Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 03, Issue: 06 (NOV-DEC, 2023)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Management of Melon Fruit Fly (*Bactrocera cucurbitae*) in Cucurbits

(*Ajit Kumar[1], Vijay Bahadur[1] and Lalit Kumar Sanodiya[2])
[1]Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, UP
[2]Department of Agronomy, United University, Jhalwa, Prayagraj (U.P.)
*Corresponding Author's email: ajitkumar0466@gmail.com

Abstract
The melon fruit fly, *Bactrocera cucurbitae* (Coquillett) (Diptera: Tephritidae) is distributed widely in temperate, tropical, and sub-tropical regions of the world. It has been reported to damage 81 host plants and is a major pest of cucurbitaceous vegetables, particularly the bitter gourd (*Momordica charantia*), muskmelon (*Cucumis melo*), snap melon (*C. melo* var. *momordica*), and snake gourd (*Trichosanthes anguina*). The extent of losses vary between 30 to 100%, depending on the cucurbit species and the season. Its abundance increases when the temperatures fall below 32° C, and the relative humidity ranges between 60 to 70%. It prefers to infest young, green, soft-skinned fruits. It inserts the eggs 2 to 4 mm deep in the fruit tissues, and the maggots feed inside the fruit. Pupation occurs in the soil at 0.5 to 15 cm below the soil surface. Keeping in view the importance of the pest and crop, melon fruit fly management could be done using local area management and wide area management. The melon fruit fly can successfully be managed over a local area by bagging fruits, field sanitation, protein baits, cue-lure traps, growing fruit fly-resistant genotypes, augmentation of biocontrol agents, and soft insecticides.

Keywords: Introduction, Distribution, Identification, Nature of damage and Management.

Introduction
This is the commonest and most destructive fruit fly of musk melon and other cucurbits throughout India. It is also found in Pakistan Myanmar Malaysia China Japan East Africa Australia and the hawaiian Island in addition to melon it has been found feeding on tomatoes chillies, guava, citrus, Peer, fig, cauliflower etc in North Western India it is very common on late sown melons that ripen after after the monsoon rain begin. Two other allied species common in India are *dacus ciliatis* Loew and *Bacterocera dorsalis*. Only maggots cause damage by feeding on near ripe fruits riddling them and polluting the pulp. The maggots are legless and appear as headless dirty white wriggling creature thicker at one and tapering to a point to others. A full grown maggot is 9-10 mm long and 2 mm broad in the middle the adult flies are reddish Brown with lemon yellow marking on the Thorax and have fuscous areas on outer margin of their wings.

Scientific classification of melon fly

Kingdom	:	Animalia
Phylum	:	Arthropoda
Class	:	Insecta
Order	:	Diptera
Family	:	Tephritidae
Genus	:	Bactrocera
Species	:	B. cucurbitae

Distribution

The melon fruit fly is distributed all over the world, but India is considered as its native home. It was discovered in Solomon Islands in 1984, and is now widespread in all the provinces, except Makira, Rennell-Bellona and Temotu (Eta, 1985). In the Commonwealth of the Northern Mariana Islands, it was detected in 1943 and eradicated by sterile-insect release in 1963 (Steiner et al., 1965; Mitchell, 1980), but re-established from the neighboring Guam in 1981 (Wong et al., 1989). It was detected in Nauru in 1982 and eradicated in 1999 by male annihilation and protein bait spraying, but was re-introduced in 2001 (Hollingsworth and Allwood, 2002). Although it is found in Hawaii, it is absent from the continental United States (Weems and Heppner, 2001).

Identification

- Adult fly:-The adult melon fly is 6 to 8 mm in length. Distinctive characteristics include its wing pattern, its long third antennal segment, the reddish yellow dorsum of the thorax with light yellow markings, and the yellowish head with black spots.
- Egg:-The egg is elliptical, about 2 mm long, and pure white. It is almost flat on the ventral surface, and more convex on the dorsal. Eggs are often somewhat longitudinally curved.
- Larva:-The larva is a cylindrical-maggot shape, elongated, with the anterior end narrowed a somewhat curved ventrally. It has anterior mouth hooks, ventral fusiform areas and a flattened caudal end. Last instar larvae range from 7.5 to 11.8 mm in length. The venter has fusiform areas on segments 2 through 11. The anterior buccal carinae are usually 18 to 20 in number. The anterior spiracles are slightly convex in lateral view, with relatively small tubules averaging 18 to 20 in number.
- Pupa:-The puparium ranges in color from dull red or brownish yellow to dull white, and is about 5 to 6 mm in length.

Fig. Life cycle of Cucurbit Fruit fly

Nature of Damage

The damage normally starts when fruit fly punctures the fruit with its long and sharp ovipositor. The maggots hatches from eggs feed on the fruits thus render them unmarketable. Fruit fly carry bacteria which decay the fruit and making it more nutritious for the maggots. Fruits finally drops down. The larvae pupate and adult flies starts emerging. The fruit subsequently rots or becomes distorted. Young larvae leave the necrotic region and move to healthy tissue, where they often introduce various pathogens and hasten fruit decomposition.

Management

Cultural control: Deep ploughing may help to expose the pupae. Crop rotation with legumes, corn or brassicas disrupts its life cycle. Trap crops such as bitter gourd and cucumber can be planted near melon crops to attract fruit flies away from the melons.Adjust

the sowing time to reduce the infestation as the fly population peaks in rainy season and low in hot day conditions.

Biological control: Introduce natural enemies such as parasitic wasps, Spray neem oil at 2 – 3 ml/lit water.

Chemical control: Chlorantraniliprole 18.5% SC in 0.3ml/lit water, Malathion 0.5% EC, Carbrayl 0.2% EC, Quinalphos 0.2% EC, Fipronil 40% + Imidacloprid 40% WDG in 0.5 gm/lit water

Bait traps: Food baits (sugar-based or protein-based baits) can be used to control fruit flies in melon. For example, ripe banana or sugar and yeast mixture can be used in traps to capture and kill fruit flies. Methyl eugenol can also be used in fruit fly traps to lure and kill male fruit flies.

Pheromone trap:- Use 6 – 8 pheromone trap per acre field to monitor and control fruit fly population.

Yellow sticky traps:- Yellow sticky traps will be most effective in trapping adult flies as they are attracted to bright yellow colour. Install 4 – 6 yellow sticky traps for 1 acre field.

Conclusion

1. The present study concludes that the melon fruit fly causes serious damage in musk melon preferably to young and immature stages. The melon fruit fly causes about 60% losses. Application of cue lure traps offer superior yield in terms of fruit size and quality, and reduced melon fruit fly infestation in musk melon. Although, cue lure is easy to prepare locally and is effective for the management of melon fruit fly, it requires more frequent applications owing to more labour cost. Therefore, future efforts should be made to increase the application of cue lures to make fruit cultivation a profitable business, and to protect environment and life.

2. References

3. Balagawi S. et al. 2012. Spatial and temporal foraging patterns of Queensland fruit fly Bactrocera tryoni for protein and implications for managmeent. *Aust. J. Ent.* 51:279-288.
4. Balagawi S. Jackson K. Clarke AR. 2013. Resting sites, edge effects and dispersion of a polyphagous Bactrocera fruit fly within crops of different architecture. *J. App. Ent.* 138:510- 515.
5. Broughton S, DeLima CPF. Field evaluation of female attractants for monitoring Ceratitis capitata under a range of climatic conditions and population levels in Western Australia. *J. Econ. Entomol.* 95:507-512.
6. Clarke AR 2010. The ecology of Bactrocera tryoni: What do we know to assist pest management? *Ann. App. Biol.* 158:26-54.
7. D'Aquino S 2011. Effects of kaolin based particle film to control Ceratitis capitata infestations and postharvest decay in citrus and stone fruit. *Crop Prot.* 30:1079-1086.
8. DeFaveri S et al. 2016. Farm-wide fruit fly management systems for the east coast of Australia. HIA Final Report MT12050.
9. Dominiak BC, Daniels D, Mapson R. 2011. Review of the outbreak threshold for Queensland fruit fly (Bactrocera tryoni). Plant Prot. Quart. 26:141-147.
10. Dominiak BC, Daniels D. 2012. Review of the past and present distribution of Mediterranean fruit fly (Ceratitis capitata) and Queensland fruit fly (Bactrocera tryoni) in Australia. Aust. J. Ent. 51:104-115.
11. Fruit fly research gap analysis. HIA Final Report VG13040. Fay HA. 2012. A highly effective and selective male lure for Bactrocera jarvisi. Aust. J. Entomol. 51:189-197.