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EDITORIAL

Conservation of the tea (*Camellia sinensis* (L.) O. Kuntze) ecosystem through enhancement of natural enemies of pests

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Tea (*Camellia sinensis* (L.) O. Kuntze), being its perennial and monoculture nature, provides a stable microclimate for various insect pests, which cause substantial loss of crop (Li *et al*., 2019). With the escalating cost of insect pest management and increasing concern about the adverse effects of the pesticide residues in manufactured tea, there is an urgent need to explore other avenues of alternate pest management strategies (Babu, 2011). In general, the tea plantations provide a stable microclimate and food supply for several notorious pests, such as insects, mites, and nematodes, etc. They also support an array of natural enemies in the ecosystem. Although there are numerous non-conventional methods available, pest control in the tea ecosystem was mainly achieved by the use of synthetic pesticides until today. Biological pest control methods are adopted globally in major crops to avoid the negative impact of synthetic pesticides (Gillespie *et al*., 2000). Several tea pests may be controlled by using natural enemies as biological control agents in an integrated pest management approach (Babu *et al*., 2011).

The natural enemy guild is dominated by predators in several ecosystems. Muraleedharan and Roy (2016) reported a total of 200 predatory arthropod species were recorded in the tea ecosystem. The overall species composition reflects the richness of arthropod natural enemies, *i.e.,* predators and parasitoids of tea pests, where the natural enemy to pest ratio is 1.7:1. The tea plantations in Northeast India harbour several species of coccinellids, such as *Cryptogonus bimaculatus, Juravia quandrinotata, J. opaca, Menochilus sexmaculatus,* and *Stethorus gilvifrons*, which feed on eriophyid mites, spider mites, aphids, and scale insects (Somchoudhury *et al*. 1995). The parasitoids, *Apanteles coedicius*, *Trioxys indicus,* and *Aphidus colemani*, have several hosts, like *Toxoptera aurantii* feeding on tea, and *Aphis gossipii* and *Aphis craccivora* on weeds in tea fields. The tea mosquito bug *H. theivora are* being preyed upon by *Chrysoperla carnea*, *Oxyopes* sp., *Plexippus* sp., *Phidippus* sp., and *Scymnus* sp. and *mantids*. Eggs of *H. theivora* were found parasitized by *Erythmelus helopeltidis* Gahan in South India (Sudhakaran and Muraleedharan, 2006). The activities of predators and parasitoids have been found to be high in Northeast India. In the areas of North Bengal, Roy *et al*. (2005) found 35 species of spiders and 25 species of coccinellids as natural enemies in the tea ecosystem, while 94 species of predators and 33 species of parasitoids were reported from the sub-Himalayan tea plantations of North Bengal, among which the predators, spiders and ladybird beetles, and among the parasitoid groups, Braconidae and Ichneumonidae, were dominant (Das *et al*. 2010).

***Sycanus collaris* (Fabricius):**

Reduviidae a large family that belongs to the order Hemiptera, are found to be efficient predators of different insect pests, preferably lepidopteran larvae (Ambrose *et al*., 2009). *Sycanus collaris, (*Fabricius), known as the assassin bug, all of its life stages efficiently feed on the target insect. The sequential predatory behaviour of the genus *Sycanus* on its prey is very active (Ambrose *et al*., 2009). *S. collaris is* found to feed on different hosts, like the tea red slug caterpillar, *Eterusia magnifica* (Butler) as well as the pupal stage of the tea looper, *Hyposidra talaca Walker*. During the winter period (December to February), when the tea plants are subjected to pruning, *S. collaris* forages for food and shelter in the un-pruned plots and shade trees. They preferred to shelter in small jungle trees associated with tea fields. The voracious predatory behaviour of *S. collaris* effectively prevented the increasing population density of *H. talaca* under field conditions. Sarkar *et al*., (2019). Sarkar *et al*., (2019) reported the predatory efficiency of *S. collaris* on the larvae of *H. talaca* and reconfirmed that the larger size of life stage *S. collaris* preferred by the later stages (IV and V instar larvae) to fulfill the nutritional requirements. Predatory behaviour of feeding preference highlights the vital role of this predator as an efficient biological control agent in the tea ecosystem. Conservation of this predator in the plantation belt would be useful in developing a bio-control-based looper pest management strategy in the tea ecosystem.

***Eocanthecona furcellata* (Wolff)**:

The stink bug, *Eocanthecona furcellata* (Wolff) is one of the important predator that has recently included in the field of biological control due to its potential to prey different orders of insect pests such as, lepidoptera,

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