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RESEARCH NOTE

Monitoring tea mosquito bug, *Helopeltis antonii* Signoret (Homoptera: Miridae) using sticky traps on drumstick, *Moringa oleifera* Lam.

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ABSTRACT: Tea mosquito bug, *Helopeltis antonii* Sign. is an emerging pest of drumstick, *Moringa oleifera* Lam. Both nymphs and adults cause severe damage (74-100%). Experiments were conducted to monitor tea mosquito bug population using colour sticky traps. Yellow colour sticky traps were found to attract significantly higher number of adult *H. antonii* (7± 2.26; $P<0.001$) compared to the blue traps (2.37± 0.75).

Keywords: Tea mosquito bug*, Helopeltis antonii*, drumstick, *Moringa oleifera,* sticky traps

Drumstick (*Moringa oleifera* Lam.) is indigenous to northwest India and is widely distributed across the country (Ramachandran *et al*., 1980). All the plant parts namely leaves, flowers, mature/ immature pods and seeds are economically important source of minerals, vitamins, proteins etc. (Anwar *et al*., 2007). In recent years drumstick cultivation has been taken up on a commercial scale in India with annual production of 2.2 to 2.4 MT of tender fruits (in an area of 43600 ha). The major states cultivating drumstick are Andhra Pradesh with an area of 15,665 ha followed by Tamil Nadu (13,250 ha) and Karnataka (10,280 ha) (Sekhar *et al*., 2017 and 2018). Various biotic and a biotic stresses influence the production of drumstick. Among the biotic stresses several insect pests have been reported attacking drumstick (Butani and Verma, 1981). The major insect pests like pod fly (*Gitona distigima* Meigen), leaf eating caterpillar (*Noorda bilitealis* Walker), leaf budworm (*Noorda moringae* Tams), bark eating caterpillar (*Inderbela tetraonis* Moore), hairy caterpillar (*Euperote mollifera* Walker) cause significant yield loss to the drumstick crop (Butani and Verma, 1981; Ragumoorthi and Subbarao, 1997; Tamoghna *et al*., 2014; Mahesh and Kotikal, 2014). Many reported *M. oleifera* as an alternate host plant for tea mosquito bug, *Helopeltis antonii* Signoret (Pillai *et al*., 1979; Honnalingappa, 2001; Mahesh and Kotikal, 2014) which is the most devastating polyphagous pest on several commercially important horticultural crops like cashew, guava etc. This has been very severe in guava causing die back on tender shoots and *kajji* symptoms on fruits. In recent past, tea mosquito bug (TMB) is extending its host range to various other horticultural crops including fruits and vegetable crops like annona, pomegranate, drumstick etc. (Pillai *et al*, 1979; Devasahayam and Nair, 1986; Reddy, 2009; Kamala Jayanthi *et al*, 2016). The pest status of *H. antonii* on drumstick was reported initially from Tamil Nadu, India (Pillai *et al*., 1979). In spite of several earlier reports regarding drumstick serving as a host crop *H. antonii,* the incidence severity was not worked out. In the present study we have assessed the symptoms of damage and damage severity of *H. antonii* on drumstick.

Table 1. Mean trap catches of tea mosquito bug, *H. antonii* in drumstick field

Trap No.	Colour	Height (m)	Mean trap catch
T1	Blue	1.2	0.50 ±0.00^{bc}
T2	Blue	1.8	1.00 ±0.37^{bc}
T3	Blue	2.1	1.25±0.18^{bc}
T4	Blue	2.4	2.37 ±0.75^{bc}
T5	Yellow	1.2	1.00 ± 0.37^{bc}
T6	Yellow	1.8	7.00 ±2.26^{a}
T7	Yellow	2.1	3.00 ±0.37^{b}
T8	Yellow	2.4	1.25±0.37^{b}
CD (P =0.05)			2.60

During 2020, extensive surveys conducted in the farmers' fields at Kandali village, Hassan district, Karnataka (76.03° E 12.97° N; cv. PKM-1, n = 500) and at the experimental fields of ICAR-Indian Institute of Horticultural Research, Bengaluru, Karnataka (12°58'N; 77°35'E; cv. PKM-1, n = 140) revealed severe damage by the tea mosquito bug on drumstick plants. To study the yield loss and severity of incidence, we randomly selected 20 plants at each place and recorded the number of adults/nymphs of *H. antonii* and number of twigs with TMB related dieback symptoms. Monitoring of tea mosquito bug field population was carried out using two different coloured sticky traps (yellow and blue) erected at four different heights *viz*., 1.2 m, 1.8 m, 2.1 m and 2.4m at the drumstick experimental block of ICAR-IIHR with three replications. Data on the weekly (n =8) trap catches (on the number of adult TMB trapped per trap) were recorded. The adults collected were identified using the taxonomic keys (Stonedahl, 1991) and *H. antonii* was identified based on the external morphology of leg (coloration on the hind femora without a pale annulus at the base). All the observations are subjected to ANOVA.

Adults (5.3± 0.59/ plant) and nymphs (5.4±0.57/ plant) of *Helopeltis antonii* were found on various plant parts of drumstick and was observed to be involved in feeding, mating and egg laying activities. Tea mosquito bug was found to damage drumstick plants by feeding on tender shoots, inflorescence and fruits. Tender shoots dried and withered resulting in die-back symptoms. Upon *H. antonii* feeding, the fruits exhibited white silvery patches. Infestation at tender fruit stage led to fruit drying and poor pod development. Severe damage by TMB resulted in complete drying of the whole tree causing100% yield loss. The drumstick plants infested with TMB did not produce any new shoots and did not yield any fruits also, the plants appeared completely defoliated with dried shoots (Fig .1).

The mean weekly trap catches were significantly different with respect to the colour (P<0.001) and the height (P<0.001). Weekly trap catch data revealed that yellow coloured sticky trap attracted more number of *H. antonii* than blue colour. The highest mean adult catch was in yellow coloured sticky trap (7.00 ± 2.26) compared to the blue coloured sticky trap (2.37 ±0.75) (Table.1). The traps installed at 1.8 m height in the borders trapped significantly higher numbers of TMB (7.00 ± 2.26). Interaction effect between colour and height was found significant (P <0.001) as yellow coloured sticky trap at 1.8 m height attracted more TMB when the crop height was 1.8 m (Table .1).

Presently TMB is being managed widely using insecticides including synthetic pyrethroids (NRCC, 1988; Bhat and Raviprasad, 2007; Mahapatro, 2008; Jalgaonkar *et al.*, 2009; Patel *et al.*, 2018).Since drumstick is used for medicinal purpose and fresh leaves are being consumed, using synthetic chemical insecticides to manage this pest without following specified waiting periods is unacceptable. The yellow coloured sticky traps can be used as early warning devices as observed in the present study for alerting about the TMB population presence in the crop well in advance for adapting timely management.

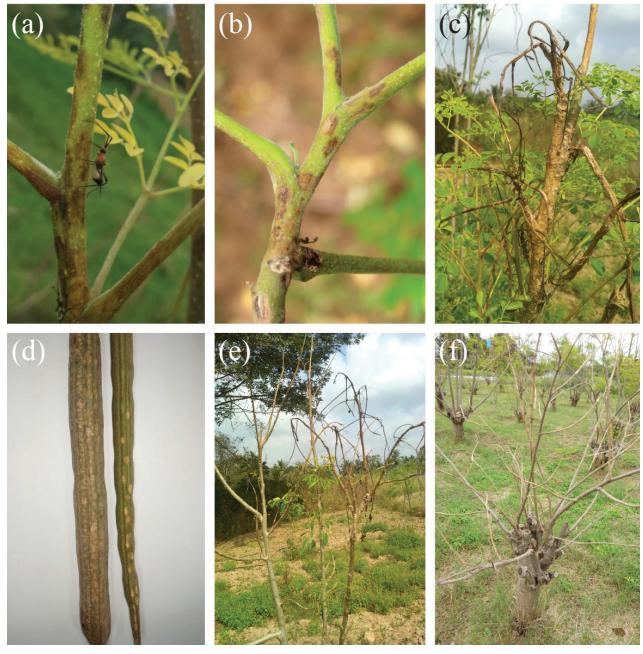

Fig.1. Incidence of tea mosquito bug (TMB) *H. antonii* Sign. on drumstick (a) adult TMB (b) Necrotic feeding lesions of TMB on tender shoots (c) Die-back of tender growing shoots (d) White silvery feeding patches on pods (e & f) Complete die-back and wilting of plants due to TMB incidence

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