Tea mosquito bugs (TMB) (*Helopeltis* spp.) (Miridae: Hemiptera) are serious pests of cashew during cropping season in India and other cashew growing countries. Pest damage begins during flushing stage of cashew and continues during flowering and fruiting. As such, TMB is a low-density pest, but causes reduction in nut yields ranging between 20 and 80 percent depending on the intensity of pest population.

Species complex

In India, this pest is common in most of the cashew growing regions including Kerala, Karnataka, Goa, Maharastra, Tamil Nadu, Goa, Andhra Pradesh, Odisha and Madhya Pradesh. Three species (*H. antonii* Sign., *H. theivora* Wat. and *H. bradyi* Wat.) are recorded in India. Apart from *Helopeltis* spp., *Pachypeltis measarum* Kirk. (Miridae) also causes similar damage in certain areas. In most parts of cashew growing regions, *H. antonii* is the dominant species on cashew.

H. antonii: The adult is reddish-brown, about 6.0-8.0 mm long with a black head, red thorax, black and white abdomen. Nymphs are also reddish brown and elongate. The longevity of male and female bugs is 9-10 days and 7-8 days, respectively. Female bugs are larger than males.

H. bradyi: The female bugs are larger than males, being 6.0-8.8 mm. This species has similar general coloration with *H. antonii*, but the hind legs have a clear white band at the base.

H. theivora: The adult bug is 5.5-8.0 mm in length with brownish-yellow pronotum and green abdomen. The body is slender and elongated with yellowish-brown or olive green head, dark red thorax and yellow and greenish-black abdomen.

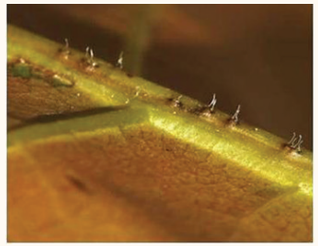
P. maesarum: This species lacks the pin like knobbed process, have white scutellum and short antenna.

H. antonii ***H. bradyi*** ***H. theivora*** ***P. maesarum***

Host plants

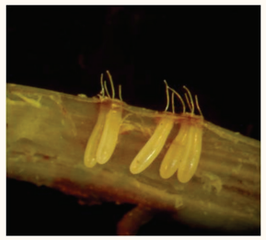
Helopeltis spp. infest a vast number of plants including cashew, cinchona, cocoa, neem, cotton, cowpea, red gram, henna, apple, grapes, guava, avocado, drumstick, mango, ber, *Annona reticulata,* allspice, black pepper, *Ailanthus,* mahogany, annatto, *Thespesia populnea, Solanum nigrum,* Singapore cherry, ornamental *Acalypha* etc.

Biology of tea mosquito bug



Respiratory processes of eggs seen outside in the ventral midrib

Eggs of TMB are inserted inside the tender shoots, inflorescence stalks, developing nuts, petioles and ventral midribs of leaves either singly or in small groups. They are translucent white, ovo-elongate and laterally compressed with a pair of extra-chorionic processes (respiratory filaments) at their anterior end. Egg period lasts for 6-12 days, depending on the weather factors. The nymphal stage consists of five instars and gets completed within 11-13 days. Adults survive for 8 - 12 days and a female bug can lay about 60 - 80 eggs during its life time. The entire life-cycle is completed within 25-35 days.



Eggs

Nymph

Adult

Nature of damage

Tea mosquito bug is a low-density pest and a small population is sufficient to cause conspicuous damage. Typical feeding damage by TMB appears as a discoloured brownish necrotic lesion around the feeding point. Subsequently, melanization and necrosis of feeding lesions appear clearly.

The feeding lesions are elongate on shoots and roundish on fruits. Feeding by the nymphs and adults causes drying up of new flushes, panicles, shriveling of developing nuts and premature drop of immature nuts. At severe damage, entire plant exhibits burnt-up appearance known as "shoot blight" and "blossom blight". Each nymph or adult can cause around 30 - 80 lesions on cashew seedlings/ immature shoots or fruits in a day.

Further, the feeding injury by TMB is attributed as one of the causes of infection and manifestation of die-back disease caused by *Colletotrichum gloeosporoides* and *Botryodiplodia theobromae*. This disease gradually progresses beyond the feeding region leading to wilting of whole shoot or panicles.

Seasonal incidence of TMB

Physical (abiotic) and biotic factors are believed to be the factors responsible for the change in a pest population. Climatic factors such as rainfall and humidity influence the population build-up of *Helopeltis* spp. Gradual increase in *H. antonii* population and its damage commences from September - October synchronizing with the emergence of new flushes after the cessation of monsoon in different agro-ecological regions. The population reaches a peak during January, when the trees are in full bloom. TMB prevails till April - May and exists in minor numbers during monsoon period (June-September) especially in the older plantations. But in younger plantations, TMB can be noticed continuously.

Integrated pest management practices

As TMB is a low density pest, regular survey and monitoring its population from initiation of flushing till fruit set, is crucial to initiate timely management measures. As an ad-hoc recommendation, 5-8% damaged fresh flushes/panicles can be considered as the Economic Threshold Level (ETL) for TMB. Proper nutrient management and pest surveillance are prerequisites to maintain a healthy crop.

Habitat management

It is obligatory to keep proper surveillance at vulnerable habitats especially, young cashew plantations or the plots nearer to alternate host plants. In east coast, particularly in Tamil Nadu, neem trees act as reservoir for this pest; besides guava and drumstick. Therefore, it is important

to check TMB population in those plants to reduce the spread of TMB. Similarly, *H. theivora* multiplies in a very common weed, *Chromolaena odorata* present in the cashew plantations of west coast region; hence timely weed management is required to avoid spread of TMB.

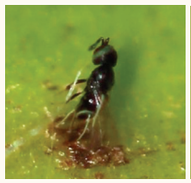
Host plant resistance

Any feeding injury of TMB in cashew leads to rapid hypersensitive reactions causing necrosis, blighting and drying of affected plant parts. Histopathological investigations revealed that cashew is inherently provided with an active phenol - phenolase system. Therefore, there is a least scope of getting resistant cultivars against TMB and all the available recommended cashew varieties are found susceptible. However, matured shoots of cashew exhibit higher oviposition repellence and feeding deterrence. This particular phenological stage helps to bring down the population build up of TMB during non-flushing period.

Mid-season / late season flowering cashew varieties are able to escape from the severity of the pest infestation to some extent. Under moderate level of pest incidence, the cashew variety; 'Bhaskara' showed consistent performance even under unsprayed situations.

Biological control

Four species of egg parasitoids *viz., Telenomus cuspis* sp. nov. Rajmohana and Srikumar (Platigasteridae), *Chaetostricha* sp. (Trichogrammatidae), *Erythmelus helopeltidis* Gahan (Mymaridae) and *Gonatocerus* sp. were recorded on TMB. Among them, *T. cuspis* is the dominant one. Besides, nymphal - adult parasitoid (*Leiophron* sp., [Braconidae]), ectoparasitic mite (*Leptus* sp.) and nematode parasitoids were also recorded. But, none of these parasitoids are amenable for laboratory rearing. Among the predators; ants, praying mantises, spiders and reduviids also help in minimizing TMB population to a certain extent. Two fungal pathogens viz., *Aspergillus flavus* and *A. tamarii* can also cause infection in *H. antonii.* In most instances, though natural enemies play an important role in control of TMB, they could not minimize TMB population below economic thresholds levels.



Egg parasitoid - *T. cuspis*

Egg parasitoid - *Chaetostricha* sp.

Spider-*Telemonia dimidiata* Simon

Reduviid - *Panthous bimaculatus* D.

Chemical control

It is absolutely necessary to keep a constant vigil on pest population so as to initiate timely insecticidal control. Even though many groups of insecticides and several plant products have been evaluated against this pest, none exhibited ovicidal action. However, lambda-cyhalothrin 5 EC (0.6 ml/lit) has longest residual action against nymphs and adults of TMB. Profenophos 50 EC (2.0 ml/lit) triazophos 40 EC (1.5 ml/ lit) are found effective in certain regions. Besides, Thiamethoxam 25 WG (0.2 g / lit) and acetamiprid 20 SP (0.5 g / lit) are also found to be equally effective. In the endemic areas, it is appropriate to spray insecticides during the vulnerable crop stages coinciding with flushing, flowering and fruiting, depending on the pest incidence. Spraying of insecticide will be remunerative, only if the trees provide economical yield. Spraying of higher doses and repetition of same insecticide should be strictly avoided to prevent build up of pest resistance.

Although cashew is an insect-pollinated crop, spraying of these insecticides during the flowering season did not significantly influence fruit set. However to lessen direct poisoning of bees while spraying, spraying should be avoided between 10.00 am and 1.00 pm, which is the peak foraging period of pollinating bees.

* * *

For further details contact:

The Director
ICAR-Directorate of Cashew Research,
Puttur, Darbe (P.O.), Karnataka – 574202
Tel: 08251-230902 Fax: 08251-234350
Email: director.dcr@icar.gov.in

Published by: **Dr. M.G. Nayak,** Director (Acting), ICAR-DCR, Puttur

Compiled and edited by:

Dr. K. Vanitha and Dr. T.N. Raviprasad
Division of Crop Protection,
ICAR-Directorate of Cashew Research,
Puttur, Darbe (P.O.), Karnataka - 574202

Funded by: Rashtriya Krishi Vikas Yojana – Remunerative Approaches for Agriculture and Allied Sector Rejuvenation (RKVY-RAFTAAR), Government of Karnataka.

TEA MOSQUITO BUG AND ITS MANAGEMENT IN CASHEW

K. Vanitha
T.N. Raviprasad

MARCH 2020

भा.कृ.अनु.प. – काजू अनुसंधान निदेशालय
ICAR-Directorate of Cashew Research
Darbe (P.O.), Puttur - 574 202, Dakshina Kannada, Karnataka