

MANAGEMENT STRATEGIES OF CUCURBIT FRUIT FLY (*BACTROCERA CUCURBITAE*)

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Bactrocera cucurbitae is an extremely serious pest of cucurbit crops. The pest has been recorded nearly in 125 plants species including the members other than Cucurbitaceae family. They are strong fliers. Adult flies spend much time on green vegetation in nearby cultivated fields. They usually found on the vegetation of any dense plant, bush or tree. In hot weathers the flies hide on the shaded areas or underside of leaves. Flight is most common in the morning hours and in late afternoon. Adult flies feeds on juices from damaged fruits and nectar from flowers.

Host range

It has been reported that the flies has a host range around 80 plants including cucumbers, tomatoes, zucchini, hyotan, pumpkins, eggplant, togan, peppers, squashes, melons and gourds in which cucurbitaceous vegetables are major.

Distribution

Fruit flies are distributed widely in, tropical, sub-tropical and temperate regions of the world.

Nature of damage

Fruit fly damage starts during summer season and ends in rainy season. The extent of damage losses by fruit flies varies from 30 to 100% depending on the season and their abundance. Maggots feed inside the fruits and also sometimes feed on flowers and stems. Infected fruits can be identified easily by the presence watery fluid oozes from the punctures made by the flies which gradually becomes concave with seepage of liquid, and then later transforms into a brown resinous deposit. Occasionally pseudo-punctures have been observed on the fruit which reduces the market value. Larvae feeding from inside the fruits are the most damaging stage. Larval attack in matured fruits develops a water soaked appearance. The tunnels made by the larvae offers entry points for other micro organisms like bacteria and fungi for causing fruit rot as secondary damage with necrotic regions. The attacked fruit consequently rot or become distorted, malformed and fall prematurely. The larvae in addition attack young seedlings in all plants.

Biology

Generally, the female prefers to lay the eggs in unopened flowers soft tender fruit tissues by piercing them with the ovipositor. The eggs are slender, white and measure 0.8 inch in length. They hatch in 2 to 4 days. After hatching, the maggots bore into the fruits by making feeding galleries. These maggots reach approximately 0.5 inch in length upon maturity. The larval period is about from 6 to 11 days, with each stage more or less 2 days depending on the host and climatic conditions. Pupation takes place in the soil at 0.5 to 15 cm below. Pupae are 0.2 to 0.25 inch long, elliptical and dull white to yellowish brown in color with each segment ringed by distinct narrow

yellow bands around. Pupae are barrel shaped and brown colored from which adult flies emerge in two weeks from the puparium. Adult measure about 0.3 to 0.5 inch long with a wingspan of 0.5 to 0.6 inch. The head and eyes are dark brown with yellowish brown bodies having yellow spot above the base of the first pair of legs. Oviposition of females takes place in about 10 days after emerging as adult and continues to deposit eggs at regular intervals. One female is capable of laying around 1,000 eggs, in natural conditions. With high mobility and fecundity, each one is able to destroy more fruits in their lifespan. Adults feed on honey and nectar of flowers and juices of ripened fruits. Adults generally live for 10 months to a year and there are several generations in a year. The pest population is lowest during hot and dry weathers and highest during rainy seasons.

Management

Keeping in view the importance of the pest and crop, cucurbit fruit fly management could be done using IPM practices which include several components as it becomes a serious pest for marketing and as well as for self-consumption. Therefore, management of the pest depends on different components other than insecticides. If the use of insecticides has become necessary, then one has to rely on soft insecticides with low residual toxicity and short waiting periods. Repetitive use of insecticides by the farmers to control this fruit fly has become threat to the safety of the environment and also there are chances of increasing poisonous residues in the vegetables and also in the soil as well through accumulation. Keeping in view the importance of the fruit fly in cucurbits, management strategies should be done using different possible components of IPM listed as below.

Cultural Control

- Deep summer ploughing is recommended to expose pupae to hot sun.
- Collect infested, deformed and fallen fruits and buried in deep pits under soil surface.
- Change the sowing dates in endemic areas from rainy season to hot dry weather conditions.
- Weeds within 100 metres of fields should be removed.
- Grow tall plants I field borders like jowar, maize etc. as the flies have the habit of resting on such plants.
- Dispose all crop residues immediately after harvest.

Mechanical Control

- Bagging of fruits on the tree with paper or polythene covers as a protective covering.

Physical control

- By using attractants like eucalyptus oil, citronella oil, vinegar (acetic acid), and lactic acid flies can be trapped.

Chemical control

- When more than 10% of fruits are infected by the flies, spray the solution of malathion @ 1 ml with 20 grams of sugar or molasses per litre of water.
- Mix malathion + methyl eugenol @ 1:1 ratio and keep 10 ml of the bait in open pot lids around the field @ 25/ ha.
- Spray dichlorvos or malathion at 2 ml/litre, repeated at weekly interval if the attack is serious.



Monitoring with pheromone traps.

- Lure traps are commercially available for use against fruit flies which are effective for monitoring and controlling.

Host plant resistance

- HPR is an important component in IPM programs. Incorporating the resistance genes through wide hybridization to the cultivated susceptible genotypes from the wild relatives protect the crop against fruit flies.