

# **KING CHILLI**

King Chilli (*Capsiclm chinellse*) belonging to the family *Solanaceaea*, is traditionally cultivated in Assam, Nagaland, Manipur and in small quantities in other North Eastern states of India. The chilli has been called by different names. In Assam, it is mostly known as Bhutjolokia / Ghost Chilli or Bihjolokia. In Nagaland, it is called as Naga jolokia, Naga Morish, Raja Mirchi, King Chilli. In Manipur the Chilli is called Umorok or Go-morok. It is grown in districts of Kohima, Mon and Peren of Nagaland, and is also being cultivated in parts of Manipur (Tamenlong, Ukhrul, Senapati and Churachanpur) and Assam (Golaghat & Tezpur districts).

The King chilli plant is a wonderful gift of nature with extra ordinary pungency and pleasant and palatable aroma. Besides, King chilli also possess medicinal properties and is used in the treatment of various diseases. It helps in treatment of cancer by killing bad cells, obesity through weight loss, diabetes by reducing required insulin to lower blood sugar, heart diseases by preventing/delaying oxidation of bad cholesterol, rhinitis and bronchitis through thinning of mucus, and also reduce chronic pain. North East people commonly use this chilli for making pickles and for adding hotness to non-vegetarian food stuffs. In the recent years the traditional crop of North East India is gaining importance because it has been reported as one of the hottest chilli in the world.

## **Plant Description**

King Chilli plants grow to a height of 60 to 130 cm in 6 months' time. The leaves have a characteristic crinkle look and the flowers are greenish white with a touch of light brown. The anthers are blue while the filaments are purple. Fruits are light green which turns bright red at maturity. The fruit is a berry and possess 25-35 slightly wrinkled seeds in 4-5 locules. King chilli is found in three distinct colour: light red, dark red and orange.

## **Soil and climate**

The crop can be grown in all types of soil, but a deep loose sandy loam or clay loam soil is preferred. The soil should be rich in organic matter with a pH of 5.5-6.0. It grows well up to an elevation of 1000 meters above MSL. It is sensitive to bright hot sun and do not grow well under open sun. Water logging and heavy rainfall affects the growth and development of King chilli berries.

## **Land preparation**

The field should be well prepared to fine tilth and mixed with adequate quantity of well rotten FYM/compost/ vermicompost/ manure mixture. FYM/ compost/ manure mixture is to be applied in pits / holes (@ 4-5 ton /ha) at least a week before transplanting and exposed to the sun.

### **Nursery bed preparation**

Raised nursery beds of 30 cm height, 1 meter width and convenient length are prepared. The medium of nursery bed should comprise of vermicompost, garden soil and sand (1:1:1). In case if fungal and bacterial disease problems (such as damping off) are prevalent then solarise the nursery bed by covering it with white polythene sheet with ends tugged in and allow for solar sterilization for one week. Remove the polthene, allow the soil to cool and drench it with a solution of *Trichoderma viride* and *Pseudomonas fluorescens* (10gm each/ lit of water).

**Seed Treatment** - Before sowing seeds are subjected to hot water treatment by dipping in hot water at 45-50°C for 30 minutes. Drain excess water, allow to dry for 10 minutes and then treat with *Trichoderma viride*. Dry treated seeds in shade. The ideal time for seed sowing is from end of December to second week of February. Broadcast the seeds and mix it with top soil. The beds are then mulched with hay to keep moisture and to prevent weed growth. Irrigate the beds once in two days. The seeds usually germinate in 7-10 days. For planting in 1 ha, 100-200 g seeds is sufficient.

### **Transplanting**

About 40-60 days old seedlings are transplanted in the main field in the month of February-March.

### **Spacing**

The seedlings are planted at a spacing of 75 x 75 cm from plant to plant and row to row. In pure crop situations around 10,000 plants can be accommodated in 1 ha.

### **Nutrient management**

King chilli being a high value cash crop, effective nutrient management is crucial to obtain optimum yield with quality. To meet the nutrient requirement 4-5 tons of FYM/ compost or 3 tons of vermicompost or 2-2.5 tons of organic manure mixture (vermicompost, chicken manure, de-oiled cakes, rock phosphate and wood ash in a ratio of 60:20:10:5:5) should be applied as basal manure just before transplanting.

Soil treatment through liquid manures (dung-urine slurry, fermented cattle urine, Jivamrit etc) and foliar feeding through vermiwash (3%) or panchgavya (5%) or protein hydrolysate (4-5 ml/lit of water) ensures continuous nutrient availability during flowering and fruit formation. 500 lit liquid manure is to be applied as soil treatment after 45 days of planting. Foliar feeding can be done at 60 and 75 days of planting through foliar spray by using 300-400 litre solution.

### **Watering**

Seedlings should be watered immediately after transplanting or can be transplanted on a rainy day. Subsequent irrigations to be done as and when required. Dry spells can damage the plant growth.

## **Weeding**

As crop is transplanted in rainy season, timely weeding is required.

## **Pest management**

### **Important Insect pests**

Aphids, jassids, spider mites and fruit borer are major insect pests of King chilli

#### **1. Aphids**

**Symptoms** - Small soft bodied insects on underside of leaves and/or stems of plant; if aphid infestation is heavy it may cause leaves to yellow and/or distorted, necrotic spots on leaves and/or stunted shoots with distorted leaves; aphids secrete a sticky, sugary substance called honeydew which encourages the growth of sooty mould on the plants. Under severe attack developing berries are also damaged.

**Management** - Foliar spray of soft liquid soap is effective if initiated as soon as the infestation is noticed. Spray Neem oil (3%) or Karanjin (3%) after germination at 10 days interval.

#### **2. Jassids**

**Symptoms** - Nymphs & adults suck cell sap from lower surface of leaves. The damaged leaves curl upward along the margins, turn yellow, then brown and show burnt patches. Tuber setting is adversely affected by infestation. Severely infested plants show stunted growth.

**Control measures** - Foliar spray of Ginger-garlic and chilly extract alone or mixed with some flour and soft soap. Foliar spray of 10% nettle leaf extract on 45th, 60th and 75th day after sowing. Foliar spray of *Verticillium/ Metarhizium* @ 5–10 gm/lit water.

#### **3. Spider mites (*Tetranychus urticae*)**

**Symptoms** - Spider mites attack is prevalent in dusty conditions and water-stressed plants are more susceptible. Spider mites damage underside of the leaves. leaves may appear bronzed; webbing covering leaves; mites may be visible as tiny moving dots on the webs or underside of leaves, usually not spotted until there are visible symptoms on the plant; leaves turn yellow and may drop from plant

**Management** – Washing leaves with water jet. Foliar spray of soft soap/ insecticidal soap. Soft soap with neem oil (3%) is also effective.

#### 4. Fruit Borer

**Symptoms** – Young larvae feed on flower bud and young pods by making a circular hole. Later the larva feed on seeds. Generally only the head portion of larva is inside, while remaining body is visible from outside. Fruits turn white and drop off prematurely.

**Management** - Summer deep ploughing, Install pheromone trap with Helilure @ 15/ha. Release of *Trichogramma chilonis* @ 50,000 eggs/ week starting pre-flowering. Growing marigold in chilli fields. Spray HaNPV @  $1.5 \times 10^{12}$  POB/ha. Prophylactic spray of NSKE (5%) or neem oil (3%)

#### 5. Slugs and Snails

**Symptoms** - Snail damage can be seen as holes appearing in the leaves of your plants. Young tender plants are more susceptible to snails attack. Damage also often occurs around the lower stem of plants. Damage to leaves and tender stem adversely affects the plant health and subsequent yield potential.

**Management** – Best control of snails is hand picking during evening hours and killing them. Egg shell pieces are good deterrent barriers. Spread broken egg shells around the plants. Gravels can also be used as physical barriers.

#### 6. Anthracnose and fruit rot (*Colletotrichum capsica*)

**Symptoms** – The disease is reported to affect almost all aerial parts of the plant. Mainly, it causes fruit rot at both green and red stages and primarily attacking ripe fruits. The disease is seed borne, soil borne, water borne and airborne and may lead to damage at the seedling stage or on the aerial parts of the plants. Necrosis of twigs from tip downwards is characteristic symptom. Spots on fruits are usually sunken with black margins. Fruit lesion is the most economically important aspects of the disease as even a small lesion on the fruit is enough to lower its market value thereby affecting the profitable yield of the crop

##### **Management**

**Cultural** – Use of disease free seeds and disease free management of nursery beds. Proper drainage, crop rotation and removal of any infected plant parts from the field. Proper drainage and timely irrigation to prevent the outbreak of the disease. Intercropping with non-solanaceous crops is an effective means to prevent the spread.

**Management** - Seed treatment with *Trichoderma viride* (@10g/kg seed) is recommended. Seed treatment with garlic-clove and cinnamon extract has also been found to be effective. Drenching of seedling beds with *Trichoderma viride*

and *Pseudomonas fluorescens* @10 gm/ liter of water. Foliar spray of copper-oxochloride (0.3%) is effective in checking the spread.

#### 7. Leaf curl of chilli (Tobacco leaf curl virus)

**Symptoms** - Leaves are small in size, stunted, poor or no bearing of fruits, Leaves curl towards midrib and become deformed. Stunted plant growth due to shortened internodes and leaves greatly reduced in size. Flower buds abscise before attaining full size and anthers do not contain pollen grains. The virus is generally transmitted through white fly.

**Management** - Uproot and burn infested plants. Control of white fly by spraying of Neem Oil @ 5ml/litre of water right from 10 days of transplanting. Garlic-chilly extract with neem oil (3%) and soft soap also prevent white fly attack and restricts its spread.

#### 8. Bacterial wilt and Bacterial leaf spot (*Ralstonia solanacearum*)

**Symptoms** - The leaves exhibit small, circular or irregular, dark brown or black greasy spots. As the spots enlarge in size, the centre becomes lighter surrounded by a dark band of tissue. The spots coalesce to form irregular lesions. Severely affected leaves become chlorotic and fall off. Petioles and stems are also affected. On the fruits, round, raised water soaked spots with a pale yellow border are produced.

##### **Management**

**Cultural** - Careful seed selection and adoption of phytosanitary measures will check the diseases. Early removal of affected plants. Rouging and destruction of affected plants

**Control measures** – Seed treatment with *Trichoderma* and *Pseudomonas* sp. @ 10 g each per kg of seed. Seed treatment with Garlic-clove and Cinnamon extract is also effective. Foliar spray of 10 gm of *Trichoderma* or *Pseudomonas* sp. per litre of water help in restricting the spread.

#### **Harvesting and Yield**

In plain area like Assam, the usual peak harvesting time of king chilli is May-July period and in hilly states like Nagaland and Manipur, harvesting starts during September- October period. When the fruits become fully red or orange, it is ready for harvest. A number of pickings can be done at an interval of 15- 20 days depending up on the climate, growth and development of fruits.

#### **Processing**

After harvesting the berries are to be processed immediately to avoid fungal growth. King chilli have a soft texture with high water content hence its quality deteriorates overtime. Usually the king chillies are dried under sunlight or by smoking.

Smoke drying is not an ideal method as it spoils the dark red colour to brownish red and reduces the market value of end product. Now a days air dryers or dehydrators are recommended. Hot air dryers or dehydrators ensure good colour retention, quick drying, no chances for fungal growth and intact aroma.

To get 1 kg of dried chilli 7.5 kg of fresh fruits are required.