

INSECT PESTS OF FRUITS



ASIAN CITRUS PSYLLID



Asian Citrus Psyllid (ACP)

Diaphorina citri Kuwayama (Hemiptera: Liviidae)

- Female lays 500 almond-shaped, orange and stalked eggs tucked into the tips of tiny new leaves
- Hatching 1 week
- They are difficult to see because they are so small



- Five wingless immature stages called nymphs
- Nymphs produce waxy tubules that direct the honeydew away from their bodies
- These tubules are unique and easy to recognize
- Nymphs can only survive by living on young, tender leaves and stems
- Nymphal period: 2 weeks



- Adults are small, about the size of an aphid
- Adult can feed on either young or mature leaves
- When feeding, the adult leans forward on its elbows and tips its rear end up in a very characteristic 45° angle



- As the psyllid feeds, it injects a salivary toxin that causes the tips of new leaves to easily break off
- If the leaf survives, then it twists
- Twisted leaves can be a sign that the psyllid has been there



Why are we so worried about ACP?

ACP can pick up the bacterium that causes Huanglongbing (HLB) disease or citrus greening disease and move the disease from citrus tree to tree as it feeds



- Huanglongbing means “yellow shoot disease” in Chinese
- It causes branches of citrus trees to turn yellow

Management

- Apply insecticides to control ACP in commercial citrus
 - Imidacloprid SL 40ml/100 L of water
 - Endosulfan EC 200ml/100 L of water
- Biological control
 - Ladybird beetle
 - Green Lacewings

CITRUS CATTERPILLAR / LEMON BUTTERFLY



Taxonomy

- *T.N:* *Papilio demoleus*
- *Family:* Papilionidea
- *Order:* Lepidoptera



Identification

- Eggs are small, rounded and pale in colour
- The caterpillar is yellowish green
- It has a horn like structure on the dorsal side of the body
- The caterpillar also have two reddish lines posterior to head
- The adult is a large beautiful butterfly with dark green colored wings having black spots



Life Cycle

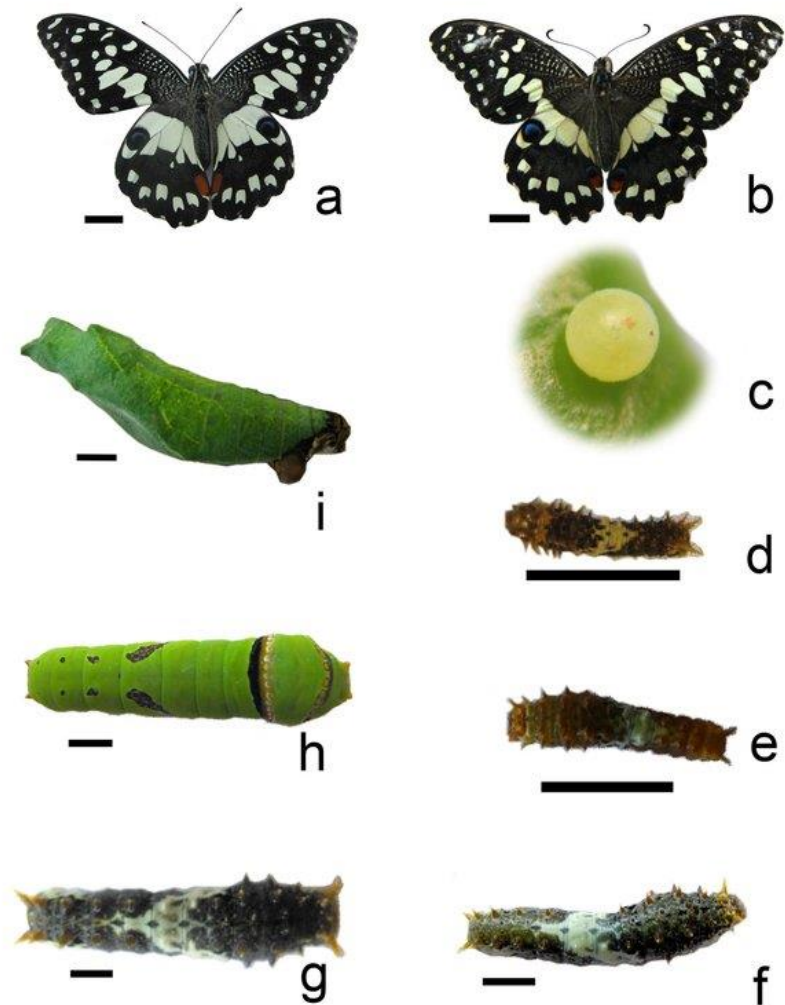


Figure: Lifecycle *Papilio demoleus*: a. Female butterfly; b. Male butterfly; c. Egg; d. 1st instar larvae; e. 2nd instar larvae; f. 3rd instar larvae; g. 4th instar larvae; h. 5th instar larvae; i. Pupa.

Life Cycle

- The female lays nearly 100-150 eggs singly or in groups
- Larva lives for 1-2 weeks
- Larva spins a cocoon around its body and pupates
- Pupal duration is one week
- Adult life is less than one week

Damage

- Larva feeds on young/ tender leaves and terminal shoots
- Their habit is to eat from edge up to midrib
- Larger caterpillar can feed on mature leaves



Control

- Hand picking of larvae
- *Trichogramma spp.* are effective egg parasitoids
- Spray of 3% neem extract is also effective
- Spray trees with
 - Endosulfan 35 EC
 - Methamidophos 60SL (200ml/100 L of water)

CITRUS LEAF-MINER



Introduction

- Citrus leafminer (CLM)
 - *Phyllocnistis citrella* Stainton
 - (Lepidoptera: Gracillariidae)
- Attacks almost all citrus cultivars
- Newly emerged leaves are preferred feeding sites
- Larvae feed by generating mines
- Leaves become curled
- Leaf deformation and drop



CLM – Citrus canker

- Exacerbation of citrus canker disease
- CLM larvae contaminated with bacteria, transported them through feeding galleries
- Intensity of disease increased with injuries caused by CLM



Adult

- The adult moth have black eye,
- Forewings - white and black spot on each wing tip.
- Adults are 2mm long with a wingspan of about 4mm.
- Adult life is 2-3 weeks

Larva

- Most damaging stage is larval stage.
- Adult female - lays single eggs on lower or upper surface of newly emerging leaves
- Larva lives for 2-4 weeks



Pupa

- Last larval stage - curl the leaf around itself, as a form of protection where it completes it's pupal stage
- Pupal duration is 1-2 weeks



Management

- Avoid pruning live branches more than once a year
- Don't apply high dose of nitrogen fertilizer and don't do pruning during pest's peak population.
- Manually remove affected leaves and destroy them
- Use pheromone traps on orchard.

- **Biological method** - Naturally occurring wasps such as, *Cirrospilus* and *Ageniaspis* species acts as larval parasitoid

- **Chemical method**
 - Bifenthrin 10 EC 40ml/100 L of water
 - Imidacloprid 200 SL 40ml / 100 L of water
- `Azadirachtin (7-14 days interval depending upon pest infestation).

MANGO HOPPERS

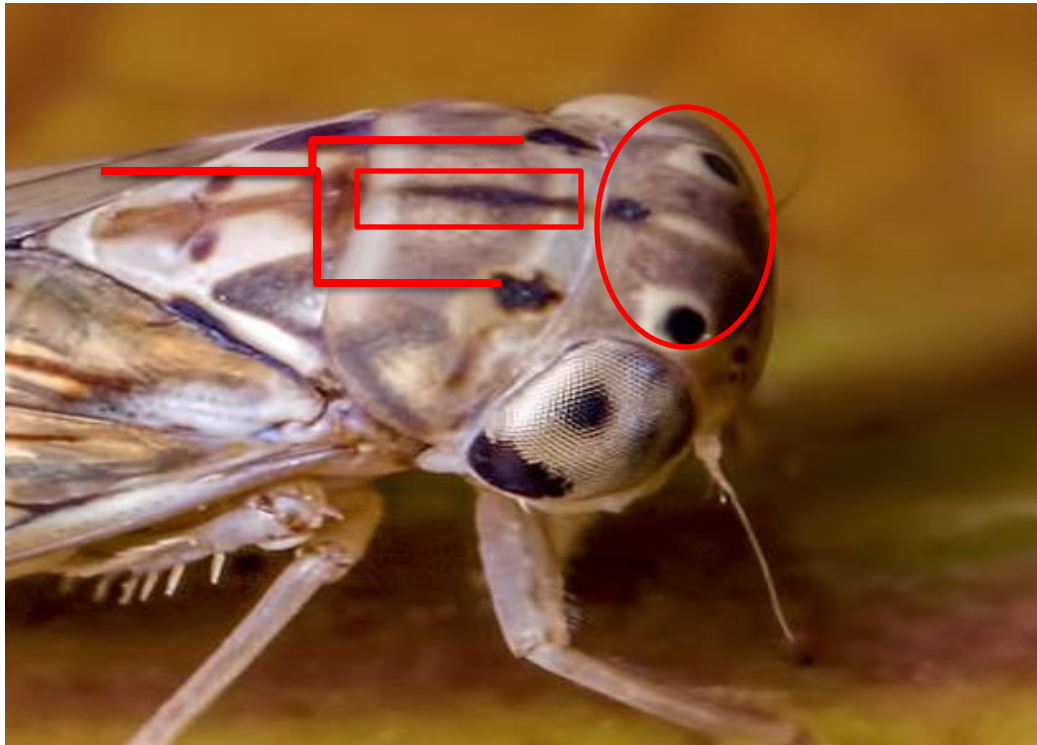


Taxonomy

- *T.N:* *Amritodus atkinsoni*
- *Family:* Cicadellidae
- *Order:* Homoptera

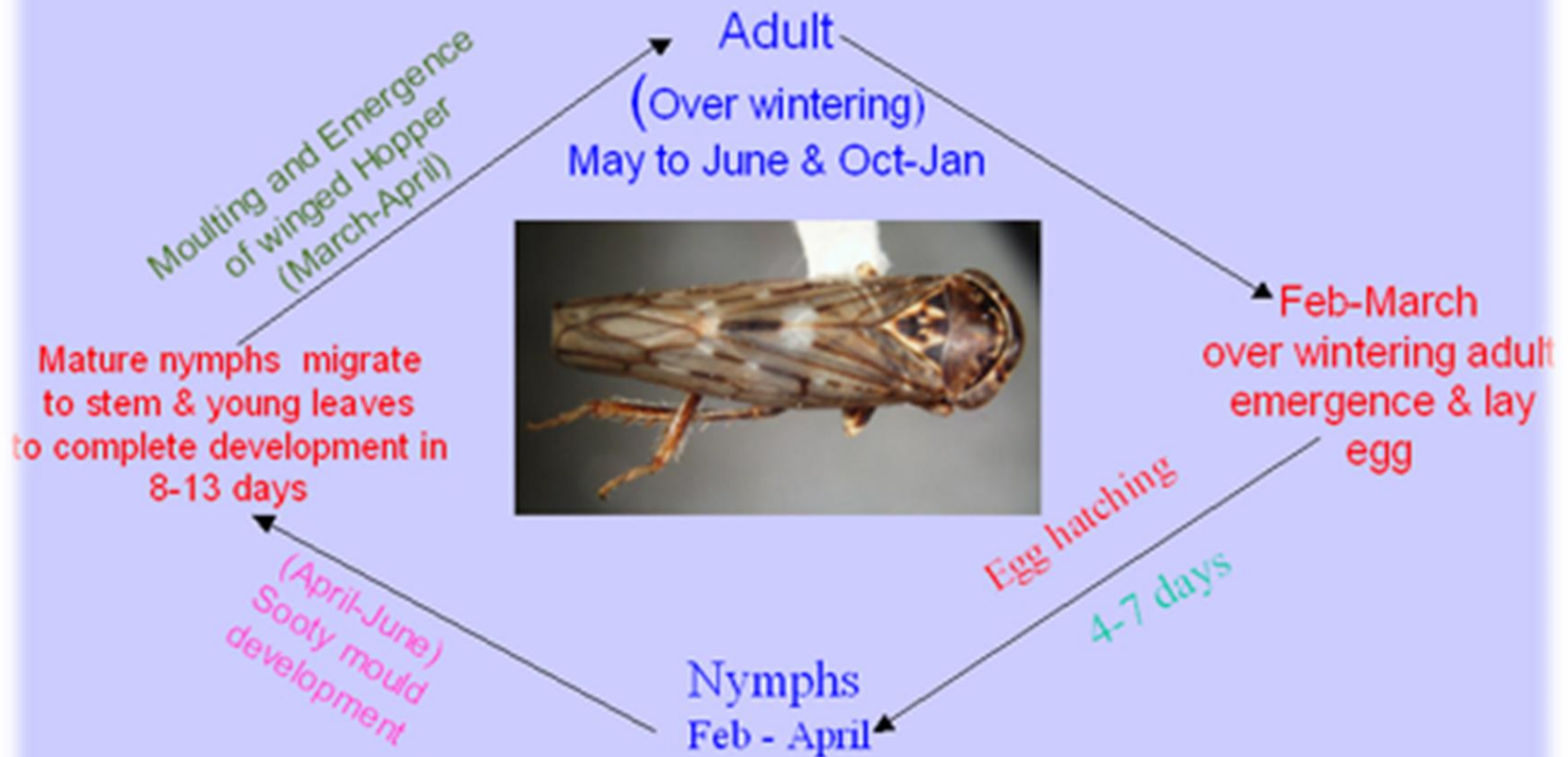
Identification

- Adult are grayish
- There are three dark brown spots on the head, a median line and two black spots on the pronotum
- Nymphs: Dull Green



Life Cycle

Mango Hopper



2nd cycle in Monsoon -

July - Aug (Egg & Nymphs)
September (Adult emergence)
Oct - Jan (Hibernation)

Damage

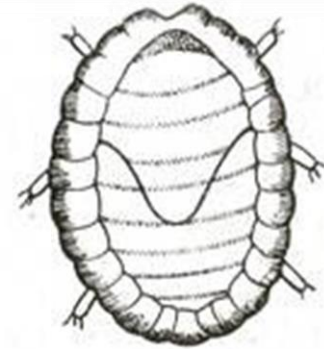
- The nymphs are particularly harmful, as they are voracious feeders
- They cause the inflorescence to wither and turn brown by sucking cell sap
- Even if the flowers are fertilized, the subsequent development and fruit -setting may cease
- The nymphs also secrete drops of a sweet thick fluid on which a black fungus develops, adversely affecting photosynthesis



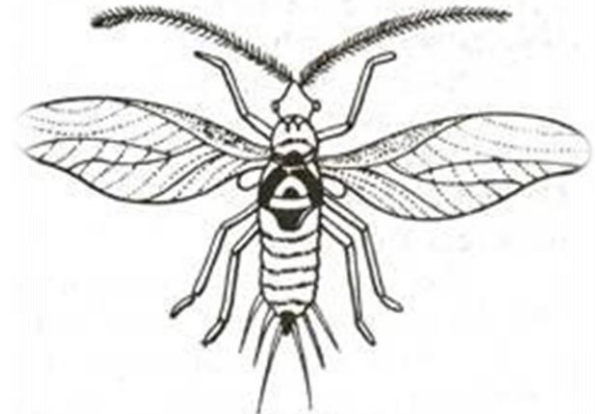
Control

- Dense plantings should be avoided
- Waterlogged conditions should be avoided
- Natural enemy of mango hopper is *Epipyrops spp.* should be encouraged
- Spray trees
 - Deltamethrin EC 400ml/100 L water
 - Imidacloprid SL 50ml/100 L of water

MANGO MEALY BUG



Male



Female

Fig. 142. *Drosicha mangiferae*.

Taxonomy

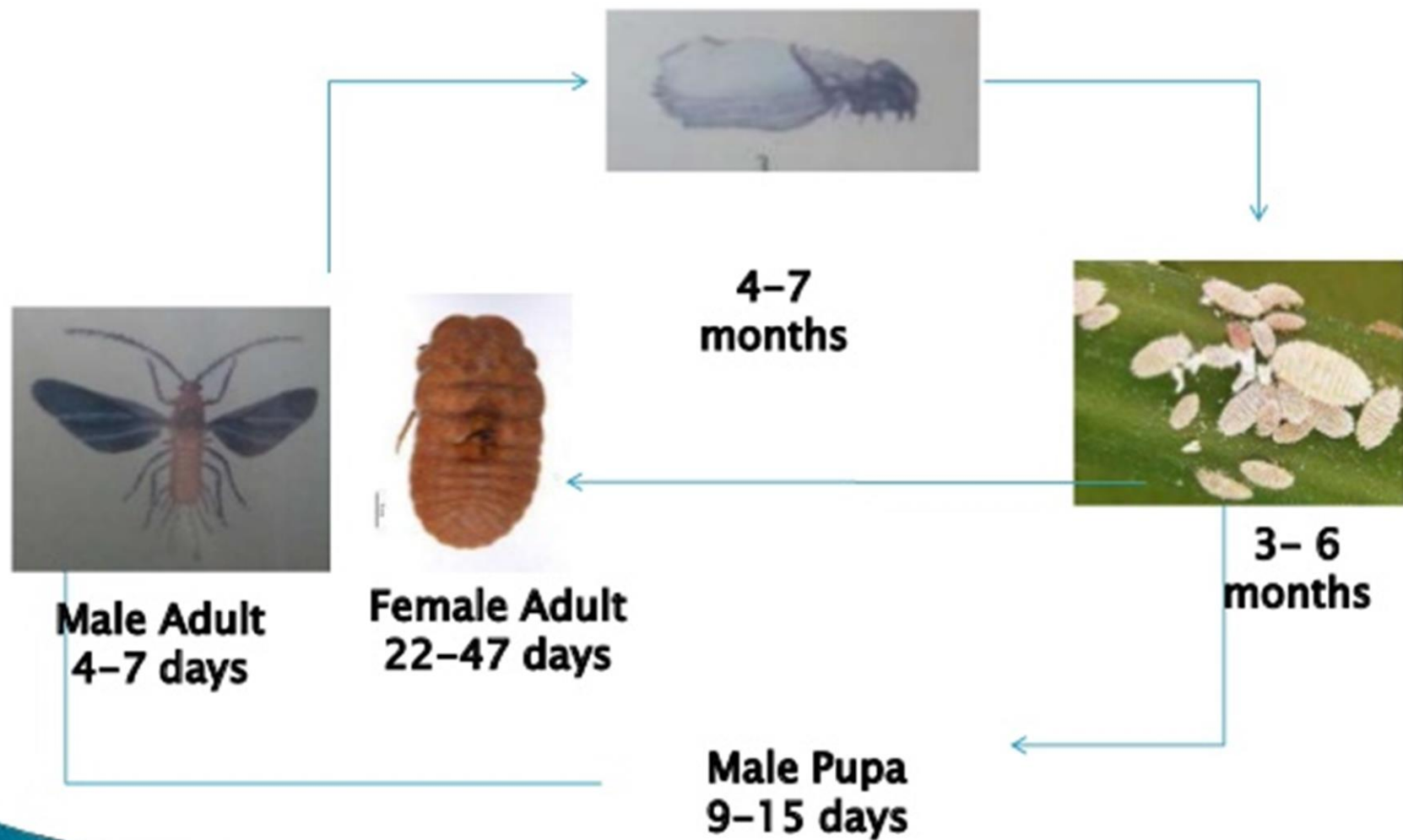
- *T.N:* *Drosicha mangiferae*
- *Family:* Margarodidae
- *Order:* Homoptera

Identification

- Eggs are pinkish or purple
- The wingless females are oval and flattened, with their body covered with white mealy powder
- Males have two pair of black wings and other body is crimson red



Life Cycle



Life Cycle

- In Pakistan, *Drosicha mangiferae* is univoltine and has a total lifecycle of 78–135 days
- Between April and May, purple-colored eggs are laid in egg-sacs consisting of a mass of wax threads, in the loose soil around (within 2–3 m radius) the infested mango trees.
- Eggs hatch in December–January and nymphs start crawling the trees to soft shoots and the bases of fruiting parts
- Nymphs go through stages of 1st instar (45–71 days), 2nd instar (18–38 days) and 3rd instar (15–26 days).
- Female and male appearance starts during March–April.
- Males are winged and short-lived after mating

Damage

- Only the nymphs and wingless females are destructive and they suck juice, causing the tender shoot and flowers to dry up
- Young fruits also become juiceless and drop off
- The pest is responsible for causing considerable loss to the mango growers and when there is a serious attack, the tree retain no fruit at all



Control

- Destroy the eggs laid under the infested tress. For this purpose, all dry leaves and twigs should be burnt in May- June
- Soil should be scraped to a depth of 15 cm to expose the eggs
- Nymphs should he prevented from crawling the trees by applying 8 cm wide sticky bands with greasy material or slippery bands or plastic sheets around the trunks at about 1 meter above the ground level during the second week of December
- Removal and destruction of weed hosts
- Coccinellid beetles are important predators of this pest
- The nymphs below the bands may be killed by spraying them with acetamiprid SP 100ml/100 L of water or imidacloprid SL 50ml/100 L of water



FRUIT FLY

Oriental fruit flies (Adults)



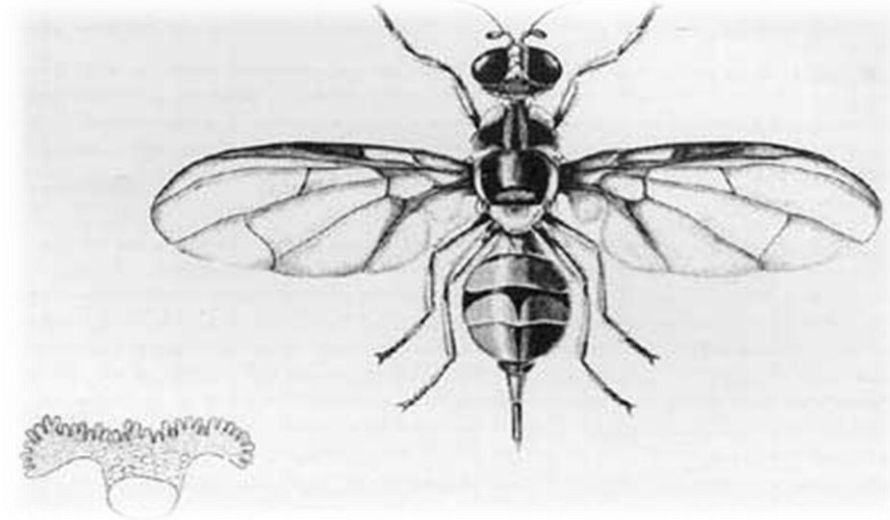
Female



Male

Taxonomy

- *T.N:* *Bactocera dorsalis*
- *Family:* Tephritidae
- *Order:* Diptera



Identification

- Female lays 50 eggs on an average
- The maggots are legless and yellowish in colour
- Fruit flies can be easily distinguished from ordinary flies by their triangular shaped abdomen and dark costal wing



MONITORING GUIDELINES

for *Bactrocera dorsalis*

Abbr.

Bactrocera dorsalis - BD
FruitFly Africa - FFA
Methyl Eugenol - ME
Production Unit Code - PUC

PLACEMENT

- In the orchard
- In the host tree
- 1,5 m above ground
- Place in shade
- Clear of leaves
- Additional trap in home garden

MONITORING

- Monitor all year
- Bi-weekly

REPLACE ATTRACTANT

- Every 6 – 8 weeks

RECORD KEEPING

Datasheet with the following details:

- Province and region
- Farm Name
- PUC
- Host/ cultivated crop
- Orchard number
- Date
- GPS coordinates
- Keep records

WHY MONITOR

- BD is a quarantine pest
- Monitoring data is required for special program registration
- Pro-active eradication/ control

HOW MANY TRAPS NEEDED

BD not present

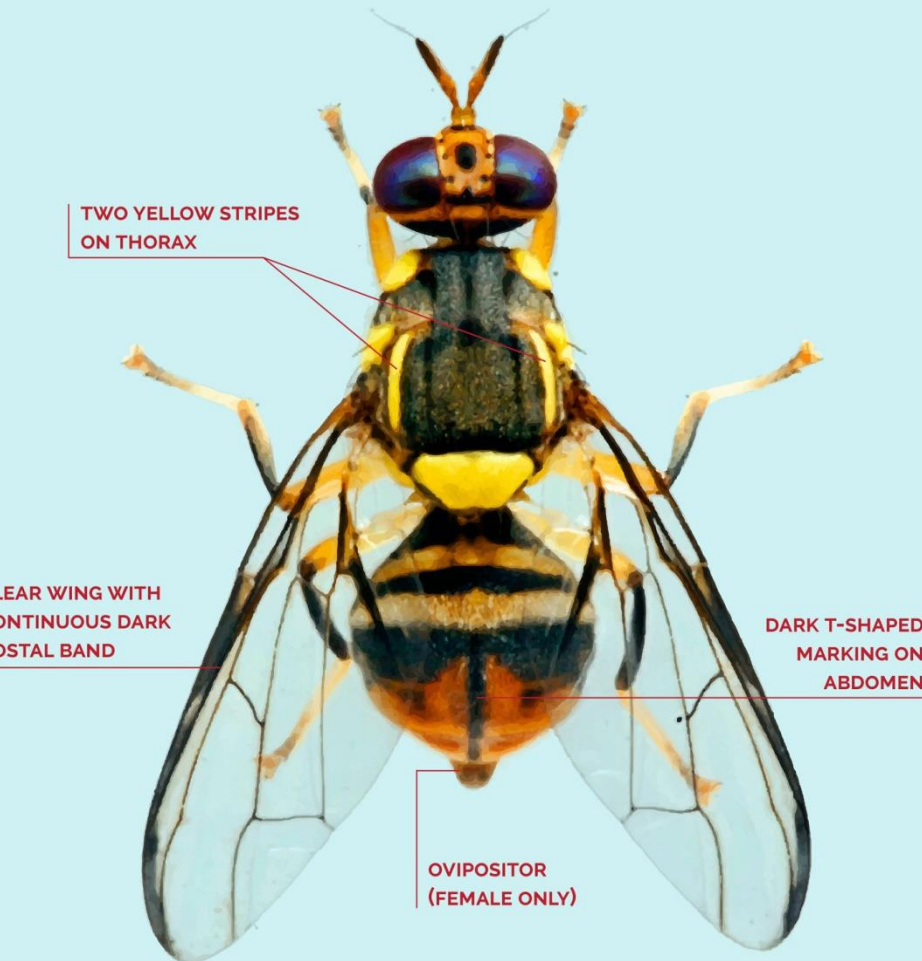
- 1/PUC
- 1/100 ha

BD present

- 1/PUC
- 1/25 ha

WHICH TRAP

- Bucket trap
- Lure: ME Dispenser
- Be cautious of cross contamination when handling ME.
- Insecticide: Dichlorvos strip
- Coat support wire with sticky ant barrier or Vaseline



NOTIFICATION

If in a BD free area:

- Notify FFA; Eloise du Plessis (eloise@fruitfly.co.za or 021 882 9541)
- Send specimen in vial to FFA

Life Cycle



Adult

7-14 days to
sexual maturation



Eggs

Oriental fruit fly Life Cycle

1-3 months



1-2 days



Larvae

10-14 days



Puparia

7-12 days



Life Cycle

- Shining whitish cigar shaped eggs are thrust into the skin of the ripening fruit, these hatch into footless maggots
- Maggots feed on the fruit pulp
- When full fed, they generally go to the soil, convert themselves into seed like pupa under the soil and emerge as flies after a week or ten days
- Life cycle is completed in 5-13 weeks
- There are many generations in a year



Damage

- Only maggots are destructive
- Maggots of these flies bore into the ripening fruits and very often cause appreciable injury, the fruits begin to rot and drop
- All sort of fruits and cucurbits, especially melons and bitter gourds suffer from these flies



Control

- Damage fruits should be rapidly destroyed
- Ploughing of soil and heavy irrigation are also helpful
- Pheromone traps of methyl eugenol are effective for their control
- Braconid wasps are effective in controlling these flies
- Spray
 - Trichlorphon WP 170 gm/100 L of water
 - Dichlorvos EC 100ml/ 100 L of water