BITTER GOURD

Scientific name: *Momordica charantia*

Mizo: *Changkha*

Hindi: *Karela*

English: *Bitter gourd*

Bitter gourd contains Iron, vit: A, B and C. It is also a cheap source Protein and minerals essential for healthy body. It is considered good for curing blood disease, rheumatis, diabetes and asthma. The fruit is reported to have hermicidal effect and is laxative, it is also easily digestible.

Climate:
- It a warm season crop, but has a wide range of adaptability and can be grown in a region with comparatively low temperature.
- At temperatures between 25°C - 30°C, the growth is normal and yields are high. When the temperature is less than 18°C, the growth is slow leading to poor yield. If the temperature goes above 40°C, more male flowers are produced, and plants become prone to mosaic disease.

Soil:

The crop can be grown in all types of soils, but sandy loam and silt loam soils are most suitable. The best pH would be 6.5 - 7

Sowing:
- In hills, the seed is sown from April – July.
- the second crop is taken in June, July.
- 4 - 5 kg / Ha seed rate is sufficient. The seed is to be treated with @ 2 gm / 1 kg of seed by soaking the seed for 6 hours. This will facilitate germination and protect from seed borne disease and insect pests.
- Germination takes longer at low temperature. Seed germination is optimum at 25 - 35°C and inhibited at. 8°C and above 40°C.
- 4 seeds are sown per pit and later 2-3 seedlings per pit are retained
**Manuring and fertilization:** The requirement of fertilizers depend upon the types and condition of the soil. However the general recommendations are as follows:

- **FYM:** 20-25/ha
- **N:** 100 kg/ha
- **P:** 50 kg/ha
- **K:** 50 kg/ha

**Pit method:**

Bitter gourd can also be grown by using pit method. In pit method, pits are dug at 45 cm x 45cm x 45 cm at a spacing of 2m apart. The pit should be filled with 20 g of N, 30 g of P and 30 g of K alongwith top soil. After flowering (ie 45 – 50 days) 20 g of N / pit should be applied again.

**Harvesting:**

Flowering starts in Bitter gourd by 45 - 55 days after planting and the first picking could be taken in 60 – 70 days after planting depending upon variety, planting season, soil types, management practices etc.

Immature, tender fruits are harvested, the color of tender fruit is light green or dark green or whitish green depending on variety. Regular harvesting at shorter intervals will increase the fruit number and irregular harvesting may delay the formation of successive fruit production and effect their growth and development adversely.

**Yield:**

It can yield 100-150 Qntl / Ha depending upon the variety and time of planting.

**Post Harvest Management:**

Bitter gourd fruits harvested at 12 days maturity (12 days after pollination). The storage life of fruits at room temperature (25-30°C) is 3 days. The storage life of bittergourd fruits is extended to 6 days at room temperature (25-32°C) and 10 days at 12°C by modified atmosphere packaging with ethylene absorbent. The storage life is
extended to 14 days by post harvest treatment with 1-MCP (250 ppb) and packaging in polyethylene bag (100 gauge) and storing at 12°C.

**Plant Protection**

**Insect Pest:**

**Red pumpkin beetle** (*Aulacophora foveicollis*, *A. lewisi*):

**Nature of Damage:**
- Adults feed on the foliage, buds and flowers:
- Grubs feed on roots.
- Beetles damage the leaves, flowers and fruits. Making irregular holes and causing death and retardation of growth.
- The grubs live in the soil and feed on roots and stem of plant.
- Fruits and leaves also get damaged when comes in contact with soil.
- Damaged roots, stems start rotting.

**Control Measures:**
- Preventive measures like burning of old creepers, ploughing & harrowing of field after harvest of crop to destroy the stages of pest.
- Collection & destruction of beetle in early stage of infestation.
- Spraying with 0.05% malathion or dusting with 5% malathion dust @ 10 kg/ha.

**Melon Fruit fly** (*Dacus cucurbitae*)

**Nature of Damage:**
- Active during March-May
- Attack fruits,
- Reddish dark brown flies with hyaline wings, lay eggs under the skin of the fruits;
- Maggots feed on the pulp of fruits
- Infested fruits start rotting and rendered them unfit for human consumption;
- Fruits show dark-brown, rotten, circular patches and fall off prematurely

**Control Measures:**
- Clean cultivation, i.e. removal and destruction of fallen & infested fruits daily.
- Deep ploughing to expose hibernating stages.
- Application of spray baits.
- Spraying with 0.05% malathion or 0.2% carbaryl at flowering
**Blister beetle** (*Mylabris pustulata*)

**Nature of Damage:**
- Active during August to December.
- Black medium-sized beetles, feed on pollen and petals of flowers; affecting fruit-setting;

**Control Measures:**
- Hand collection & destruction of beetles.
- Collect & destroy the conspicuous beetles;
- Dust 4% Carbaryl or spray 0.05% Malathion

**Aphids** (*Aphis gossypii*)

**Nature of Damage:**
- Colonies of nymphs and adults attack leaves and tender shoots and suck the sap;
- Leaves curl and dry up.

**Control Measures:**
- Remove infested leaves and shoots in the initial stage;
- Spray 0.02% Pyrethrins or 0.05% Malathion or Dichlorvoe (DDVP)

**Mites** (*Tetranychus cucurbitae*)

**Nature of Damage:**
- Large colonies feed on the leaves, and are protected by fine shining webs;
- Leaves develop grayish patches and dry up

**Control Measures:**
- Dust sulphur or spray 0.05% wettable sulphur

**Disease:**

**Powdery Mildew:**

Powdery mildew caused by the fungus *Erysiphe cichoracearum*, affects cucumber, muskmelon, pumpkin, and squash. It is caused by a fungus that appears as a white powdery growth on leaves. Crown leaves are affected first and may wither and die.
Management:

- Crop rotation should be followed
- Spray Dinocap(0.1%) or Wettable sulphur (0.2%) or Calixin (0.5%) 2-3 times at 10 days intervals after disease appearance.

**Downy Mildew:**

Downy mildew on cucumber and muskmelon is caused by the fungus *Pseudoperonospora cubensis*. Irregularly shaped yellowish to brown spots appear on upper sides of leaves, usually at the center of plants. Under moist conditions, a purplish mildew develops on the underside of leaf spots. Leaves die as spots increase in size. Spread is rapid from the crown toward new growth.

Management:

- Removal of badly infested leaves followed by chemical spraying prevent spread of the disease.
- Spray Mancozeb (0.2%) at 8-10 days interval.

**Anthracnose:**

Anthracnose, caused by the fungus *Colletotrichum lagenarium*, affects cucumbers, muskmelons, and watermelons. Muskmelon and cucumber leaf spots begin as yellowish or water-soaked areas that enlarge rapidly, turn brown, and shatter to form a ragged hole within the spot. Leaf spots on watermelons turn black. Elongated dark spots with light centers often develop on petioles and stems and can cause death of tissue beyond these spots. Young fruit may be killed, but large fruit usually develop depressed dark-bordered cankers with creamy pink colored ooze in the center.

Management:

- Spray Mancozeb (0.2%) or Hexacap(0.25%)or carbendazim(0.1%) at 15 days interval.
**Mosaic Viruses:**

Mosaic Viruses are important on muskmelons, summer squash, and cucumbers. Three viruses that affect cucurbits are cucumber mosaic virus (CMV), watermelon mosaic-2 (WM-2) and squash mosaic virus (SqMV). Vines on mosaic-infected plants are stunted, and new leaves are dwarfed, mottled, and sometimes distorted. On CMV-infected muskmelons and cucumbers, new leaves sometimes wilt and die; old crown leaves may turn yellow and dry up, resulting in a slow decline of affected plants. CMV and WM-2 overwinter in some biennial and perennial plants and usually are carried to new plantings by aphids. SqMV overwinters and is introduced to new plantings in infected seed. Within plantings, CMV is spread chiefly by aphids (but also by cucumber beetles), WM-2 is spread by aphids, and SqMV is spread by cucumber beetles and workers

**Management:**

- Eliminate weed hosts from field
- Crop rotation should be followed
- Cucurbitaceous crops should not grown regularly in the same field
- Spray Diamehoate (0.05%) or Oxy demeton methyl (0.02%) at weekly interval.
- Use barrier crops- sunflowers – all around