Capsicum – production technologies

Capsicum is variously called as green pepper, sweet pepper, bell pepper, etc. In shape and pungency it is different from chilli. It is fleshy, blocky, of various shapes, more like a bell and hence named bell pepper. Almost all the varieties of green pepper are very mild in pungency and some of them are non-pungent, and as such they can be used as stuffed vegetable.

Climate
It requires a similar climate like that of chilli and is also susceptible to frost. It prefers milder climate than chilli and 21 to 25°C is ideal for green pepper. Higher temperatures are detrimental to fruit set. High temperature and low relative humidity at the time of flowering increases the transpiration pull resulting in abscission of buds, flowers and small fruits. Moreover, higher night temperatures are found to be responsible for the higher capsicin (pungency) content in green pepper.

Soil
Although sweet pepper can be grown in almost all types of soils, well drained clay loam soil is considered ideal for its cultivation. It can withstand acidity to a certain extent. Levelled and raised beds have been found more suitable than sunken beds for its cultivation. On sandy loam soils, the crop can be successfully grown provided the manuring is done heavily and the crop is irrigated properly and timely. The most suitable pH range of soil for green pepper is 6 to 6.5.

Varieties
There are a number of varieties of green pepper cultivated in India. The important ones are California Wonder, Chinese Giant, World Beater, Yolo Wonder Bharat, Arka Mohlnl, Arka Gaurav, Arka Basant, Early Giant, Bullnose, King of North, Ruby King, etc.

Planting Requirement
The following procedures are followed to plant capsicum in the field.

i. Seedling raising
Seedlings are first raised in the nursery beds and then transplanted in the main fields. Normally, 5-6 seed beds of size (300x60x15 cm) each are sufficient for one hectare cultivation. Seed should be sown in rows at 8 -10 cm apart to get healthy seedlings. The seeds should be dressed with Agrosan, Ceresan, Thiram or Captan @ 2 g per kg seed before sowing to prevent the occurrence of any seed-borne diseases. About 1 -2 kg seeds are required for one hectare cultivation depending on the cultivar. The seeds should be properly covered with a thin layer of soil manure mixture or any other media and irrigated with sprinkler to maintain optimum moisture till the seeds germinate.

ii. Sowing time
The sweet pepper is generally sown in August for the autumn-winter crop and in November for the spring -summer crop. In the hills of North Bengal sowing of seeds in the months of March-April (under cover) and September -October, is very successful for getting high yield. Plants sown in September and October take the longest period for development because of poor availability of light in winter.
iii. **Land preparation**
For planting the seedlings, the main field is thoroughly prepared by ploughing the land 5-6 times followed by smooth planking. Farmyard manure or compost is added after the first ploughing so that it is thoroughly mixed in the soil during subsequent ploughings. Then the field is brought to a clean and fine tilth.

iv. **Transplanting**
The seedling having attained 4-5 leaves should be transplanted. The nursery beds should be irrigated before lifting of seedlings. The seedlings are transplanted in rows in the evening or during the cloudy day followed by irrigation. Generally, 50 to 60 days old seedlings are used for transplanting.

v. **Spacing**
The seedlings are transplanted in rows at a distance of 30 to 60 cm depending upon the area and the variety. Rows spaced at 90 cm and plants spaced at 40 to 45 cm are also fairly common.

**Manures and Fertilizers**
About 50 to 80 cartloads of farmyard manure, 30 to 55 kg of nitrogen in the form of ammonium sulphate or urea, 50 to 110 kg of phosphorus in the form of super phosphate and 75 to 100 kg of potash per hectare should be given depending upon the fertility status of the soil. The complete dose of farmyard manure should be applied in the soil at the time of first ploughing. Potassium and phosphate fertilizers should be mixed in the plant rows just before transplanting. The nitrogenous fertilizer is given two and half a month after transplanting.

**Irrigation**
The first irrigation is given just after transplanting and later the field should be irrigated as and when required. Irrigation is essential in arid and semi-arid regions.

**Weed Control**
Interculture operations are similar to that of chillies. Two weedings 30 and 60 days after transplanting lead to high yield in green pepper. Earthing of plants may also be done after 2-3 weeks of transplanting. Earthing operation will also help in removing the weeds.

**Insects and Diseases**
Some of the important insects and diseases which attack capsicum are described below.

A. **Insects**
The important insect pests attacking capsicum are described here along with their suitable control measures.

1. **Thrips**
The adults of these tiny insects are slender yellow, active and pointed at both ends. The females have four extremely slender wings which have long fringe on their posterior margins. The male is similar to female except that it is smaller and lighter in colour. The minute insects lacerate the
plant tissues and suck the sap from the leaves forming white blotches and curly leaves with stunted plant look. Consequently yield is reduced considerably.

**Control**
It can be controlled by the spraying Malathion (Cythion 50 EC @ 1.5 ml per litre) or Dimethoate (Rogar 30 EC @ 1 ml per litre of water). It may also be controlled by the spraying of 0.25% Nicotine sulphate.

2. Aphids
Aphids sometimes becomes serious on capsicum. They suck the cell sap from the leaves and petioles and cause considerable loss.

**Control**
Complete control of aphids can be obtained by the application of Dimeton methyl (0.05 to 0.02%) or Monocrotophos (0.05 to 0.01%).

3. Mites
Mites of different genera have been found feeding on leaves of chilli and capsicum. These tiny spider like creatures may be found in large numbers on the underside of leaves, covered with fine webs. Both nymph and adults suck the cell sap and devitalise the plants.

**Control**
- It is reported that spraying of Phosaione (Zolone) 35 EC at 3 ml per litre can control mites.
- Spraying Dimethoate (Rogar @ 1 ml per litre) or Dicophol (Kelthane @ 1.5 ml per litre of water) is very effective against mites.

B. Diseases
The important diseases affecting capsicum are described below:

1. Damping off
This is a fungal disease which frequently occurs in nurseries. The seed may rot or the seedlings may be killed before they emerge from the soil. The stem of young seedlings may also be attacked after emergence showing water soaking and shriveling of stem which fall over and die. In a nursery, the disease may start in patches and in the course of 2 - 4 days the entire lot may be destroyed. The disease is most damaging on moist soil with poor drainage conditions.

**Control**
Partial sterilization of soil by burning trash in the surface helps in checking the disease. Providing better drainage by forming raised beds with free drainage all around helps in avoiding the disease. The seedlings may be protected by spraying with 0.5 to 1.0% Bordeaux mixture or any other effective copper oxychloride like Blitox or Fytolan.

2. Anthracnose
The foliage, stem and fruits are attacked by the fungus causing this disease. Disease areas on fruits develop as dark, round, sunken spots. Infected fruits drop off prematurely. Black minute spots develop on infected seeds. High humidity is favourable for the disease spread.

**Control**
- Treat the seeds before sowing with organo-mercurials such as Thiram (0.2%) or Brassico (0.2 per cent).
Spray Difoltan (0.2%) or Ditbane M-45 or Blitox (0.4%) at 15 days interval.

3. Powdery mildew
It is a serious disease of capsicum especially during summer. white talcum powder like growth appears on the leaf. Diseased leaves are shed and plants remain stunted.

Control
The disease can be controlled by spraying Sulfex (0.2%) or Calixin (0.2%) at 15 days interval.

4. Bacterial wilt
This is a serious disease of capsicum affecting leaves as well as fruits. Characteristic symptom of bacterial wilt are rapid and complete wilting of normal grown up plants.

Control
-There is no chemical control for this disease. However, application of bleaching powder before planting @ 15 kg ha has been found very effective.
-The variety" Arka Gaurav" is known to be tolerant to this disease.

5. Leaf curl disease
This is an important viral disease of chilli and capsicum. Symptoms consists curling of leaves accompanied by puckering and blistering of interveinal areas and thickening mid swelling of the leaves.

Control
The disease is transmitted by thrips and aphid. Thus it can be controlled by reducing the vector population. In the beginning, the plants showing infection should be uprooted.

Harvesting and yield
Large sweet peppers usually are picked while they are still green in colour but fully grown when sold in the market. Some exotic varieties such as Pimiento and Paprika are harvested when fruits are GMk red ripe. However, the most favourable time for harvesting in Pimiento for seed production is between 50 -60 day old stage or when the fruit attain the bright to deep red colour.

Sweet peppers are picked with an upward twist which leaves a piece of stem attached with the fruits. Young immature peppers are rather soft and yield readily to mild pressure of the fingers. Green fruits ready for harvest are relatively firm and crisp.

The yield of capsicum varies depending upon variety and the method of cultivation. If proper care is taken during its growth, it may yield 10 to 12 tonnes of quality fruits per hectare.

Ripening and Storage
The bell type peppers are usually harvested and sold when they are of suitable market size and are still green. There is but a limited demand for the mature red specimens. Now-a-days different chemicals are used to accelerate ripening as well as inducing the fruit colouration. Spraying with Ethephon at 200 to 3200 ppm has been found effective to accelerate fruit colour development, fruit and leaf drop and leaf yellowing. Some varieties are harvested when they are completely red.
Green peppers can be kept in good condition for at least 40 days at 0°C and at 95 to 98% relative humidity. The shrinkage of fruits stored under these conditions is only 4% in 40 days.

**Seed Production**
In seed to seed method of seed production, transplanting is done for commercial seed production. Optimum spacing may be followed to obtain high quality seeds. Capsicum is a cross pollinated crop, so it crosses easily with chillies and thus deteriorates fast in quality, if proper isolation distance is not maintained during seed production stages. The isolation distance between two cultivars of capsicum should be 200 meters for foundation seed and about 100 meters for certified seed production.

Off-type plants are removed as soon as they are observed. The small leaved plants can be detected from the large leaved plants and should be rogued as per the requirement. The number of rouging should be 3 -4 depending upon the purity of the seed desired. Field inspection of seed crops should be done at least twice or thrice. The fruit should be picked when red ripe and cut and crushed or macerated by machine. Seed is to be washed thoroughly to make it free from pulp and skin. After washing, the seeds should be dried immediately in the sun. Picking of pods may be done according to climatic conditions. In case, there is no danger of rains at the maturity time, the pods may be picked in one lot but where there is some danger of rains picking may be done is 2 -3 installments.

*Source: Vegetable booklet by Dr. K.T. Chandy, Agricultural & environmental Education*