



Helopeltis theivora (Heteroptera, Miridae) as a pest of betel vine (*Piper betle*)

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Betel vine (*Piper betle* L.) is an important economic crop in India with a variety of uses. The leaf extract and purified compounds are known for their properties like anti-inflammatory, anti-diabetic, immunomodulatory, analgesic and hepato-protective (Sharma *et al.* 2009, Kumar *et al.* 2010). Use of betel leaf is an integral part of the folklore, art, rituals, ceremonies and social interactions of daily life in South East Asia (Ahuja and Ahuja 2011). In India, around 15-20 million people consume betel leaves on a regular basis and leaves worth around ₹ 30-40 million are exported to Afghanistan, Australia, Bangladesh, Canada, Hong Kong, Nepal, Pakistan, USA, Europe and Middle East (Palaniappan *et al.* 2012). In India, betel vine cultivation is concentrated in the states of Assam, Andhra Pradesh, Bihar, Gujarat, Odisha, Karnataka, Madhya Pradesh, Rajasthan, West Bengal, Maharashtra and Kerala.

Cultivation of betel vine is practised mainly through organic means or with minimal use of chemical inputs as the fresh leaves are chewed. Insect pests mainly infest the leaf, which is the economic part. The main sucking pests reported are: *Aleurocanthus rugosa* Singh, *Dialeuro despallida* Singh (Aleyrodidae), *Aphis gossypii* Glover (Aphididae) and *Tricentrus gibbosulus* (Walker) (Membracidae), *Membrothrips indicus* (Hood) (Phlaeothripidae), *Zaniothrips ricini* Bhatti (Panchaethripinae), *Mymarothrips garuda* Ramakrishna and Margabandhu (Aeolothripidae), *Aroidothrips longistylus* Ananthakrishnan (Thripidae) and *Disphinctus politus* Wlk. (Miridae) (Raut and Bhattacharya 1999, Sivakumar 2012).

Severe betel vine damage was reported from Thazhava, Kollam District, Kerala, South India (09°05.921' N 76°33.203' E) by a farmer in January, 2018. Further investigations revealed leaf feeding by nymphs and adults

of *Helopeltis theivora* Waterhouse (Heteroptera, Miridae). Adults could readily be recognised by the bicolorous pronotal collar and the yellow or orange band ventrad of eyes.

Brown to black, angular spots were seen on the affected tender leaves (Fig 1). Both nymphs and adults fed on the tender leaves. The last instar nymphs were seen feeding aggressively. They were found on the adaxial and abaxial surface of the leaves. Feeding punctures first developed into water-soaked lesions which later turned brown or black. Subsequently, spots on the surviving leaves caused the formation of shot holes (Fig 2). Infestation on tender leaves resulted in severe crinkling and distortion. Feeding tests in the laboratory with field collected nymphs and adults produced the same symptoms on leaves. The infested leaves were not fit for use with reduced marketability. Severely affected leaves fell off from the plants. Damage was assessed by random selection of fifty plants. Results showed that 66% plants were infested. Natural enemies of *H. theivora* or other sucking pests were not observed in the field.

Black pepper (*Piper nigrum* L.) and long pepper (*P. longum* L.) are the two related crop species of betel vine grown in the region. Infestations of *H. antonii* on black pepper (Devasahayam *et al.* 1986) and *H. theivora* (Abraham 1991) on long pepper were reported earlier from the region. In cashew, *H. theivora* was first recorded from Kerala in 1983 by Ambika and Abraham (1983). *Helopeltis theivora* is a major sucking pest of tea throughout India (Roy *et al.* 2015) and most of the tea producing countries. Apart from tea and cashew, it attacks a variety of crop and weed species (Roy *et al.* 2015, Borthakur *et al.* 2016). This is the first report of *H. theivora* as a pest on *P. betle*.

Since leaves are consumed directly, no chemical pesticide can be applied on *P. betle*, thus, management practice of spraying neem oil-sodium soap emulsion (1.67:1.0 ratio) @0.2% concentration was tried to reduce infestation. Spraying was carried out on every third day for two weeks. No severe infestation was noticed after one month of the last spray. The level of infestation was reduced to 10 and 4% after two and six months of spraying, respectively. An earlier study by Roy *et al.* (2010), with

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Fig 1 Angular spots formed by feeding of *H.theivora* on *Piper betle*.



Fig 2 Shot hole symptoms on *Piper betle*.

neem-based integrated approaches against *H. theivora* on tea, could achieve 65% reduction in pest incidence, corroborates with this observation.

SUMMARY

Tea mosquito bug (TMB), *Helopeltis theivora* Waterhouse (Heteroptera, Miridae) has been recorded for the first time from Kerala, India, as a pest of betel vine (*Piper betle* L.). Nymphs and adults feed on the tender leaves making it unfit for consumption and sale. Angular water-soaked patches which later appear like shot holes were the symptoms of infestation. Neem oil soap emulsion (0.2%) was effective against the pest. The infested plot was not near tea or cashew plantations, which ruled out the possibility of opportunistic incidence of *H. theivora* on *P. betle*. Hence, it is evident that *H. theivora* has to be reckoned as a pest of betel vine. The current observation on betel vine is important as many of the betel vine growing states in the country are also known for large scale cultivation of tea. Host shift from tea to betel vine and vice versa in these areas may pose a challenge to the production of both the crops. An IPM module with safe organic pesticides has to be developed for contingencies in future.

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