existing in the field were observed on 25 plants selected randomly from one acre area. The immature stages of the mites were recorded on both nymphs and its predation on the neonate larvae of N. tenuis (Homoptera: Delphacidae) and its natural enemies in Karnataka. J Pl Prot Environ. 3 (1): 95–100.

Various hosts of Bochartia sp. recorded in different crop ecosystems in addition to N. tenuis include, cow bug, Otinotus oneratus on Yellow Myrobalan (Terminalia chebula) (Fig. 1C); spider, Oxypotes sp. (Fig. 1D) on tomato (Solanum lycopersicum), little bee, Apis florea and butterfly, Eurema hecabe on Physic nut (Jatropha curcas). Up to five parasitic mites on a single host were found on O. oneratus. Kumar and Prabhuraj (2006) recorded these mites on sorghum shoot borer at tritrophic level. However, the present occurrence of the Bochartia sp. at the tetra-trophic level in the tomato ecosystem is reported for the first time.

The morphometric measurements of three parameters viz., total length, width and capitulum length of the mites (N=10) were undertaken using Olympus SZX7 stereomicroscope with Q-imaging software. The mean ± SD values obtained were 0.59 ± 0.17 mm (total length), 0.2 ± 0.09 mm (width) and 0.17 ± 0.06 mm (capitulum length). The specimens are deposited at NPIB, New Delhi with RRS no (981/12, 982-984/12).

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