

Mealy bug:

An emerging threat for horticultural crop

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Since last few years, mealy bug has acquired position of major insect pest of many horticultural crops which was earlier considered as minor one. It is a polyphagous pest. The body of insect is oval shaped, soft and covered with wax. Nymph and adult female cause damage by sucking cell sap. Affected leaves turn yellow and gradually dry. It also excretes honeydew on which black sooty mold develops, resulting in decreased efficiency of photosynthesis. Some species are vector of plant diseases. Overall, it affects both quantity and quality of the products. Repeated use of chemical insecticides can only control insect up to some extent. Hence, the cultural control like water spray, judicious use of nitrogen application, soil raking, destruction of infected plant parts and banding of tree trunk etc. are the efficient way to manage the mealy bug.

Keywords: Horticulture, Mealy bug, Natural enemy, Nymph

IN India, horticulture sector is making important contribution in agriculture and shares 33% of gross value added (GVA). Currently, India is producing 320.48 million tonnes of horticulture produce on 25.66 ha area and has surpassed the food grain production. Productivity of horticulture crops (12.49 tonnes/ha) is also much higher than food grains (2.23 tonnes/ha). Apart from ensuring nutritional security, it provides diversification in farm activities, generate rural employment and enhances income of farmers. India has emerged as world leader in the production of a variety of fruits like mango, banana, guava, papaya, sapota, pomegranate, lime and aonla, and is the second largest producer of fruits and vegetables. The demand of horticultural produce is increasing day by day with increase in health awareness, income and export. Ministry of Agriculture and Farmers Welfare has provided an enhanced allocation of ₹2250 crore for the year 2021-22 for Mission for Integrated

Development of Horticulture (MIDH), to promote holistic growth in the agricultural sector.

Under field conditions, both biotic and abiotic factors cause heavy losses. Insect pest is one of the major constraint, especially for fruit and vegetable crops. Application of toxic insecticides having longer waiting period are not suitable for management of insect pest of horticultural crops because most of the products are consumed immediately after harvest. Management of polyphagous insect pests is another very tremendous job because host plant is available throughout the year. Mealy bug is a polyphagous insect pest and one of the emerging problems for vegetable and fruit crop throughout the country. It was considered as minor pest for many vegetables and fruits crop but, from last few years it has acquired the status of major pest in open as well as protected conditions.

The mealy bugs are group of small insects belongs to family

Pseudococcidae of order Hemiptera. They have worldwide distribution but are dominant in tropical and sub-tropical region.

Nature of damage

Damage is caused by only nymph and adult female because, males are short-lived and don't feed. They attach themselves to plant and suck sap from tender leaves, petiole and fruits. Usually, they remain in masses in somewhat protected areas such as two touching fruits, in the crown of plant, between the stem, in branch crochets, between stem and touching leaves or lower surface of leaves. During sucking of plant juice, female insect secretes wax layer for protection. Affected leaves turn yellow and gradually dry. Severe attack causes shedding of leaves and inflorescences, reducing fruit setting and shedding of marble size fruit. They excrete honeydew on which black sooty mold develops. Leaves covered with sooty mold and wax, reduce their photosynthetic efficiency. Contamination of fruit

Table 1. Commonly found mealy bug species in India

Common name	Scientific name	Identification	Preferred host
Striped mealy bug	<i>Ferrisia virgata</i> (Cockerell, 1893)	Gray colour, body covered with long waxy filaments and two long tail. Two dark stripe on dorsum	Sapota, Guava, Grape, Pomegranate, Custard apple, Aonla, Tomato, Pepper, Jackfruit
Longtail mealy bug	<i>Pseudococcus longispinus</i> (Targioni Tozzetti, 1867)	Pink colour, anal wax filaments are as long as body, dorsal median stripe present	Pineapple
Citrus mealy bug	<i>Planococcus citri</i> (Risso, 1813)	Yellow to pink colour, body covered with medium sized slightly curved waxy filament, one dorsal stripe, anal caudal filament less than one eight of body	Citrus, Coffee, Cocoa,
Pink mealy bug	<i>Maconellicoccus hirsutus</i> (Green, 1908)	Larger and darker, more whitish waxy material, caudal stripes absent	Grape
Papaya mealy bug	<i>Paracoccus marginatus</i> (Williams & Granara de Willink, 1992)	Yellow coloured with white waxy coating caudal filament less than one fourth of body	Papaya, Tapioca
Solanum mealy bug	<i>Phenacoccus solani</i> (Ferris, 1918)	Body covered with very short waxy filament, long tail and stripe absent	Brinjal, Tomato, Okra
Giant/mango mealy bug	<i>Drosicha mangiferae</i> (Stebbing, 1903)	Flat shaped body covered with white mealy powder	Mango

with honeydew reduces consumer acceptance and required scrubbing before packaging. Honeydew attracts ants, which protect it from natural enemies and create difficulties during harvesting of fruits. Some mealy bug inject toxin substances in plant during feeding, causing deformities in plant. Some are vectors for plant diseases, viz. *Ferrisia virgata* transmit swollen sheet diseases of cocoa and *Maconellicoccus hirsutus* transmit Tukra diseases of mulberry.

by mealy bug depends on density of pest population, weather factor, availability of host and management practices.

Management

Management of mealy bug is very challenging task, due to its polyphagous nature, fast multiplication and relatively water proof eggs because of enmeshed waxy fluff. Insect has waxy cover on the body, therefore, even direct application of contact insecticides

on body of the insect does not work. Biological control is most effective and long-term solution for management of mealy bug. Its natural enemies are self-perpetuating, persist even when the pest population density is low and keep the insect population below economic injury level. Release of lady beetle (*Cryptolaemus montrouzieri*) @10 beetle/tree or 5000/ha effectively controls population. Two to three releases may be required depending upon the pest incidence. Female

Economic impact

In horticultural crop, mealy bug species cause considerable economic loss by reducing the quality and quantity of products (Table 1). It affects almost all major fruit and vegetable crops of India. Mango mealy bug (*Drosicha mangifera*) is second major pest of mango after mango hopper. According to National Bureau of Agriculturally Important Insects, papaya mealy bug (*Paracoccus marginatus*) causes 60–80% damage in fruit production. Citrus mealy bug (*Planoccus citri*) causes 38–65% damage on various citrus species in India. In grapes, pink mealy bug (*Maconellicoccus hirsutus*) causes 50–100% yield loss while in other crops, losses up to 75% are observed. The damage caused



Mealy bug infestation on papaya and mango plant



Mealy bug infected okra fruit

Source: <https://www.krishisewa.com/articles/disease-management/233-okra-ipm.html>



Mealy bug infected citrus fruit

Source: <https://www.alliedacademies.org/articles-images/agricultural-science-botany-Citrus-Mealybug-2-2-029-g001.png>

parasitoid of lady beetle lays egg in third instar of mealy bug and parasitized mealy bug bulge into yellow-coloured hard mummies.

Some cultural practices may be adopted to manage pest populations, viz. if cropped area has history of mealy bug attack, then use plant variety less prone to attack at least from one or two years. Mealy bug does not disperse very fast therefore, when infestation starts to observe, destroy insect or infested plant or plant part. If pest population is somewhat increased then, forcibly spray water. High rate of nitrogen application coupled with irrigation stimulate tender new plant growth and egg laying. Therefore, fertilizers should be applied only as per the recommended dose. Field should be free from weed because, it provides alternate host for ant when mealy bug population are small. Destroy ant nest during land preparation. In mealy bug prone area, soil raking or light ploughing is very important to destroy the egg. In orchard, band tree trunk with alkathene and apply grease on it to prevent ascending of mealy bug on tree.

If aforesaid methods fail to manage pest population or are not adopted properly at time then, the use of insecticides is the only way to control pests. During humid

period fungal insecticides like verticillium lecanii 1.15 WP @5 g/litre of water may be spread to cause disease among the insects. Botanical insecticides, viz. neem oil 0.2–0.5% @20–50 ml/10 litre of water is also effective. In case of perennial crop, remove loose bark to expose hidden population and swab stem with fish oil or soap in water. Among chemical insecticides, systemic insecticide is more reliable and use of broad-spectrum insecticides must be avoided because it also kills natural enemies along with pest. Chemical control is also partially effective and requires multiple applications. Apply only recommended insecticides, viz. buprofezin 25 EC @2 ml/litre, dimethoate 30 EC @2 ml/litre, thiamethoxam 25 WG @0.6 g/litre, imidacloprid 17.8 SL @0.3 ml/litre for effective control of mealy bug. Addition of detergent powder along with insecticides increases effectiveness of insecticides. If natural enemies of mealy bug are established in agro-ecosystem, they provide long term solution. Some species of mealy bug may be used in laboratory for mass multiplication of natural enemies, viz. *Maconellicoccus hirsutus* for *Cryptolaemus montrouzieri* and *Ferrisia virgata* for *Brumus sututralis*.

SUMMARY

India is emerging as world leader in terms of fruit and vegetable production. The market of these horticultural crops is expanding day by day with increased health awareness in people. Nowadays, mealy bug has become threat for number of fruit crops, viz. mango, grapes, papaya, citrus, jackfruit and vegetable crops, viz. okra, tomato, brinjal etc. It can be easily identified as its body is oval shaped and covered with wax. In severe cases, loss may be up to 100%. Its control measure is very difficult task due to its polyphagous nature; its host remains available throughout the year; body covered with wax which protects it from contact insecticides and excretes honeydew which attracts ant and protects it from natural enemies. People prefer to consume fruit and vegetables in fresh condition just after harvesting hence, use of chemical insecticides should be avoided. Therefore, cultural control is the best way for management of mealy bug.

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