

Diversity, Importance and Management of Fruit Flies

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SUMMARY





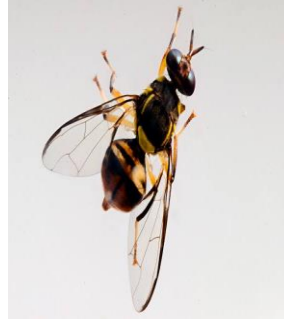
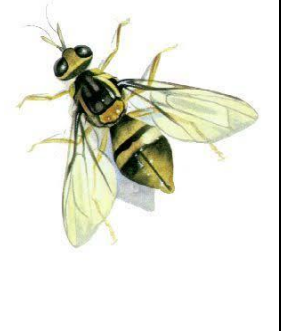






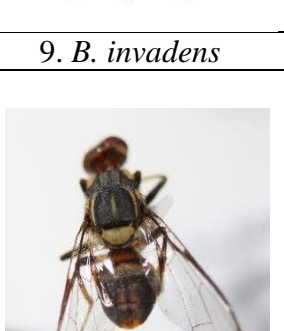
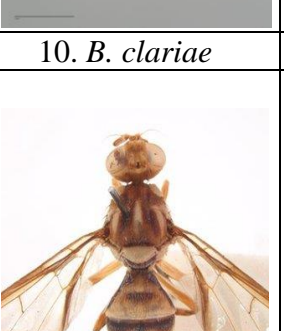
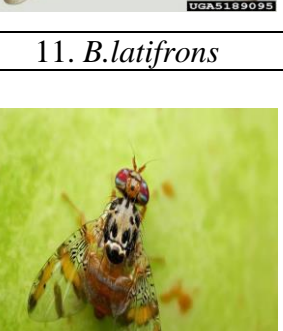
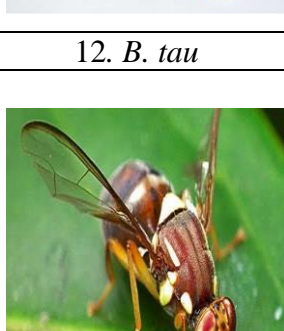
The fruit flies are one of the most destructive pests of fruits and vegetables around the world, causing huge economic losses and is a serious pest on a wide range of fruit crops in the Indian subcontinent. There are 325 species of fruit fly, of which 243 families and 79 genera are from India alone. In India, Oriental fruit fly, *B. dorsalis* is the most destructive fruit fly of mango, followed by peach fruit fly, *B. zonata* and guava fruit fly, *B. correcta*. The flies attack fruits at different stages of maturity but damage is more obvious at harvest maturity stages. *Bactrocera dorsalis* is reported to cause 100.0, 87.0, 78.0 and 61.0% fruit damage in rainy season on guava, mango, peach and pear respectively. There are also significant losses in Kinnow due to fruit flies. The infestation of oriental fruit fly are generally significant from April to June in mango orchard where as that of guava fruit fly is prevalent from first week of August upto the second week of January.

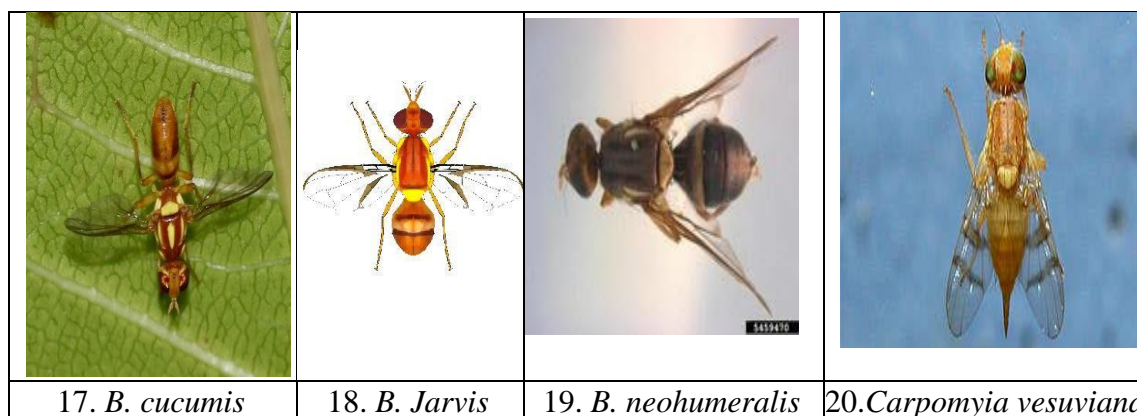
INTRODUCTION

Improving productivity and quality of fruits and vegetables enhance food security, employment and trade opportunities. Asian countries produced 178 million ton of tropical fruit which amounted to 66% of the global production. However, several factors constrain fruit and vegetable production such as tephritid fruit flies. They are so named because a number of species infest a wide variety of fruits and vegetables in tropical and subtropical regions of the world. These fruit flies cause direct damage to fruit and vegetables which can lead upto 90-100% yield loss depending on fruit fly population, locality, variety and season. Fruit flies are among the world's most serious pests of horticultural crops due to their direct economic impact as females oviposit inside the fruits and consequently young larvae feed on the pulp thus render them unmarketable. Fruit fly is any of numerous small, black or steely green flies of the family tephritidae, whose eggs are deposited in fruit for the larvae to feed on after hatching. Sometimes these are called Peacock flies due to their habit of strutting about, vibrating their wings and displaying their elaborate wing and body markings.

Different Species of Fruit Flies

1. Mango fruit fly or oriental fruit fly, *Bactrocera dorsalis* (Hendel)
2. Peach fruit fly, *Bactrocera zonata* (Saunders)
3. Guava fruit fly, *Bactrocera correcta* (Bezzi)
4. Melon fruit fly, *Bactrocera cucurbitae* (Coquillett)
5. Carambola fruit fly, *Bactrocera carambolae* (Drew and Hancock)
6. Papayae fruit fly, *Bactrocera papaya* (Drew and Hancock)
7. Asian fruit fly, *Bactrocera occipitalis*
8. Phillipines fruit fly, *Bactrocera phillipinensis*
9. Invasive fruit fly, *Bactrocera invadens* (Drew, Tsuruta and White)
10. Caryea fruit fly, *Bactrocera caryeae* (Kapoor)
11. Malaysian fruit fly, *Bactrocera latifrons* (Hendel)
12. Pumpkin fruit fly, *Bactrocera (Zeugodacus) tau* (Walker)
13. Three-striped fruit fly, *Bactrocera (Hemigymnodacus) diversa* (Coquillett)
14. Cucurbit Fruit Fly, *Bactrocera (Zeugodacus) scutellaris* (Bezzi)
15. Mediterranean fruit fly, *Ceratitis capitata*
16. Queensland fruit fly, *Bactrocera tryoni*
17. Cucumber fruit fly, *Bactrocera cucumis*
18. Jarvis's fruit fly, *Bactrocera jarvis*
19. Lesser queensland fruitfly, *Bactrocera neohumeralis*
20. Ber fruit fly, *Carpomyia vesuviana*

			
1. <i>B. dorsalis</i>	2. <i>B. zonata</i>	3. <i>B. correcta</i>	4. <i>B. cucurbitae</i>
			
5. <i>B. carambolae</i>	6. <i>B. papayae</i>	7. <i>B. occipitalis</i>	8. <i>B. philippinensis</i>
			
9. <i>B. invadens</i>	10. <i>B. clariae</i>	11. <i>B. latifrons</i>	12. <i>B. tau</i>
			
13. <i>B. diversa</i>	14. <i>B. scutellaris</i>	15. <i>C. capitata</i>	16. <i>B. tryoni</i>



Nature of damage

The female flies lay eggs just below the fruit epidermis (1 - 4 mm deep). On hatching the maggots feed on pulp of those fruits. Brown patch appears around the place of oviposition and the infested fruits start rotting due to fruit rotting bacteria that reproduce and cause the surrounding tissues rot. These affected fruits drop down prematurely and the maggots come out from these fallen fruits to pupate in the soil.



Management Strategies

Cultural Control

- Raking and Ploughing.
- Sound Crop Sanitation.
- Early Harvesting.
- Fruit Type Selection.
- Fly Control for Each Season.
- Picking up of Infested Ripe Fruit.
- Picking up of Fallen Fruit.
- Disposal.
- Host Plant Removal.
- Alternative Plants
- Solarization.
- Crushing.

Mechanical Control

- Wrapping of fruits.
- Bagging of fruits.
- Netting of fruits.
- Use of traps and baits that release specific volatile substances.
- Use of mega or khoka trap.

Though this is a laborious practice but is an effective method to prevent the attack of fruit flies on fruits (Badii *et al.*, 2015).

Male annihilation technique

- Para pheromones are used in controlling fruit flies.
- Aim of MAT is to reduce the population density of male fruit flies so that mating does not occur or mating gets reduced to very low levels.
- Mainly types of attractants used include
 1. Methyl eugenol (ME)- *Bactrocera dorsalis*.
 2. Cue lure (CUE)- *Bactrocera cucurbitae*.
 3. TriMed lure (TML)- *Ceratitidis capitata*.
 4. Terpinyl acetate (TA)- *Ceratitidis capitata*.
 5. Vertlure (VL)- *Daucus sp*

Chemical control

- Hydrolysed proteins and partially hydrolysed yeast are used in a ratio of 4:1 with organophosphates like Malathion.
- Wooden blocks which are impregnated with Methyl Eugenol and Malathion.
- Spray application of suitable insecticide twice at 15 days interval in the month of May in the severely infected area.
- The surrounding vegetation should be sprayed with the suitable insecticides such as Monocrotophos, Fenitrothion, Phosphomidon, Dimethoate and Deltamethrin *etc.*
- Plantation of *Ocimum sp.* (Tulsi) and keeping it sprayed with insecticide help in attraction and killing of male fruit fly.
- Fumigation of fruits in close containers with 0.5ml EDB for 12 hours or 1ml EDB for 4 hours per 50 kg fruits kills the maggots in the fruits.

Integrated Pest Management

- Collect and destroy fallen fruits at weekly intervals starting from initiation of fruit maturity
- Soil raking around and below trees to a depth of 6 cm in orchard crops
- Deep ploughing to expose hibernating stages
- Continuous picking of fruits with total harvest
- Spot application of 0.1% Malathion and 10% jaggery or protein hydrolysate or molasses solution should be done at spots of 15 m distance. The application should be done weekly starting 45 days prior to fruit maturity and also throughout the active season.
- Apply bait spray in spots to surroundings hedges also. Avoid spraying on fruits
- Annihilate male flies in methyl eugenol traps (cue-lure in case of flies infesting cucurbit hosts) or blocks (10 traps/blocks ha⁻¹). Start trapping about a month prior to fruit maturity
- Avoid delay in harvesting.

CONCLUSION

Attack of fruit flies is a major factor affecting the production of fruits crops. It is very difficult to target their damaging stage which is larvae because larvae of fruit flies feed under the skin of the fruits. Due to the fruit fly infestation farmers are suffering from huge losses. They are deteriorating the quality and decreasing the yield potential of fruits crops. There is urgent need to combine all the available management practices like cultural, physical, mechanical, behavioural, biological, chemical control *etc.* to manage fruit flies. It is very important to create awareness among farmers about the importance of these pests and the techniques of managing these pests so that they can grow a crop which is free from the infestation of fruit flies and earn a handsome amount of money in exchange of their crops.

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