

Pest Fact Sheet

The Asia-Pacific Forest Invasive Species Network (APFISN) has been established as a response to the immense costs and dangers posed by invasive species to the sustainable management of forests in the Asia-Pacific region. APFISN is a cooperative alliance of the 33 member countries in the Asia-Pacific Forestry Commission (APFC) - a statutory body of the Food and Agriculture Organization of the United Nations (FAO). The network focuses on inter-country cooperation that helps to detect, prevent, monitor, eradicate and/or control forest invasive species in the Asia-Pacific region. Specific objectives of the network are: 1) raise awareness of invasive species throughout the Asia-Pacific region; 2) define and develop organizational structures; 3) build capacity within member countries and 4) develop and share databases and information.



Asia - Pacific Forest Invasive Species Network



Papaya mealy bug

Phylum: Arthropoda
Class : Insecta
Order : Hemiptera
Family : Pseudococcidae

Scientific name: *Paracoccus marginatus* Williams and Granara de Willink

Common name: Papaya mealybug



Infestation on papaya



Nymphs and adults of the mealybug

Introduction: *Paracoccus marginatus*, commonly called Papaya mealybug, is a small hemipteran, polyphagous insect which attacks more than 60 plant species including *Acacia*, *Acalypha*, *Ananas*, *Annona*, *Bidens*, *Capsicum*, *Hibiscus*, *Ipomoea*, *Mangifera*, *Manihot*, *Mimosa*, *Persea*, *Plumeria*, *Punica* and *Solanum* and a wide range of vegetables, flowers, ornamentals and weeds. *Carica papaya* and *Parthenium hysterophorus* are the most preferred hosts. Honey dew produced by this bug results in the development of sooty mould that covers the leaves, fruits and stems, obstructing photosynthesis and gaseous exchange. On papaya, it infests the veins of older leaves, which turn yellow, dry up and are shed prematurely. Tender leaves become crinkled and curly, young fruits drop and shoots become bunched and the tree dies within a few months. The bug has a strong association with ants by providing honeydew as food to ants and in return the ants help the spread of the bug.

Description: The infestations by the bug resemble clusters of cotton-like masses on the above ground portion of plants. The adult female is yellow and is covered with a white waxy coating. Adult females are approximately 2.2 mm long and 1.4 mm wide. A series of short waxy caudal filaments less than one-fourth the length of the body exists around the margin. Eggs are greenish yellow, 100 to 600 in number and are laid in an egg sac that is three to four times the body length and entirely covered with white wax. The ovisac is developed ventrally on the adult female. Adult males are pink coloured, especially during the pre-pupal and pupal stages. They appear yellow in the first and second instar. Adult males are approximately 1.0 mm long, with an elongate oval body that is widest at the thorax. Adult males have ten-segmented antennae, a distinct aedeagus, lateral pore cluster, a heavily sclerotized thorax and head, and well-developed wings. Pheromones are used by females to attract the male.

Biology: The life cycle of the papaya mealybug has not been completely deciphered. It is active in warm, dry weather. Wingless females disperse either by crawling or through air

currents. Reproduction is mainly through hatching of eggs. The bug lays eggs over the period of one to two weeks and hatching occurs in about 10 days. There are five instars in females, each generation takes about a month to complete, depending on temperature.

Damage: The mealybug feeds on the sap of plants by inserting its stylets into the epidermis of the leaf and also into fruits and stem. At the time of feeding, it injects a toxin into the plant which causes chlorosis, stunting, leaf deformation and heavy build up of honeydew ultimately leading to the death of the plant. Heavy infestation makes the fruits inedible due to the thick white wax.

Distribution: Papaya mealybug is believed to be a native of the Neotropics (Belize, Costa Rica, Guatemala and Mexico) where it is not a major pest. It is now widely distributed in the temperate and tropical regions of the globe. The bug was first collected in 1955 but described only in 1992. It was recorded from several Caribbean countries since 1994. Infestation of the bug was noticed in Indonesia and India in 2008. Currently the bug is also seen in Bangladesh, Cambodia, Guam, Northern Mariana Islands, Palau, Philippines and Thailand in the Asia-Pacific region.



Pseudleptomastix mexicana



Anagyryus loecki

Spread: The papaya mealybug can move by crawling, through wind, rain and through birds. The waxy coating sticks to equipments, animals and man while moving. The transportation of infested twigs and the movement of vegetables help the mealybug to spread to distant areas. Ants carry the bug and spread to non-infested plants.

Management: Prevention of infestation is the best method against the papaya mealybug. Weak and less vigorous plants are more susceptible than healthy plants. Forceful spray of water on the affected part of the plants will help to control the bug to a certain extent. Application of insecticidal soaps or dish detergents mixed with water in low concentration gives good result. Chemical control is effective but requires multiple applications. Moreover, chemicals cause toxicity hazards, pollution and mortality of natural enemies.

Several natural enemies of the bug like *Cryptolaemus montrouzieri* and certain parasitoides were screened for their efficacy as biocontrol agents but most of them were generalist predators. Classical biocontrol programme using three encyrtid endoparasitoid wasps viz., *Acerophagus papayae*, *Anagyryus loecki* and *Pseudleptomastix mexicana* were successful in controlling the mealybug in Guam, Palau islands and Sri Lanka. These parasitoides were recently imported in India and tested against the bug for efficacy. Preliminary results from the field trials were very encouraging. Of the three parasitoides, *A. papayae* was the most promising as a biocontrol agent.



Acerophagus papayae

References

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