

## MANDARIN

(*Citrus Reticulata* Blanco.)

Mandarin orange is the most important commercial fruit crops of NE region. It is well known for its quality fruits in the market of North eastern region.

**Cultivar:** *Khasi* Mandarin

### Soil and Climate

Well-drained medium deep soil is to be selected for orchard. Soil having pH of 5.5 to 6.5 is considered most favourable.

Mandarin thrives well in sub-tropical to semi-temperate climates up to 1000msl. It requires high humidity, warm summer and



### Propagation

**Seed:** Seeds should be sown in the nursery immediately after extraction (within 1 week) into a depth of 1.5-2 cm at 10x5 cm distance. Seedlings are replanted in secondary bed or polythene bags of size 5" x8" (containing equal part of soil, sand and FYM) at 4-6 leaf stages in polyhouse for speedy and uniform growth. Seedlings for planting should be strong, healthy, and uniform in growth having a height of 60-90 cm and free from pest and diseases. Rootstocks are also raised as above mentioned technique.

### Budding

Time: February-March or in July-August

Method: 'T' - budding

Rootstock: Rough lemon and Rangpur lime

### Soft wood grafting

Time: July-August

Method: Wedge grafting

Scion selection: Previous season 3-4 months old shoot of 2-4 mm thickness with 3-4 healthy buds of 8 to 10 cm long round shape should be selected.

Rootstock: Rough lemon and Rangpur lime (90-120 days old)

### Pit preparation

The size of the pit is 0.75 x 0.75 x 0.75 m and pit refilled with upper 30 cm soil along with 15-20 kg FYM, 100g urea, 100g MOP, 300g SSP and 50g Chlorpyrifos dust or granule. The pits are filled about 15 cm above the ground level.

### Spacing

The spacing between the two plants should be 5 x 5 m apart.

### Planting time

The best time of planting is June to August. If there is no rain after planting, light irrigation should be given. Bud/graft union should be kept at least 15 cm above the ground level.

### Manure and Fertilizer

Depending upon the age of tree, the following manure and fertilizer schedule is followed.

Type of manure/ chemical	Time of application	Age of tree (Year)					
		I	11	III	IV	V	VI
FYM,kg	Feb-March		5	10	15	20	25
Urea, g	March	100	150	200	250	300	35
SSP,g	March	100	200	300	400	500	60
MOP,g	March	50	100	150	200	250	30
Lime, kg	Feb.		1	2	3	4	5

Repeat the same dose of urea, SSP and MOP during June-July and again in September- October. Therefore, requirements of grown up trees may be N-480g, P<sub>2</sub>O<sub>5</sub>-290g and K<sub>2</sub>O- 540g along with 25kg FYM per tree per year. The fertilizers are applied around the basin under the canopy of the tree, 20-25 cm away from the main stem. Besides, 2-3 spray of Zinc Sulphate (0.4%) + Magnesium Sulphate (0.2%) + Copper Sulphate (0.3%) or Multiplex (mixture of micro-nutrient) @ 2.5ml/litre of water should be given during flushing period.

### Irrigation

Irrigations are to be given only during dry periods, the first being at planting time, subsequent irrigations can be given at 15-20 days interval during December to March.

### Intercultural operation

Weeding should be done frequently at monthly interval, mulching with paddy straw/ farm grass or black polythene can also use to control weeds.

### Intercropping

Additional income can be obtained by growing suitable intercrops such as French bean, rice bean, cow pea, black gram and other vegetable crops from mandarin orchards during pre-bearing stage (1-5 years).

### Control of fruit drop

Control of fruit drop can be achieved by spraying with 2,4-D or GA<sub>3</sub> @15 mg/L + Urea (10 g/L) +Benomyl(1g/L) in April, May and September or Spraying of Planofix @ 1 ml/5 L of water in the month of March-April and August-September to minimize the fruit drop.

### Insect/Pests

**Leaf miner:** Caterpillars feed on newly emerged leaf tissues forming zigzag shrinking streak like galleries.

**Citrus scale:** All parts except roots, infested by scales. Due to attack the leaves turn yellow, bristle like and fall off. Fruits mottled and shrivelled shoots and twigs withered.

**Aphid:** Nymphs and adults suck the sap from newly emerged leaves, tender parts and flowers.

**Mealy bug:** The nymphs and adults suck the sap from plants.

Monocrotophos@ 2.5 g/ L of water or Dimethoate (Rogor) @ 1.5 ml/L of water can effectively control these insects.

**Lemon butterfly:** Caterpillars feed on leaves, defoliate the plants, very serious in nursery. It can be controlled easily by hand picking and killing of larvae as well spraying of Chlorpyrifos@ 2 ml/l.

**Citrus Trunk borer:** Grubs bore and feed on the bark, making tunnels inside the trunk. To kill the trunk borer grubs, clean the bored hole of the infested plant with iron wire and insert a cotton swab soaked in Dichlorvos/ petrol or inject 5 ml of Dichlorvos (2.5 ml litre) or petrol and plug with mud. Collection and destruction of trunk borer adults during May-June by shaking the branches 2-3 times at 10 days interval may also help in controlling the pest population.

## **Diseases**

**Damping off:** Cotyledons of newly emerged seedling rotted near the ground. Spraying and soil drenching with Bavistin@ 2.5g/litre of water is effectively control the disease.

**Powdery mildew:**A whitish powdery growth is visible on young leaves and green parts. Spraying of Sulfex@ 2.5 g/litre of water during flush period is recommended to control the disease.

**Scab:** The corky lesion on fruits, leaves and young branches identifies the disease.To control the scab, spraying of Bavistin@ 2g/litre of water in April, June and September is recommended.

**Twig blight:** Plant exhibits drying of twigs and small branches from growing tip. The affected portion should be cut and pasted with Bordeaux paste. Spraying with 1 % Bordeaux mixture or Copper oxychloride@ 2.5 g/L found effective.

**Phytophthora rot:** The first indication of the disease is exudation of gum from the bark of the stem. The bark cracks open and in the later stage dries up. Drenching of root with 1 % potassium permanganate solution followed by 1 % Bordeaux mixture may save the plant from declining.

## **Harvesting and yield**

Fruits should be harvested when they attain full size, develop attractive colour with a TSS of more than 9<sup>0</sup>Brix. Fruits are ready for harvesting during the month of November-December. From 6-year-old tree about 40-50 fruits may be harvested