



Pests of Cucurbitaceous Vegetables and Their Management

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The Fruit flies, snake gourd semilooper, pumpkin beetles, pumpkin caterpillar, stem borer or clear winged moth, bottle gourd plume moth, stem gall fly and leaf miners are the devastating pests of cucurbits in India. It starts to attack the crop from seeding stage continues till maturity of fruits and almost damages all the plant parts (shoot, leaf, flower and fruits). Under severe attacks at early stage of crop may cause complete failure of crop especially in rain fed areas. Mostly the pest is managed through application of synthetic chemicals. They are effective easy to apply and show rapid effects but they have begun to be withdrawn from the market in some developed countries owing to concerns about public health and environmental issues.

Introduction

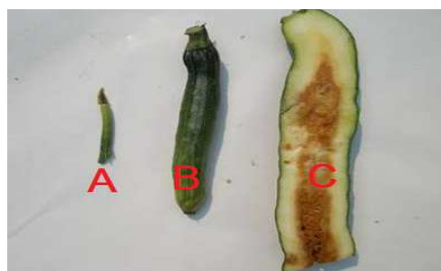
Cucurbits constitute the largest group of summer vegetables grown all over the world. In India, it accounts for an area of 39.1 lakh ha with production of 6889 MT. (Anonymous, 2013). Fruits of cucurbits are rich in iron, vitamins (A, B, C), proteins, minerals and have medicinal properties. Cucurbits are infested by a number of insect pests right from the germination up to harvesting stage, but a few of these viz., red pumpkin beetle, fruit flies and hadda beetle are of serious concern (Gupta 2004). Red pumpkin beetle, *Aulacophora foveicollis* (Lucas) is a widely distributed polyphagous pest of cucurbit crops in India. Cucurbitacins widely distributed in cucurbits, play a major role in host acceptance. However, Glucoside a triterpenoid found in bitter gourds acts as a feeding deterrent. The fruit flies constitute an important group of pests infesting cucurbit vegetables. Two species namely *Bactrocera cucurbitae* (Coquillett) and *Bactrocera tau* (Walker) commonly called as melon fruit flies are the major species found infesting cucurbits. The extent of losses caused by *B. cucurbitae* varies from 30 to 100% depending on the cucurbit species and season (Dhillon et al. 2005). These insect pests reduce the quality as well as quantity of cucurbit fruits and adversely affect the growth of plants. The infested fruits become unfit for human consumption and hence unmarketable. Keeping in view the huge losses caused by these pests, it was pertinent to undertake the studies on management of these pests.

1. Fruit flies: *Bactrocera cucurbitae* (Coquillett) (Tephritidae: Diptera)

Host range: Melons, tomato, chillies, guava, citrus, pear, fig, cauliflower, etc

Symptoms of damage:

- Maggots feed on the pulp of the fruits.
- Oozing of resinous fluid from fruits.
- Distorted and malformed fruits.
- Premature dropping of fruits.
- The attacked fruits decay because of secondary bacterial infection.



Picture: Different stages of squash fruit damaged by cucurbit fruit fly. **A.** Pre-set damage, **B.** Post-set damage, **C.** Harvested damage.

After the first shower of the monsoon, the infestation often reaches 100 per cent.

Identification of pest:

Eggs: Lay singly in clusters on fruits.

Larva: Dirty white apodous maggot.

Pupa: Pupate in soil.



Adult

<i>B. cucurbitae</i>	<i>B. ciliatus</i>	<i>B. zonata</i>
Hyaline wings with costal band broad and prominent, anal stripes well developed and hind cross veins thickly margined with brown and grey spots at the apex	Smaller than <i>B. cucurbitae</i> , ferruginous brown body, prominent dark brown oval spot on either side of 3 rd tergite.	Body yellowish with pale yellow band on 3 rd tergite and wing expanding 10-12mm costal band incomplete and anal band wanting.

Management

- ❖ Collect infested and fallen fruits and burn in deep pits.
- ❖ In endemic areas, change the sowing date as the fly population is low in hot dry conditions and at its peak during rainy season.
- ❖ Expose the pupae by ploughing and turning over soil after harvest.
- ❖ Use ribbed gourd as trap crop and apply carbaryl 0.15% or malathion 0.1% on congregating adult flies on the undersurface of leaves.
- ❖ Use attractants like citronella oil, eucalyptus oil, vinegar (acetic acid), and lactic acid to trap flies.
- ❖ Use poison baiting in severe infestation.
- ❖ Mix methyl eugenol + malathion 50 EC at 1:1 ratio and keep 10 ml of the bait in polythene bags @ 25/ha.
- ❖ Abamectin (0.0015%) was the most effective treatment in terms of reducing the fruit
- ❖ Infestation as well as number of maggots (Khursheed and Raj, 2012).
- ❖ **Use fly trap**
- ❖ Keep 5 g of wet fishmeal in polythene bags (20 x 15cm) with six holes (3 mm dia)
- ❖ Add 0.1 ml of dichlorvos.
- ❖ Dichlorvos should be added every week and fishmeal renewed once in 20 days @ 5traps/ha.

Caution: In cucurbits, DDT, lindane 1.3 D, copper oxychloride, Bordeaux mixture and sulphur dust should not be used as these are highly phytotoxic.

2. Snake Gourd Semilooper: *Plusia peponis* (Pyraustidae: Lepidoptera)

Host range: Melon, gourds, cucumber and cucurbits

Symptoms of damage: Both grubs and beetles damage. Grubs remain below the soil surface feeding on roots, underground stems of creepers and on fruits lying in contact with the soil. The adults feed on those parts of the plant which are above the ground. The early sown cucurbits are so severely damaged that they have to be resown.

Identification of pest:

Egg: White spherical eggs laid singly on tender leaves.

Larva: Green in colour with longitudinal white stripe humped last abdominal segments.

Pupae: Pupation takes place inside the leaf fold.

Adult: Brown moth with shiny brown forewings.



Management

- Collect and destroy the caterpillars
- Encourage activity of *Apanteles taragamae*, *A. plusiae*
- Spray any following insecticides
- ✓ Malathion 50 EC @500 ml/ha
- ✓ Dimethoate 30 EC @500 ml/ha
- ✓ Methyl demeton 25 EC @500 ml/ha

3. Red Pumpkin beetles: *Raphidopalpa foveicollis*/Aulacophora foveicollis**Purple bettle:** *A. cincta*, **Ash beetle:** *A. intermedia* (Galerucidae: Coleoptera)**Host range:** Ash gourd, pumpkin, tinda, ghia tori, cucumber and melon.**Symptoms of damage**

- Grubs feeds on the roots, stem and fruits touching the soil
- Adult feeds on leaf and flowers.

Identification of pest**Grub:** Freshly hatched dirty white, fully grown grub creamy yellow in colour***Aulacophora foveicollis*:** red in colour.***A. cincta*:** grey in colour having glistening yellow red border.***A. intermedia*:** blue in colour.**Management**

- Deep summer ploughing exposes the grubs and pupae.
- Collection and destruction of adults
- Dusting the plants with ash temporarily repel the beetle s.
- Dusting the soil and foliage with carbaryl 10D.
- Foliar spray with carbaryl 3g/l/ or methyl parathion 2 ml/l or dimethoate at 2 ml/l or malathion 2 ml/l and drenching the soil at root zone so as to kill the grubs.
- Synthetic pyrethroids show phytotoxic symptoms resulting in whitening of foliage.
- Plough the fields just after harvesting destroy the hibernating adults.
- Collect and destroy adult beetles.
- Spray malathion 50 EC @ 500 ml or dimethoate 30 EC 500 ml or methyl demeton 25 EC@ 500 ml/ ha.
- Use of egg parasitoid: *Trichogramma spp.*, larval Parasitoids: *Brachymeria tachardiae* *Trichospilus pupivora*.

4. Pumpkin caterpillar: *Diaphania indica* (Pyraustidae: Lepidoptera)**Symptoms of damage**

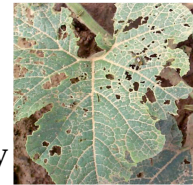
- Young larva scrapes the chlorophyll content.
- Later on it folds and webs the leaves and feeds within.
- It also feeds on flowers and bores into developing fruits.

Identification of pest

- ❖ **Egg:** Eggs lay singly or in groups on lower surface of leaves.
- ❖ **Larva:** Bright green with a pair of white mid dorsal lines.
- ❖ **Pupa:** Pupation takes place inside a cocoon among the leaves.
- ❖ **Adult:** Whitish wings with broad and dark marginal patches. Female have tuft of orange coloured hairs at anal end.

Management

- ❖ Collect and destroy early stage caterpillars.
- ❖ Encourage activity of parasitoid: *Apanteles spp.*
- ❖ Spray any following insecticides:
- ✓ Malathion 50 EC @500 ml/ha
- ✓ Dimethoate 30 EC @500 ml/ha



Infested leaf



Adult



Larva



Adult

- ✓ Methyl demeton 25 EC @500 ml/ha

5. Stem borer or clear winged moth: *Melittia eurytion* (Aegeriidae: Lepidoptera): It is a pest of snake gourd and occurs widely in India. Moth is clear winged with fan like tufts of hairs on hind legs. White larvae bore into the stems producing galls. Frass comes out of the gall through a hole made on it. Plants stunted with poor foliage. Pupal period 20-24 days in earthen cocoon in soil.

Symptoms of damage: Larva bores into the stem of snake gourd and produces galls.

Identification of pest

Larva: White in colour.

Pupa: Pupation takes place in earthen cocoon in the soil.

Adult: Dark brown moth with transparent wings.

Management

- Collect and destroy the damaged plant parts with larvae.
- Encourage activity of parasitoid: *Apanteles* spp.
- Spray any following insecticides-
 - malathion 50 EC @ 500 ml
 - dimethoate 30 EC 500 ml
 - methyl demeton 25 EC @ 500 ml/ ha

6. Bottle gourd plume moth: *Sphenarches caffer* (Pterophoridae: Lepidoptera)

Symptoms of damage: Larva feeds on leaves making small holes

Identification of pest

Egg: Eggs are laid singly on buds and leaves.

Larva: Small, cylindrical and yellowish green with short spines all over body.

Pupa: Greenish brown pupa.

Adult: Slender moth with lobed wings, fringed with scales.

Management

- ✓ Collect and destroy larvae and pupae
- ✓ Spray any following insecticides
 - Malathion 50 EC @500 ml/ha
 - Dimethoate 30 EC @500 ml/ha
 - Methyl demeton 25 EC @500 ml/ha

7. Stem gall fly: *Neolasioptera falcata* (Cecidomyiidae: Diptera)

Symptoms of damage: Maggots bore into the distal shoot and form galls.

Identification of pest

Adult: slender dark brown mosquito like fly.

Management

Spray any following insecticides

- Malathion 50 EC @ 500 ml
- Dimethoate 30 EC 500 ml
- Methyl demeton 25 EC @ 500 ml/ ha

8. Leaf miner: *Liriomyza trifolii* (Agromyzidae: Diptera)

Symptoms of damage:

- Leaves with serpentine mines.
- Drying and dropping of leaves due to severe infestation.

Identification of pest:

Larva: Minute orange yellowish apodous maggots.

Pupa: Pupates within mines.



Leaf mining symptom

Adult: Pale yellow in colour.

Management:

- ❖ Collect and destroy mined leaves.
- ❖ Spray NSKE 3%.



Adult

Note: HCH (BHC), DDT, copper and sulphur dusts are phytotoxic to gourds.

Conclusion

The fruit flies, snake gourd semilooper, pumpkin beetles, pumpkin caterpillar, stem borer or clear winged moth, bottle gourd plume moth, stem gall fly and leaf miners are capable of causing significant yield loss in cucurbits as these damage at all the stages of the crops. A single control strategy may not give satisfactory control and therefore integrated strategies would be more economical and ecologically sustainable. Periodical monitoring of field and ETL based application of recommended botanicals and synthetic chemical at right time at right dose would be more appropriate for successful management of these potential pests.

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