MIRIDS (Capsids) sap sucking bugs

IMPORTANCE

Mirids and Capsids describe the same types of insects that feed on cocoa and belong to the family Miridae. The term Mirid is commonly used in Asia and the Americas whereas Capsid is the common term in Africa. In Malaysia, common names are Mosquito Bug and Bee Bug.
These insects attack by using their needle-like stylet (mouth part) to pierce the surface of the cocoa stems, branches and pods. Mirids suck out the sap and also inject toxic saliva (spit) into the plant and the internal tissues die.
Mirids are described as the most injurious and widespread of insect pests. On cocoa, there are forty or more species that can be described as 'Mirids'. *Helopeltis* species are the most important in Asia

DESCRIPTION

Mirids are good flyers and are active during the warm hours of the day. Feeding by sucking plant juices causes small water-soaked areas that quickly turn black.

The lesions on pods are circular, while the lesions on stems are usually oval and of a larger size. Soft and hard stem tissues are attacked, with feeding on soft stems resulting in wilting and terminal death and allowing entry of wound fungi.

ECOLOGY

The life cycles of the various Mirid species are very similar. Single or small groups of eggs are buried in the skin layers of pods, pod stalks, chupons and fan branches. Incubation periods of most Asian *Helopeltis* species vary with locality and season, but are generally 6-11 days. Two breathing structures project from each egg above the plant surface and are just visible to the naked eye.

Mirids do not have a pupal stage, but have five successive juvenile larva instars (nymph) stages, a process which takes on average 18-30 days. The nymphs increase in size with each moult and the last moult produces a winged adult. The adults are 7-12mm long and very slender. *Helopeltis* have long legs and antennae while in other genera the legs and antennae are more thickset.

The rate of larval development of the five instars is affected by climatic factors such as temperature and humidity, and by food quality. The average lifespans (first to fifth instar) are 9-19 days.

Adult lifespan and fertility vary between 6 and 30 days depending on local conditions and availability of pods and young shoots for feeding. There is a continuous cycle of generations through the year. In Malaysia, populations of *H. theivora* peak in October and are lowest in April/May. *Helopeltis* populations do not do well under conditions of heavy rain, high winds and low humidity.

MANAGEMENT

Integrated Pest Management
Cultural techniques (installing temporary shading in young plantings, upkeep and sucker removal in farms and the maintenance of a complete canopy) have been routinely applied, as a sole control practice or in addition to the rational use of pesticides, with the aim of minimizing pest damage to cocoa plantations. A number of trees are known to serve as alternate hosts of Mirids, including *Cola* sp., other *Theobroma* sp. and *Adansonia digitata*. These should not be used as shade trees in cocoa farms.

Biological control
Since 1900, cocoa planters in Indonesia have been aware that damage is less when cocoa trees are colonised by ants, notably *Dolichoderus thoracicus* which is not aggressive to plantation staff. This ant has been deliberately released into some cocoa farms as a control measure. The introduction of ants has been developed as a component of integrated pest management in Indonesia (against *H. antonii* and *H. theivora*) and in Malaysia (against *H. theobromae*). The area to be colonised is first treated with ground applications of insecticides to suppress antagonistic ants and then colonies of *D. thoracicus* are introduced.

Mealybug species, which do not cause damage to cocoa pods, are also introduced to provide honeydew and encourage the ants to remain in the farm. The proximal ends of the cocoa pods are left on the trees at harvest to conserve the mealybugs. However, in areas with Cocoa Swollen Shoot Virus, this practise should be avoided as mealybugs can transmit CSSV! The litter layer on the ground is also conserved to provide nesting sites for the ants. Another ant (*Oecophylla smaragdina*) is equally beneficial, but it is aggressive and so is not liked by cocoa workers.
High levels of parasitism have been demonstrated by some egg and nymph parasitoids. Egg parasitoids of the genus *Telenomus* and the mymarid *Erythmelus helopeltidis* are particularly promising, as are the nymphal parasitoids of the genus *Leiophron*. Other predators such as assassin bugs and spiders are not specific to Mirids however, as part of a healthy system, have a role in control.

Chemical control
Chemical applications remain the primary method of controlling mirids. Cocoa-producing countries launched national mirid control campaigns as early as 1958-1960. Annual eradication of the pest by chemical control was ensured by State companies under the authority of the Ministries of Agriculture in Ghana, the Cote d'Ivoire, Cameroon and Togo. This is possible for state and private companies, but for small holders chemical application using appropriate equipment is too expensive. Insect eradication operations start at the beginning of rising mirid populations, coinciding with the peak cropping periods. Complete treatment consists of two rounds one month apart. The second round is intended to reach young instars, which were not affected by the first spraying. Research on reducing the flow rate (Low Volume Treatment) has been undertaken and the results have been extended. This rational chemical control programme against mirids has been a success in West Africa.

PREFFERED SCIENTIFIC NAME	**Taxonomic position**
Helopeltis species	Domain: Eukaryota Kingdom: Metazoa Phylum: Arthropoda Subphylum: Uniramia Class: Insecta Order: Hemiptera Suborder: Heteroptera Family: Miridae

DISTRIBUTION MAP

***Helopeltis antonii* (Tea bug)**

● = Present, no further details ● = Widespread ● = Localised
● = Confined and subject to quarantine ● = Occasional or few reports
● = See regional map for distribution within the country

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DISTRIBUTION MAP

Helopeltis theivora **(Tea mosquito)**

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