• Plant maize as a border crop seven days before sowing.
• Management of leaf miner by removal of cotyledon leaves infected with leaf miner one week after germination followed by spraying of neem seed powder extract @ 4% or neem soap @ 1% reduces the incidence of leaf miner.
• Set up yellow/blue traps/sticky traps 15 cm above the crop canopy for monitoring and mass trapping of Thrips, Whitefly, Aphids @ 10-20 traps per acre.
• Mechanically collect and destroy the pest like Epilachna and Red pumpkin beetles if incidence is low.
• Conserve the existing bio-control agents like Spiders, Coccinelids, Syrphid flies etc. in the field by avoiding, delaying and reducing the use of chemical pesticides and promoting the use of bio-pesticides including botanicals and microbial.
• Augment the bio-control agents like egg parasite Trichogramma spp., Telonomus sp., Bracon sp., Campoletis chloridea, C. blackburni, Chrysopa sp. Etc
• For management of fruit fly crush pumpkin 1 kg and add 100 gm jaggery and 10 ml Malathion and keep in the plot (4-6 places per acre). Adults are attracted to the fermenting pumpkin and lay eggs and get killed. Repeat the process 2-4 times in the cropping season.
• Bait Application technique (BAT) Spray liquid of 0.1% insecticide and 10% jaggery or 10% ripe banana at 200 spots/ha or Erect Cuelure (para pheromone trap) 3 per acre to attract and trap male fruit flies.
• Male Annihilation Technique (MAT) 5 x 5 cm2 wooden blocks soaked in solution of 6:4:1 ethanol: methyl eugenol: malathion for 48 hours hung @ 10/ha.

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**Integrated Pest Management (IPM) in Little Gourd (Coccinia grandis) for export purpose**

**Biodiversity in natural enemies: Parasitoids**

**Biodiversity in natural enemies: Predators**

Apply chemical pesticides strictly as per the recommendation of CIB&RC ([www.cibrc.gov.in](http://www.cibrc.gov.in)) as a last resort.

**Important activities for pest free bottle gourd production for export**

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**For more details please contact:**

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Coccinia grandis, the little gourd, also known as baby watermelon, ivy gourd, gentleman’s toes, tindora, or (misleadingly) gherkin, is a tropical vine. It is also known as Cephalandra indica, Kovakka, and Coccinia indica. Its native range extends from Africa to Asia, including India. In traditional medicine, fruits have been used to treat leprosy, fever, asthma, bronchitis, and jaundice. Young gourds can be cooked and eaten as a vegetable while the mature gourds are used to make decorative items such as bottles, containers and utensils.

I. Identification of important pest

1. Western Striped Cucumber Beetle (western spotted cucumber beetle, banded cucumber beetle) (Acalymma vittatum, Diabrotica undecimpunctata Diabrotica balteata):

The striped cucumber beetle is a small beetle approximately half a centimeters in length, and characterized by brown-yellow elytra completely covering the abdomen and longitudinally transversed by three thick black stripes.

Overwintering beetles move into cucurbit fields as seedlings are just cracking through the soil. Beetles prefer to feed on the cotyledons of cucurbits and can kill small plants. Feeding damage also occurs to the stem and true leaves. Beetles will also feed heavily on pollen and flowers. Fruit, usually pumpkin, squash and watermelon, can also be scarred as the outer rind will be eaten. When eggs oviposited in soil next to the base of plants hatch, larvae feed on the roots and stem of the plant (York, 1992). Feeding by adults or larvae when plants are small can stunt or kill plants. Somewhat larger plants can be defoliated by the adults.

2. Squash Vine Borer (Bmelitita cucurbitae):

The larvae are white, with a darkened head capsule. Newly emerged larvae are 1.5 to 2 mm long, tapered on the posterior end, and covered with numerous large hairs. As the larva matures, it develops a dark thoracic shield, loses its tapered shape and hairy appearance, and grows to a length of approximately 25 mm.

The adult squash vine borer is thought to resemble a wasp. They are approximately 16 mm in length, with a wingspan range of 25 to 38 mm. The front wings are covered with scales that give them a metallic green to black sheen. Large portions of the hind wings lack scales, making them look clear. The abdomen is covered with conspicuous orange to reddish hairs, punctuated dorsally with black dots.

Plant or owner wilting suddenly; entry holes in vines; sawdust like material at the base of the plant; may be yellow to brown feces coming out of holes. Adults emerge in spring; adults lay eggs on leaves and larvae burrow intro stems to feed.

3. Fruit Fly (Dacus cucurbitae and Ducus dorsalis):

The female fly oviposits on soft fruits. Cavity is made by sharp ovipositor and 12 cylindrical eggs are laid in the evening time and exuding gummy substance covers, cements and makes it water proof. Female lays 58-95 eggs in 14-54 days. Egg period is 1-9 days. The maggots are apodus (leg less), accephalous, dirty white, wriggling creatures, thicker at posterior end and tapering at the other to a point. Larval period is 13 days in summer and about three weeks in winter. Mature maggots come out and jump to ground and select suitable place, enter soil and pupate. Adults are reddish brown with lemon yellow markings on thorax with spotted wings. It is active throughout the year.

II. Pest Surveillance

Weekly monitoring through pest scouting with the help of monitoring device like pheromone traps, colored sticky traps should be practiced. For field scouting 300 fruits in 100 plants/acre in a cross diagonal pattern through zig zag manner is required to be observed for counting of each and every type of insects. Pest monitoring for fruit flies using Cue-lure traps should be done regularly from fruiting stage onwards. If 95% plants are found free from insect pests then the field will be considered fit for export.

III. Management Practices:

- Deep ploughing of field after the crop is harvested.
- Destruction of debris, crop residues, Weeds and other alternate hosts.
- Adoption of proper crop rotation.
- Use of Resistance varieties and tolerant varieties recommended by the State Agricultural Universities of the region.
- Use of Neem cake @ 8-10 tones per acre or vermi-compost @ 5 tons per acre treated with Trichoderma sp. and Pseudomonas sp. @ 2 kg per acre as seed / nursery treatment and soil application.
- Soil application of neem cake @ 250 kg/ha immediately after germination and repeat at flowering followed by sprays of neem soap 1% or PNSPE 4% at 10 days interval after flowering.
- Always treat the seeds with approved chemicals/bio products for the control of seed borne diseases/pests.
- Follow the recommended procedure of trap crop technology.