

Innovative Global Strategies to Control the Damage of Mealy Bug on Papaya Fruit

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Introduction

The papaya mealy bug (*Paracoccus marginatus*) is a polyphagous, sucking insect pest which belongs to family (Pseudococcidae) and order (Homoptera). Previous literature has been proved that the first sample of this devastating mealy bug was collected in Mexico during 1955. It was described in 1992 in the Neotropical Region occupying Belize, Costa Rica, Guatemala, and Mexico. (Williams and Granara de Willink 1992). In Asia it was firstly reported in 2008. Its small size insect pest which infests leaves and fruits of papaya tree. Body of this insect is covered with thick waxy material. It has strong association with ants and ants also help in dispersion and transportation of papaya mealybug. This insect commonly found on every horticultural and other agricultural plants. Now a day's attack of this insect pest will be increasing gradually on papaya fruit in worldwide.

Morphological Identification

Body of female adult is yellowish, flattened, oval and dusted by thick white waxy material. They are approximately 2.2 mm long and 1.4 mm wide. When they become adult then they produce sticky and elastic white waxy Projecting filaments from her body. They are wingless insect pests. Male of this insect is short having six legs and long 8-10 segmented antennae. They are pink and winged insect pests. They are 1 mm long and 0.3 mm wide.

Life span

It's has 3 development stages

1. **Eggs:** Female lays eggs range from 600 - 900 which are greenish yellow and covered by thick waxy material.
2. **Nymph:** They are known as crawlers at first instar stage. They are too active and secrete white waxy. They attack on soft portion of plant and start feeding by sucking mouth parts.

3. **Adult:** Females are yellowish green, but males are pink in color. Females are wingless, but males have wings. Males are smaller in size than females.

Ecology

The ideal temperature for the growth of this insect pest is 20 - 25 Centigrade and minimum is 21 Centigrade.

Host plants

This pest is polyphagous in nature having 65 host plants and 25 genera. Hosts of this pest are some horticultural and other agricultural crops like, papaya, mango, tomato, citrus, cotton, brinjal, eggplant, pepper, beans, peas, sweet potato and cherry etc.

Mode of spread

Papaya mealy bug spreads very fast like a fire. It is invasive and migratory pest and has been identified in almost 50 countries during last decade. It migrates from infested plants to healthy. It can also move through wind, air, rain, human activities, irrigation and transportation.

Damage symptoms

It attacks on a stem, leaves and fruits of plant. When this insect pest secretes toxic waxy material on leaves then they become crinkled and deformed. Growth of plant becomes stop, due to which immature fruit becomes mature in early and drop off. Flowers of papaya cannot bloom in proper way. Black spots present on fruit after infestation. Basically, it sucks the cell sap, so veins of older leaves become dry and shed immediately. When PM attacks on fresh leaves then they become crumpled as well as shoot becomes bunched. In case of heavy infestation, they can kill the plant.

Management strategies

Physical and cultural control

All crop residue and infested plant parts should be removed. Pruned stems, leaves and other twigs should be burnt. We should wrap the polythene sheets around the trunk of plants to prevent the movements of papaya mealy bug as well as ants. We should remove colonies of ants because they help in spread of papaya mealy bug. Infected farm equipment's should not be used in healthy or uninfested field. We should use sprinkler or drip irrigation in field instead of flood irrigation to prevent migration of pest.

Biological control

This is the best tool in IPM to control insect pests. There are few insect predators which feed on papaya mealy bug like Wasps, Coccinellids, Green lacewings and some parasitoids. It is very effective and long term tool to control the damage of this pest. In field we should use bio cages of parasitoids for their multiplication and then release to control papaya mealy bug. Probably 100 - 250 parasitoids could be produced per cage depending upon nymph's availability [1-9].

Chemical control

There is not currently specific chemical used to control this pest. There are some sucking insecticides which can be used to treat the papaya mealy bug damage like;

- o Acephate
- o Carbayle,
- o Chlorpyriphos,
- o Diazinon,
- o Malathion,
- o Acetamiprid,
- o Imidacloprid
- o And White Mineral Oils.

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