New record of *Helopeltis bradyi* Waterhouse and *Pachypeltis maesarum* Kirkaldy (Hemiptera: Miridae) on tea *Camellia sinensis* L.O. (Kuntze) in southern India

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Abstract

Helopeltis theivora commonly called as tea mosquito bug (TMB) is considered as important pest of tea in South India. Extensive survey in tea plantations of Anamallais, recorded *H. bradyi* and *Pachypeltis maesarum* (Hemiptera: Miridae) causing considerable damage and were registered for the first time on tea. Their occurrence was seen in association with *H. theivora*. There was considerable variation among these species in size of the circular rings formed by rostral piercing, indicating that these three species can be easily demarcated based on the observation of feeding punctures even in field condition. As the dosage and recommendations of insecticides against TMB in tea in south India was pertaining only to *H. theivora* the addition of *H. bradyi* and *P. maesarum* will improve the future pest management strategies.

Keywords: Helopeltis, new record, punctures sucking pests, tea

Introduction

Tea, *Camellia sinensis* L.O. (Kuntze) is one of the major foreign exchange earning commodities in India. Tea industry cannot hope to compete successfully in the world market with its counterparts from other tea producing countries if it has to suffer handicaps in the form of serious pest problem affecting crop production (Rao, 1970). More than 300 species of insects and mites have been reported causing damage to tea. The important pests belong to the order Acarina, Thysanoptera, Coleoptera, Lepidoptera and Hemiptera (Muraleedharan and Chen, 1997). The distribution and abundance of tea pests are largely influenced by weather, altitude, crop variety and the cultural operations such as pruning, manuring, regulation of shade, use of pesticides, natural enemies of pests and economics of tea production (Muraleedharan, 1992). All parts of the plant, leaf, stem, root, flower, and seed, are fed upon by at least one pest species. The yield loss due to these pests may vary

from 5 to 55% and in some cases reaching upto 100% (Hazarika et al., 2009). Tea mosquito bug (TMB), *Helopeltis theivora* Waterhouse alone can cause 15-55% damage. Due to intensive feeding by nymphs and adults, leaves curl up and are badly deformed. Gradually these shoots dry up and almost the entire crop is lost (Sudhakaran, 2000).

Helopeltis has palaeotropical distribution extending from West Africa to New Guinea and Northern Australia. Of the 41 recognized species, 26 are restricted to Africa and 15 prevalent in Asia and Pacific region (Stonedahl, 1991).Three species of tea mosquito bug (TMB), *H. antonii*, *H. bradyi* and *H. theivora* were recorded in India (Sundararaju 1996; Srikumar et al., 2015). The severity of *H. bradyi* infestation was also reported in cashew plantations of Puttur, Karnataka region (Srikumar and Bhat, 2012). *Helopeltis* spp. has five nymphal instars that vary in size, colour and development of body parts. Longevity and fecundity vary depending on rearing conditions (Srikumar and Bhat, 2013).

The incidence *of H. theivora* which was restricted only to Vandiperiyar and Peermade (Kerala) areas and recently had spread in an alarming form in tea plantations of Anamallais, Valparai (Tamil Nadu).

Materials and methods

Extensive surveys were conducted in tea plantations of Anamallais (Coimbatore District, Tamil Nadu) (10º22´N latitude, 76º58´E longitude and 1065 m a.s.l) in order to identify pests of tea in this area (Figure 1). Survey was conducted in fortnightly interval for a period of two years from April 2014 to March 2016. Insects were collected using glass tubes (25 × 200 mm length) were preserved in 70% alcohol and brought to laboratory for identification.

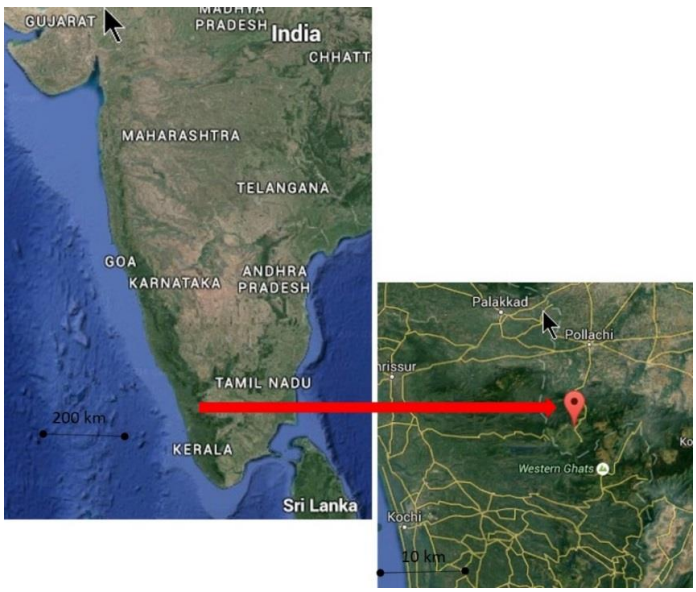

Figure 1. Map showing the Anamallais, Tamil Nadu tea plantations

Results and discussion

Helopeltis bradyi Waterhouse, 1886 and *Pachypeltis maesarum* Kirkaldy (Hemiptera: Miridae) causing considerable damage and were registered for the first time on tea (Figure 2). A total of 80 adults and nymphs of *H. bradyi* and 120 adults and nymphs of *P. maesarum* were found in 100 tea bushes sampled. Their occurrence was seen in association with *H. theivora* Waterhouse. Tea was reported as a host plant for *H. bradyi* (Stonedahl, 1991). But this pest remained unnoticed till date in Indian tea plantations. Alternate host plants recorded for *H. bradyi* was guava (*Psidium guajava* L.) and for *P. maesarum* was *Acalypha wilkesiana* (Euphorbiaceae). *Pachypeltis maesarum* was a minor pest mainly infesting betel vines, has of late become one of the serious pests of cashew in India (Bhat and Srikumar, 2012).

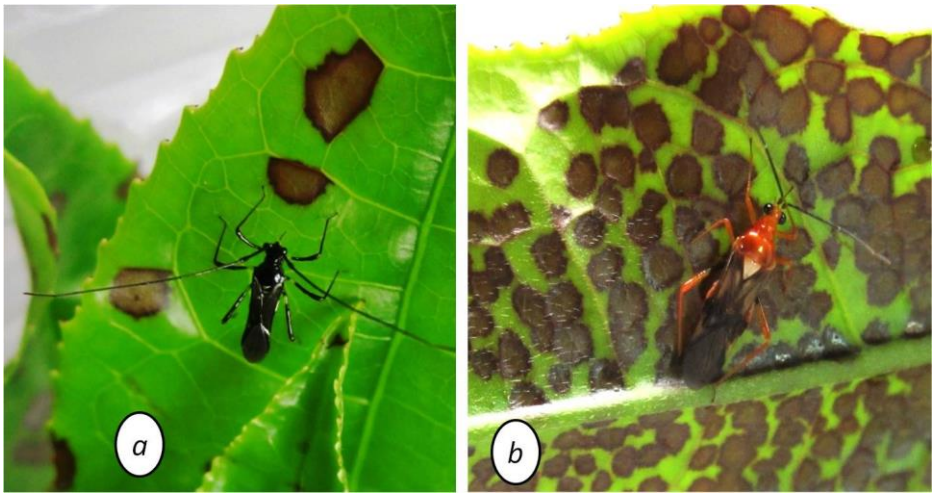

Figure 2. Adults of: a) *Helopeltis bradyi*., b) *Pachypeltis maesarum* feeding on tea

Adults and nymphs of *H. bradyi* and *P. maesarum* with their rostrum, pierce the tender leaves and suck the cell sap. Within two to three hours, a circular ring forms around the point of injury. The interior of the ring becomes light brown within a day. These rings appear as dark brown sunken spots after a day. Gradually they dry up and holes appear in their place. Severely infested leaves become deformed and curl up.

We observed there is considerable variation among these species in size of the circular rings formed by rostral piercing, indicating that these three species can be easily demarcated based on the observation of feeding punctures even in field condition. *Helopeltis bradyi* rostral probing caused large sized circular rings when compared to *H. theivora* and *P. maesarum.* The circular rings were merged and smaller in sized on *P. maesarum* feeding (Figure 3).

Figure 3. Difference in punctures caused: a) *H. bradyi.,* b) *P. maesarum* and c) *H. theivora* on tea

It was observed that feeding punctures made by adult females were comparatively larger than those made by males; during oviposition still large punctures were made (Sudhakaran and Muraleedharan, 2006). Laboratory observation suggested that the number of feeding punctures caused by different stages of these mirids also varied (Table 1). Fifth instar and adults made more damage to tea than other life stages. Number of punctures made by *H. bradyi* female was 112-132/shoot whereas *P. maesarum* made 196-249/shoot in 48h. The number of punctures per shoot varied with life stages and intensity of feeding (Way and Khoo, 1989).

Table 1. Number of feeding spots generated by rostal probing of *Helopeltis bradyi* and *P. maesarum* on tea

Period	No. of punctures/ shoot					
	H. bradyi			*P. maesarum*		
	5th Instar	Male	Female	5th Instar	Male	Female
24h	57-83	63-85	67-97	113-159	112-160	111-163
48h	94-145	105-146	112-132	189-243	198-240	196-249

Conclusion

As the dosage and recommendations of insecticides against TMB in tea in south India was pertaining only to *H. theivora* the addition of *H. bradyi* and *P. maesarum* will improve the future pest management strategies.

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References

Bhat, P. S., Srikumar, K. K. (2012) Record of *Erythmelus helopeltidis* Gahan (Hymenoptera: Mymaridae), an egg parasitoid from *Pachypeltis maesarum* (Heteroptera: Miridae) infesting cashew. Pest Management in Horticulture Ecosystems, 18 (1), 103-104.

Hazarika, L. K., Bhuyan, M., Budhindra, N. H. (2009) Insect pests of tea and their management. Annual Review of Entomology, 54, 267-284. DOI: 10.1146/annurev.ento.53.103106.093359

Muraleedharan, N. (1992). Pest control in Asia In: K. C. Wilson and M. N. Clifford eds. (2012) Tea: cultivation to consumption. London, Champan and Hall. 375-411.

Muraleedharan, N., Chen, Z. M. (1997) Pests and diseases of tea and their management. Journal of Plantation Crops, 25 (1), 15-43.

Rao, G. N. (1970) Tea pests in Southern India and their control. PANS Pest Articles & News Summaries, 16, 667-672. DOI: 10.1080/09670877009413434

Srikumar, K. K., Bhat, P.S. (2012) Field survey and comparative biology of tea mosquito bug (*Helopeltis* spp.) on cashew (*Anacardium occidentale* Linn.). Journal of Cell and Animal Biology, 6(14), 200-207. DOI: 10.5897/JCAB11.094

Srikumar, K. K., Bhat, P.S. (2013) Biology of the tea mosquito bug, *Helopeltis theivora* Waterhouse on *Chromolaena odorata* (L.). Chilean Journal of Agricultural Research, 73 (3), 309-314. DOI: 10.4067/S0718-58392013000300015

Srikumar, K. K., Bhat, P. S., Raviprasad, T. N., Vanitha, K., Krishna Kumar, N. K., Rebijith, K. B., Asokan, R. (2015) Distribution of major sucking pest, *Helopeltis* spp. (Hemiptera: Miridae) of cashew in India. Proceedings of Zoological Society of India, 68 (1), 30-35. DOI: 10.1007/s12595-013-0091-2

Stonedahl, G. M. (1991) The Oriental species of *Helopeltis* (Heteroptera: Miridae): a review of economic literature and guide to identification. Bulletin of Entomological Research, 81, 465-490. DOI: 10.1017/S0007485300032041

Sudhakaran, R. (2000) Studies in the Tea mosquito bug, *Helopeltis theivora* Waterhouse (Hemiptera: Miridae) infesting tea in Southern India. Ph.D. Thesis, Bharathiar University, Tamil Nadu.

Sudhakaran, R., Muraleedharan, N. (2006) Biology of *Helopeltis theivora* (Hemiptera: Miridae) infesting tea. Entomon, 31, 165-180.

Sundararaju, D. (1996) Studies on *Helopeltis* spp. with special reference to *H. antonii* Sign. in Tamil Nadu. PhD Thesis, T.N.A.U., Coimbatore.

Way, M. J., Khoo, K. C. (1989) Relationships between *Helopeltis theobromae* damage and ants with special reference to Malaysian cocoa smallholdings. Journal of Plant Protection in the Tropics, 6, 1–11.