

Controlling Mealy Bug Infestation in Custard Apple Cultivation

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OPEN ACCESS

Keywords

Custard Apple, Mealybug, Infestation, Management

How to cite this article:

Pavan, T., Ravi, G. and Sarkar, N. 2024. Controlling Mealy Bug Infestation in Custard Apple Cultivation. *Vigyan Varta* 5(11): 259-262.

ABSTRACT

The custard apple mealybug, *Maconellicoccus hirsutus* also known as the pink hibiscus mealybug, is a significant pest affecting custard apple trees and a wide range of other plants, including hibiscus and various fruits. This pest, identified by its waxy, pink appearance, poses considerable economic challenges in tropical regions due to crop yield loss and reduced marketability. The life cycle of *M. hirsutus* includes egg, nymph, and adult stages, with females laying eggs in protective sacs and nymphs dispersing to feeding sites. Infestation symptoms include yellowing leaves, stunted growth, and distorted fruits, often covered with cotton-like wax and accompanied by sooty mold due to honeydew excretion. Integrated Pest Management (IPM) strategies are essential to control this pest and include cultural, mechanical, biological, and chemical methods. Continued research into biocontrol agents and improved management practices is critical to reducing the impact of *M. hirsutus* on agricultural production.

INTRODUCTION

The custard apple mealy bug *Maconellicoccus hirsutus* is a significant pest that targets custard apple trees and various other plants. This pest is known for its devastating impact on crops, characterized by its soft-bodied and wax-covered appearance, which allows it to blend into the plant tissue. It has also been referred to as the pink hibiscus mealybug due to its pink coloration and the range of host plants it infests, which include hibiscus and various fruit and ornamental plants.

1. Taxonomic Classification

The custard apple mealy bug belongs to the kingdom: Animalia, Phylum: Arthropoda, Class: Insecta, Order: Hemiptera, Suborder: Sternorrhyncha, Family: Pseudococcidae, Genus: *Maconellicoccus*, and is identified as the species *hirsutus*. This classification highlights its affinity with other mealybug species, which are common agricultural pests.

2. Life Cycle

The life cycle of *Maconellicoccus hirsutus* consists of distinct stages: egg, nymph, and adult.

2.1 Egg Stage

Female mealybugs lay clusters of eggs, which are enclosed in a protective, waxy sac. The egg-laying period occurs in clusters on twigs and leaves, and eggs typically take about 28 to 32 days to hatch.

2.2 Nymph Stage

After hatching, the first instar nymphs emerge, also known as crawlers. These nymphs are highly mobile and can disperse to find suitable feeding sites on host plants. The nymphs undergo a series of moults. Females go through three instars while males go through four before reaching adulthood. The total

duration of the nymphal period can last from 21 to 30 days influenced by environmental conditions.

2.3 Adult Stage

Adult female mealybugs are approximately 3 mm long, wingless, and characterized by their pink coloration and a heavy waxy covering. Whereas males in contrast possess wings and are smaller with distinguishing long waxy tails. The lifespan of female mealybugs generally spans from 46 to 49 days, while males live only 23 to 29 days.

3. Symptoms of Infestation

Infestation by the custard apple mealy bug manifests through various symptoms. Plants exhibit yellowing leaves, stunted growth, and distorted fruits with a characteristic cotton-like covering. Heavily infested fruits may shrivel, leading to market rejection and potential crop loss. Additionally, the pest excretes honeydew, which promotes the growth of sooty mold on infested plants, further complicating the health of the plants.



4. Economic Impact

The economic impact of *Maconellicoccus hirsutus* on custard apple production is considerable. In certain tropical regions, significant yield losses have been reported due to this pest as this pest is affecting both direct crop output and the marketability of the fruits.

5. Integrated Pest Management Strategies

Integrated Pest Management (IPM) strategies are essential for controlling mealybug populations while minimizing harm to the environment.

5.1 Cultural Controls

Collecting and destroying the mealy bug infested leaves, twigs and fruits. In October month flooding of the orchard with water kills the eggs. In November month Ploughing of the orchard will also reduce the infestation. Minimizing plant stress helps make them less prone to pest and disease attacks. Healthy plants have a stronger natural resistance. Quarantining incoming plants can also help prevent the introduction of infestations.

5.2 Mechanical Controls

Mechanical approaches involve manual removal of mealybugs and the use of sticky traps to capture adult insects. These methods can be particularly effective in low-level infestations. Pruning of branches attached to ground and banding of stem bottom with polythene sheet (30 cm wide) pasted with grease would be effective to control further spread. Put a band of Lindane swab around the tree trunk leaving 30 cm from the main stem. (Maruthadurai and Karuppaiah, 2014)

5.3 Biological Controls

Releases of ladybird beetle *Cryptolaemus montrouzieri* @ 30 larvae/plant twice at 15 days interval found to be significantly suppress the mealybugs *Ferrisia virgate* (Mani and

Krishnamoorthy, 2007). The exotic parasitoid *Leptomastix dactylopii* capable of causing mortality under field conditions ranged from 0.41 to 2.72% (Mani et al., 2007). The release of parasitoids like *Anagyrus kamali* may also help reduce mealybug populations effectively. Follow ant control methods such as the destruction of ant holes and red ant nests.

5.4 Chemical Controls

Application of Profenophos 50 EC at a concentration of 0.05% will give good control of this pest. Spray of Buprofezin 25 SC@1125ml/ha reduces the congregation of Mealybug. Spraying of Acephate 70SP @2ml/L water or Imidacloprid 17.8 SL @ 0.3ml/L water will give good control. Implementation of such treatments should be done judiciously to avoid the development of resistance and negative effects on beneficial insects.

6. Research Directions

Continued research into the biology and management of *Maconellicoccus hirsutus* remains critical. New studies are focusing on alternative biocontrol agents, such as entomopathogenic fungi, and refining existing management strategies that integrate cultural, biological, and chemical methods for sustainable pest control.

CONCLUSION

The custard apple mealy bug represents a significant threat to custard apple cultivation and broader agricultural practices. Its control requires a comprehensive understanding of its biology, effective management strategies, and ongoing research efforts to mitigate its impact on crops and the environment.

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