- Use ribbed gourd as trap crop
- Hand collection and destruction of infested leaves and fruits
- Use attractants like citronella oil, eucalyptus oil, vinegar (acetic acid), dextrose and lactic acid to trap flies.
- Apply the bait spray containing 50 ml of malathion 50 EC + 0.5 kg of gur/sugar in 50 L of water per ha. Repeated at weekly intervals. Keep the bait in earthen lids placed at various corners of the field.
- Spray the bait on the maize plants grown as trap crop
- Use fly trap: Keep 5 g of wet fishmeal in plastic container with six holes (3 mm dia), two cm from the bottom of the bag. Add a drop (0.1 ml) of dichlorvos in cotton plug and keep it inside the bag. Dichlorvos should be added every week and fishmeal renewed once in 20 days (20 traps/acre).
- Use fly traps having methyl eugenol soaked plywood pieces (2” x 2”). Collect and destroy the flies.
- Conserve pupal parasitoids viz. O. piusfletcheri, O.compensatus, and O. insitus (Braconidae)
- Encourage activity of Apanteles plusia and A. taragamae

### CIB&RC recommended pesticide against cucurbit pests

<table>
<thead>
<tr>
<th>Pest/Pesticide</th>
<th>Dosage</th>
<th>Formulation (g m/litre)</th>
<th>Dilution (Litre)</th>
<th>Waiting period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Pumpkin beetle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dichlorvos 76%EC</td>
<td>500</td>
<td>627</td>
<td>500-1000</td>
<td>-</td>
</tr>
<tr>
<td>Trichlorfon 5%GR</td>
<td>500</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Trichlorfon 5% Dust</td>
<td>500</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Trichlorfon50%EC</td>
<td>500</td>
<td>627</td>
<td>500-1000</td>
<td>-</td>
</tr>
</tbody>
</table>

**Integrated Pest Management (IPM) in Pumpkin** (*Cucurbita pepo*) **for export purpose**

**Biodiversity in natural enemies:**
- Parasitoids
- Predators

**Important activities for pest free custard apple production for export**

**For more details please contact:**

**Plant Protection Adviser**

Directorate of Plant Protection, Quarantine & Storage
NH IV, Faridabad—121 001 (Haryana)
Tel: 0129-2410056, 2413985; Fax: 0129-2412125
E-mail: ppa@nic.in
Website: agricoop.nic.in, ppqs.gov.in

**Government of India**

Ministry of Agriculture & Farmers Welfare
Department of Agriculture, Cooperation & Farmers Welfare
Directorate of Plant Protection, Quarantine & Storage
NH IV, Faridabad—121 001 (Haryana)

Dr. S. N. Sushil, Plant Protection Adviser
Dr. J. P. Singh, JD (Ento.)
Dr. Neelam Chaudhary, AD (Ento.)
Dr. Mir Samim Akhtar, AD (Ento.)
Pumpkin (Cucurbita pepo) belongs to the family Cucurbitaceae and is grown primarily as a vegetable plant. Pumpkin plants are short lived annual or perennial vines with branching tendrils and broad lobed leaves. The plant produces large yellow or orange flowers and a pepo fruit (berry with a thick rind) known as a pumpkin.

I. Identification pest of Pumpkin

1. Fruit Fly (Bactrocera cucurbitae):
Eggs lay singly in clusters on fruits. Larva is dirty white apodous maggot and they pulate in soil. Fruit fly maggots feed on the internal tissues of the fruit causing premature fruit drop, yellowing and rotting of the affected fruits. This fruit fly is difficult to control because its maggots feed inside the fruits, protected from direct contact with insecticides.

2. Pumpkin beetles (Aulacophora foevicollis):
Adult are red colure, oblong 5-8 mm long, in their life span of 60-85 days, they lay about 300 oval, yellow eggs singly or in batches of 8-9 in moist soil, near the base of the plants. The eggs hatches in 6-15 days, freshly hatched grubs are dirty white; full grown are creamy yellow, 22 mm long. Grub period 13- 25 days and pulate in thick-walled earthen chambers in the soil, at a depth of about 20-25 cm. The pupal stage lasts 7-17 days. Life-cycle is completed in 26-37 days and the pest breeds five times in a year. Both grubs and beetles damage the crop, 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.

3. Pumpkin caterpillar (Diaphania indica):
Adult has transparent white wings with broad and dark brown marginal patches and orange colored anal tuft of hairs in the female. Eggs are laid singly or in groups on the lower surface of the leaves. Egg, larval, pupal periods last for 3-6, 9-14 and 5-13 days respectively. Larva elongate bright green with a pair of thin white longitudinal lines on the dorsal side. Pupation takes place in a cocoon in the flowers. Adult lives for 3 -7 days and females lays upto 366 eggs. Larvae webs leaves and feed. Ovaries and young developing fruits are also eaten. Affected flowers bear no fruits and infested fruits become unfit for consumption.

4. Squash Bug (Anasa tristis):
Adult squash bugs begin to fly into fields and gardens about the time the plants begin to run. They remove plant sap with the piercing -sucking mouthparts. Soon after beginning to feed, they start laying eggs, primarily on the undersides in the angle between veins. The bronze eggs are football-shaped and lie on their sides in groups of 12 or more. Eggs hatch in one to two weeks. Initially the larvae are dark red with a light green abdomen. Older nymphs are light gray in color with black legs. Young nymphs are gregarious and feed in groups. Nymphs require five to six weeks to mature into adults. Squash bugs spend most of their time around the base and stems of the plants and on the undersides of leaves.

Squash bugs damage plants by removing sap and causing leaves to wilt and collapse. Young plants and infested leaves on older plants may be killed.

II. Pest Surveillance

Weekly monitoring should be done through pest scouting with the help of monitoring devices like pheromone and colored sticky traps. For field scouting 300 fruits from 100 plants per acre should be observed. Minimum 15 spots at reasonable distance with each other following a cross diagonal pattern moving zig zag manner for counting all type of insects. Pest monitoring for fruit flies using 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. Integrated Pest Management strategies

The following Good Agricultural Practices should be adopted for the management of various pests of pumpkin:

- Collect infested fruits and dried leaves and dump in deep pits.
- Change the sowing dates as the fly population is low in hot dry conditions and at its peak during rainy season.
- Early planting of pumpkin during October – November to avoid damage by pumpkin beetle
- Frequent rake the soil under the vine or plough the infested field after the crop to kill eggs, grubs and pupae.