
Insect Pests Management in Mango

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Introduction

Mango (*Mangifera indica L.*), an evergreen and widely cultivated fruit crop of tropical and subtropical regions, is attacked by about 400 insect and mite pests. However, only a few are of major economic importance. These include leaf hoppers, fruit flies, stone weevil, mealy bugs, gall midges and others. Of them fruit flies is quarantine importance and restrict the national trade of mangoes. The pest distribution is also not uniform across the country with some species confining to specific zones. For instance, shoot gall psylla and giant mealy bug are more common in the north compared to south India.

Mango is grown in India for wide adaptability, higher nutritive value, delicious taste excellent flavour and attractive appearance. Mango plants are infested with various insects, right from nursery to old orchard and severely affected mango yield and fruit quality. 45 percent of total insects affecting mango are found in India and Mealy bug, hopper, fruit flies, shoot gall psylla, Bark eating caterpillar are main pests observed in various orchard of Pusa, Bihar. The management of Mealy bug, hopper and fruit flies are being given here (in brief) for the benefit of orchardists.

- a) **Mango mealy bug**
- b) **Mango hopper**
- c) **Shoot Gall Psylla**
- d) **Mango fruit fly**

a. Mango Mealy bug (*Drosicha mangiferae*)

A polyphagous pest feeds on wide range of fruits, vegetables and ornamental crops including Mango, guava, citrus, grape, fig, date palm, apple, avocado, banana, mulberry, coffee, coconut, soursop, peanut, bean, tomato, brinjal, okra, maize, sugarcane, soybean, cotton, rose, chrysanthemum, china Rose, croton etc. It is small oval, sort-bodied sucking insect found on new emerging leaves as well as matures stems, panicle, fruits and roots and covered with white milky wax, makes them difficult to eradicate.

Young mealy bug (Crawler) is highly mobile crawl from infected plants to non-infected plants. Small crawlers are readily transported by wind, birds, ants, clothing and vehicle and may settle in cracks and crevices, usually on new plants. The wax, which sticks to each egg, also facilitates passive transport by equipments, animals or people. Long distance movement is most probable through carrying infested planting material and fresh fruit and vegetables across the country or even from one end of a farm to the other. Ants, attracted by the honey dew, have been seen carrying mealy bugs from plant to plant.

Symptoms

- They suck cell sap from leaves and stems.
- The excess sap is excreted as honey dew which attracts ants and develops sooty mould on entire leaves surface which inhibit the photosynthetic capacity of plants.

- Interestingly, female bug and nymphs of both sexes cause damage while male adults survive only for mating. Plants become stunted and swollen (when infested) on growing tip of young plants.
- Heavy clustering of mealy bugs can be seen on fruit panicle and under leaf surface giving the appearance of a thick mat with waxy secretion.
- Severe infestation can cause defoliation with the white, waxy coating of the mealy bug. Infestation can lead to fruit drop, or fruit may remain on the plants in a dried and shriveled condition.
- Mealy bug infected fruits do not fetch good market price. Survey was conducted at Pusa site for mango diversity and almost all the mango orchards are infested with mealy bug. The principal damage associated with mealy bugs arises from sap sucking and their secretion of honeydew, led to growth of sooty mould.

Management

Cultural and mechanical Practices

- Mechanical barriers such as fences can be applied parallel to the field periphery to keep ants away from field and subsequently help in controlling mealy bug populations.
- All crop residues in orchard should be removed and dump in compost pit. Crop residues and grass left in the orchard may harbour mealy bug populations which may invade the new crop.
- Orchard should be free from weeds and crop debris as weeds also provide alternative host.
- Deep ploughing in the first fortnight of December, raking the soil around the tree trunk can prevent Nymph to climb.
- Do not move any plant material with suspected mealy bugs. Moving infested

plants is the fastest way to spread the pest.

- Remove alternate host plants like Hibiscus, croton, okra, custard, guava etc., in and nearby crop.
- Equipments should be thoroughly washed before moving to new plant or orchard.
- Manual picking of mealy bugs can be done in small plants or where infestation is in early stage, apply strong jet of water to remove bugs.
- Flooding of orchards in October followed by deep ploughing kills the eggs. Additional ploughing of the orchards in November exposes the remaining eggs and other soil dwelling pests to sun's heat/birds.
- Fasten 400 gauge alkathene sheets of 25 cm width to the tree trunk besides raking the soil around the tree trunk is very effective tool for the management of mealy bug.

Chemical Control

- Chemicals are less effective against mealy bug, because of its habit to hide in crevices and the waxy covering on its body and therefore, pesticides cannot penetrate the heavy waxy layer. Most granular insecticides are ineffective; therefore, systemic insecticides are used to control heavy infestation.
- Mixing of 1.5% chlorpyrifos dust @ 250 g per tree in the middle of November reduces the newly hatched nymphs.
- If nymphs have already ascended the tree, spray imidacloprid 17.8 SL @ 0.5 ml/L or dimethoate 30 EC @ 2 ml/L of water.

Biological Control

- Biological control is regarded as

effective, long-term solution to the mealy bug infestation because parasites and predators are self-perpetuating, persists even when the mealy bug is at low population densities and they continue to attack the mealy bugs, keeping populations below economic injury levels.

- The coccinellid beetles such as *Cheilomenes sexmaculata*, *Rodolia fumida*, *Scymnus coccivora*, *Aulis vestitia*, *Coccinella septempunctata* and *Nephus regularis* are important predators of mealy bug nymphs. Biological control by release of natural enemies has proved very successful. Among the biological control agents introduction of *Cryptolaemus montrouzieri* (Australian Ladybird), *Anagyrus pseudococci*, *Leptomastix dactylopi*, *Hypoaspis* spp., *Verticillium lecanii* and *Beauveria bassiana* are effective in managing the infestation.
- *Hypoaspis* is a small mite feeds on crawlers. Soil application of the spores of the fungus, *B. bassiana* will ensure further reduction of the pest population.

b. Mango Hopper (*Amritodus atkinsoni*)

Mango hopper is another very serious problem in mango cultivation and found in all mango growing areas including India, Indonesia, Philippines, Taiwan, Vietnam, Sri Lanka, Burma, Pakistan and Malaysia. Being only mango host for this pest in favorable conditions severely hampered the fruit setting.

Symptoms

This is one of the most destructive pest of mango. Both nymphs and adults puncture and suck the cell sap from tender leaves, shoots and particularly from inflorescence results in withering and shedding of flower buds and also wilting and drying of shoots and leaves. Heavy

puncturing and continuous chaining of sap causes curling and drying of infested tissues. Young fruits and dried inflorescence fall to the ground as the summer wind blow. The flower stalks and leaves in infested trees become sticky due to the deposition of honey-dew secreted by the hoppers that encourages the growth of black sooty mould on foliage and other parts. Survey conducted in Bihar showed that pest can damage 30-40% crop in neglected orchards.

Management

Cultural and Mechanical Practices

- Avoid close planting as the incidence very severe in overcrowded orchards.
- Orchards must be kept clean by ploughing and removal of weeds.
- Pruning of dense overcrowded and overlapping branches to facilitate aeration and sunlight
- Avoid excess use of nitrogenous fertilizers.
- Avoid water logging or damp conditions.

Chemical Control

- Being sucking pest only systemic insecticides are effective against this pest therefore, dimethoate 30 EC @ 2ml/L or imidacloprid 17.8SL @ 0.5 ml/L can be sprayed. Buprofezm 25 SC @ 1ml/L is also effective against mango hopper.
- First spray should be done in January when the blossom is about to come up and second spray after fruit set, if required.
- A rational rotational of insecticide is desirable to counteract the tendency of pest to develop field resistance.

c. Shoot Gall Psylla (*Apsylla cistelata*)

It appears occasionally serious pest in several parts of North India and observed

seriously in Bihar. Most of the mango orchards seriously affected by this pest. Likewise mango hopper this pest damage only mango crop.

Symptoms

Nymphs feed on vegetative and reproductive buds causing the formation of gall which restrict flower formation or inflorescence and reduce fruit set. Nymphs suck the cell sap inside the gall and excrete white sticky material. Nymphs are covered with white powder inside the gall. About 80 nymphs reside in a gall. Affected parts start dry and very little new growth is observed in affected parts.

Management

- Collect and destroy the gall during November.
- Spray dimethoate 30 EC @ 2ml/L or methyl-demeton 25EC @ 2ml/L of water in mid-August and repeat the spray at 15 days.
- Use Resistant variety like Prabhshankar, Husnara and tolerant variety like Alphanso.

d. Mango Fruit fly (*Dacus dorsalis*)

- The adults are the size of house fly and brownish with yellow marking.
- They lay eggs on mango fruits at 50% maturity, which hatches into white maggots that feed on pulp and cause rot to the fruit, causes fruit drops and larvae pupates in soil and then adults re-emerge to attack fresh fruits. Attack can take place even during harvest.
- Fruit flies are the major problem to domestic as well as export market. Several overlapping generations are completed in a year.

Management

- Fruit fly infestation begins 45-60 days prior to harvest, Initial breeding of the fruit flies takes place on fallen fruits. So, collect and destroy by deep burying (at least 4 feet) or burning all fallen fruits at weekly interval, two months prior to harvest.
- Place fruit fly traps, @ 8-10 per acre. Before placing the traps in the field add 5 drops of malathion or dichlorvos on the plywood pieces impregnated with lure. Traps should be fastened well on lower branches, between 3-6 feet height, at least 60 days prior to harvest or earlier. Traps should be kept in shade to enhance their life and should be replaced with fresh plywood lure every 3-4 weeks. If harvest is prolonged or trap is full then empty the dead flies. In case of rain take care to remove rain water by tilting the trap and allowing water to drain off from entry holes.
- If trap monitoring shows more than 5 flies/ day, there is a need to give three bait splashes on trunk, starting at least 3 weeks prior to harvest.
- The bait splashed is prepared by mixing 100 grams of Jaggery per liter of water to get a 10% solution, add 2 ml of malathion for every liter of the jaggery solution and dip a brush or broom into this solution and splash three times on the main trunk, a foot above the ground. Repeat this every week till harvest.

Conclusion

It is concluded that appropriate management of insect pest in mango at right time of preharvest apply cultural, mechanical and chemical practices to prevent the insect pest, by the reduction of fruit yield

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