

## Identification of Insect Pests of Tropical Fruits *viz.* Mango & Guava and Their Management

Pushplata Kurmi and Jagrati Upadhyay

Department of Agriculture, Mangalayatan University Jabalpur (M.P.) 483001

ARTICLE ID: 29

### Abstract

Tropical fruits are a botanically diverse group of fruit indigenous to tropical regions. tropical fruits are regularly grown in a different climate from latitude 23° 27”N to 23°27”S of the equator. Despite the increase, pests and disease remain major factor in the loss of marketable yield. The insect pests damage major tropical fruits in this country. In mango (*Mangifera Indica*) an evergreen and widely cultivated fruit crop and subtropical region is attacked by about 400 insects and pests. These include leafhopper, stem borer, fruit flies and stone weevil, mealy bug and others. The pest distribution is also not uniform across the country with some species confined to specific zones most tropical fruits are perennial plants which persist for several years without abrupt major changes other than seasonal leaf formation, flowering and fruit development.

**Keywords** –Tropical fruits pest, leaf formation, stone weevil, leaf hopper etc.

### Introduction –

The tropics, with the warm climate and little temperature variation, occupy approximately 40% of the Earth’s land surface. The region also has half the world’s population. The tropic can be divided into three zones. The zone most recognised is that with year-round rainfall and lies on the equator and is 8% of the world’s land surface. The most common tropical fruits in trade come from three major areas, central and South America (Papaya, guava) , Asia (most citrus, litchi) and South and South East Asia (Banana , mango , durian). Only one important tropical fruit is native to Africa and that is the date, through the continent has many other tropical fruits.

### Global Production –

Global production of tropical fruits has been growing steadily over the past decade, predominantly in response to growing demand in major producer areas. While tropical fruits play a small role in global agricultural trade in volume terms overall, accounting for a mere 3

percent of world agricultural food products exports, their high average export unit value of well above USD 1000 per tonne places them as the third most valuable fruit group globally, behind bananas and apples. Trade in tropical fruits generates substantial income for smallholder producers, as well as significant export earnings for many of the producing countries, thereby contributing to their food security.

### **Insect Peste of Mango (*Mangifera Indica*)**

#### **1) Mango leaf hopper - *Amritodus atkinsoni***

##### **Damaging symptoms –**

- Adults lay eggs on flower buds and inflorescence stalk.
- Adults and Nymph suck sap from flowers, causing the drying of flowers and subsequent dropping.
- 3-4 generation, completed in a growing season with a population build-up in February to April and June – August.
- The hoppers take shelter in cracks and crevices on the bark during the non-flowering season.



##### **Management –**

##### **Cultural control –**

- Pruning of dense orchards in November – December, orchards sanitation and field sanitation.
- Keep the nursery area clean, free of weeds and grasses.
- Removal of weeds and alternate host plants like hibiscus, custard apple, guava etc.
- Avoid excess use of nitrogenous fertilizers.

##### **Biological Control –**

Application of bio-agents, *Metarhiziumanisopliae* @  $1 \times 10^8$  cfu/ml or *Beauveria bassiana* @ 108 cfu/ml on tree trunk once during the off-season and twice at 7 days intervals during the flowering season.

### Chemical Control:

Application of any of the following insecticides gives good control, but spray should be done only after the insect pest population crosses its ETL. First spray should be given at the early stage of panicle formation. The second spray is at the full-length stage of panicles but before full bloom and the third spray is after the fruits set at pea size stage.

- Buprofezin 25% SC @ 1.25ml/ I of water, 5 – 15 I per tree.
- Deltamethrin 2.8% EC @ 0.03 -0.05% (0.33 to 0.5 ml/lit) As per field requirement.
- Dimethoate 30% EC @ 990-1320 ml in 600-800 I of water/acre.
- Imidacloprid 17.8% SL @ 3ml / I of water, 10 l/ tree.
- Malathion 50% EC @ 900-1200 ml in 600-800 I of water/acre.
- Monocrotophos 36% SL @ 600-800 ml in 200-800 I of water/acre.

### 2) Mango Mealybug – *Drosicha mangiferae*

#### Damage symptoms

- The adult bugs are covered with whitish powder and colonize between the bark of tree trunk, young shoots and panicles
- The nymphs' ascend the trees and settle on inflorescence causing flower drop, affecting fruit set.
- . Drying of leaves and inflorescence
- Presence of pinkish nymphs and adult mealy bugs on fruit and fruit stalk.



## Management

### Cultural control –

Polythene (400 gauges) bands of 25 cm width fastened around the tree trunk have been found effective barriers to stop the ascent of nymphs to the tree. All crop residues in previously infested fields should be removed and burnt.

### Biological control –

*Monochillus sexmaculatus*, *Rodolia fumida* and *Suminius renardi* are important predators in controlling the nymphs. The entomogenous fungus *Beauveria bassiana* is found to be an effective bioagent in controlling the nymphs of the mealy bug. Foliar spray of *Verticillium lecanii* or *Beauveria bassiana* 5g/ml per liter of water is effective during high humid months in reducing the population of mealy bugs.

### Chemical control –

Application of 250 g per tree of Methyl Parathion dust 2 percent or Aldrin dust 10 percent in the soil around the trunk kills the newly hatched nymphs which come in contact with the chemical. Spraying of 0.05 percent Monocrotophos or 0.2 percent Carbaryl or 0.05 percent Methyl Parathion has been found useful in controlling early instar nymphs of the mealy bug.

### 3) Mango Stem Boror - *Batocera rufomaculata*

#### Damage Symptoms –

- Grub tunnels in the sapwood on the trunk or branches
- Grub bore into the sapwood and made irregular tunnels.
- Feeding the vascular tissues
- interruption of nutrient and water transport on the tissue
- Drying of the terminal shoot in the early stage
- Frass comes out from several points and sometimes sap oozes out of the holes
- Wilting of branches or the entire tree.



**Management –**

- Removal and destruction of the dead the severely affected branches of the tree.
- Removal of alternate host, silk cotton and other hosts.
- Growing of tolerant mango varieties viz., Neelam, Humayudin etc.
- Swab Coal tar + Kerosene @ 1:2 or Carbaryl 50 WP 20 g / l (basal portion of the trunk – 3 feet height) after scraping the loose bark to prevent oviposition by adult beetles.
- Padding with monocrotophos 36 WSC 10 ml in 2.5 cm / tree soaked in absorbent cotton.
- If infestations are severe then apply the copper oxychloride paste on the trunk of the tree.
- Hook out the grub from the bore hole – apply monocrotophos 36 WSC 10 – 20 ml/ hole. One celphos tablet (3 g aluminum phosphide) per hole or place cotton swab soaked with kerosene on the entrance hole in trunk and plaster the hole with mud.
- Apply carbofuran 3G@ 5 g per hole and plug with mud.
- Orchard sanitation and destruction of dry shoots from the tree followed by the application of Imidacloprid 17.8 SL was the most effective in minimizing the borer damage.

**4) Mango Stone Weevil - *Sternochetus mangiferae*****Damage Symptoms –**

- Grub makes zigzag tunnels in pulp
- Eats unripe tissue and bore into cotyledons
- Fruit dropping at marble stage
- Oviposition injuries on marble-sized fruits.
- Tunnelled cotyledons in mature fruit by grubs.



**Management –**

- Collect And Destroy All Fallen Fruits At Weekly Intervals Till Harvest.
- Clean, Using Old Brooms Junctions of Branches on the Trunk Prior To Flowering (October).
- Spray Acephate 75 SP @1.5 G/L When The Fruits Are Of Lime Size (2.5 – 4 Cm Diameter). This Spray Should Be Followed By Decamethrin 2.8 EC @ 1ml/L After Two To Three Weeks.
- Destroy All Leftover Seeds In The Orchard After Harvest And Also In The Processing Industry.

**5) Mango Fruit Fly - *Bactrocera dorsalis***

**Damage Symptoms –**

- Maggot bore into semi-ripen fruits with decayed spots and dropping of fruits.
- Brownish rotten patches on fruits.



**Management –**

**Cultural control:**

- Before harvest (30-40 days ahead) collect and disposed off infested and fallen fruits to prevent further multiplication and carry-over of population.
- Ploughing of orchard during November-December to expose pupae to the sun's heat which kills them.
- If infestation is heavy, bait splash on the trunk only, once or twice at weekly interval is recommended. To prepare bait splash, mix 100 gm jaggery in one litre of water and add 1-2 ml of deltamethrin by using an old broom

- Managing fruit flies also reduces Mango anthracnose disease and prevents late fruit Fall.

**Physical control:**

- Hot water treatment of fallen mature fruits at 48+ 1 °C for 4-5 min

**Mechanical control**

- Male annihilation technique: Set up a fly trap using methyl eugenol. Prepare methyl eugenol 1 ml/1 of water 1 ml of malathion solution...
- Take 10 ml of this mixture per trap and keep them at 25 different places for one ha between 6 and 8 am.

**Chemical control:**

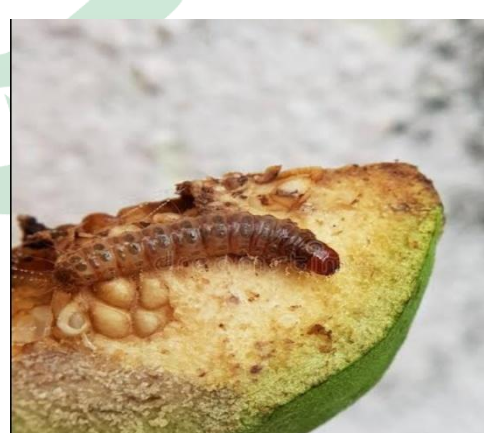
- The adult fruit flies can also be controlled by bait sprays, Bait spray can be prepared by combining any one of the insecticides given
- below and protein hydrolysate or molasses or jaggery @ 10 gm per liter of water.
- fenthion 10 EC 1ml/l,
- malathion 50EC 2 ml/l,
- dimethoate 30 EC 1 ml/l,
- carbaryl 50 WP 4 g/l

Spray the mixture at 2 weeks interval before ripening of fruits.

**Insect Peste of Guava (*Psidium guajava*)**

**1) Guava Fruit Borer – *Deudorixisocrates***

**Damage Symptoms –**



- Larvae bore inside the developing fruits and feed on pulp and seeds just before the rind exhibiting round bore holes on fruit.
- Infested fruits are also attacked by bacteria and fungi, which ultimately fall off and give an offensive smell.
- Fruit rotting and dropping.
- Fruits damaged by *D. isocrates*.

#### MANAGEMENT –

##### Cultural control:

- Cover fruits with paper bags.
- Remove and destroy the affected fruits.

##### Mechanical control:

- Remove weeds of compositae family.
- Prune the affected parts of the plant and destroy them. Detect early infestation by periodic monitoring Install light trap @ 1/ acre to monitor and mechanical collection of insects.

##### Chemical Control:

- Spray malathion 50 EC at 3 L or endosulfan 3 Litr dimethoate 30 EC 3 L in 1500-2000 L water per ha, two rounds, one at flower formation and next at fruit set.

#### 2) Guava Fruit Fly –*Bactrocera diversus*

##### Damage Symptoms –

- Adults and maggots attack semi – ripe fruits
- Oviposition punctures on fruits
- Maggots destroy and convert pulp into a bad smelling
- Discoloured semi-liquid mass.





## Management

- Collect and destroy fallen and infested fruits
- Summer ploughing to expose pupa
- Use methyl eugenol lure trap (25/ha) to monitor and kill adults of fruit flies
- Prepare methyl eugenol and malathion 50 EC mixture at 1:1 ratio( take 10 ml mixture/ trap)
- Insecticides: malathion 50 EC 0.05%
- Bait spray combining molasses or jaggery 10g/l and one of the insecticides,
  - malathion 50 EC 2 ml/l
  - dimethoate 30 EC 1ml/lit, two rounds at fortnight intervals before ripening of fruits.

## Conclusion

The future tropical fruit production depends on many complex factors. These include global climate change, competing conservation needs, increasing land scarcity, environmental degradation, globalization, and the need to meet the growing demands of a rapidly growing global population and middle-class expansion. Common strategies for enhancing tropical fruits' production and trade include increasing productivity, improving quality, and upgrading postharvest. Tropical fruits occupy a distinguished place in the world's horticultural trade. They are grown in conditions that favour pathogens and insect infestations, grow far from important Markets, and frequently in regions in developing countries that lack basic infrastructure For postharvest handling and storage. In addition, most of these crops are chilling sensitive and are characterized by a short postharvest life. Tropical fruits are grown both in the Northern and southern hemispheres of the world which ensure the year around availability of these fruits to the nonproducing countries.

## Reference

- [https://agritech.tnau.ac.in/crop\\_protection/crop\\_prot\\_crop\\_insectpest%20\\_Mango\\_pest](https://agritech.tnau.ac.in/crop_protection/crop_prot_crop_insectpest%20_Mango_pest)
- <https://www.slideshare.net/SubhomaySinha1/mango-insect-pests-and-their-management>
- <https://www.fao.org/3/y5143e/y5143e1a.htm>
- <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=148616>