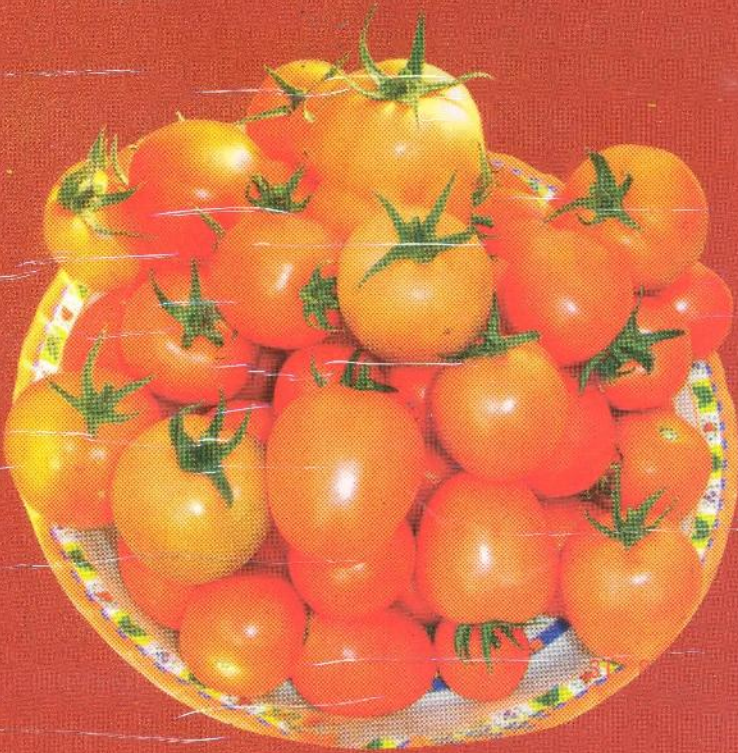




Under CSS - Technology Mission (MM-1)

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PRODUCTION TECHNIQUES FOR TOMATO IN TRIPURA



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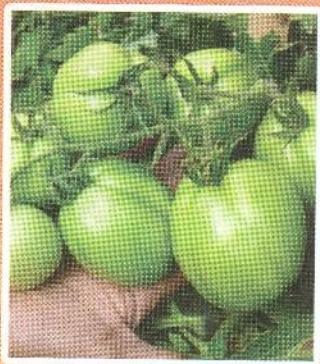
ICAR Research Complex for NEH Region
Tripura Centre, Lembucherra - 799 210
Tripura (west)
Tripura

Commercial Cultivation of Tomato in Tripura

Tomato (*Lycopersicon esculentum*) is one of the most popular tropical vegetables grown in Tripura. The fruits are eaten raw or cooked or processed in to products like tomato puree, ketchup, whole peeled, pickles and dehydrated tomatoes.

Soil and Climate

Tomato is grown in a wide range of soil types, sandy loam to clay, black and red soil having proper drainage. However, sandy loam soils with high organic matter are ideal for cultivation. The pH of the soil should be 6.0-7.0. This crop is very sensitive to frost and low temperature, the optimum soil temperature required for its cultivation is 15-17°C but fruit set takes place at temperature ranges from 21-24°C. Moisture stress and dry weather cause or increases the incidence of blossom end rot and fruit cracking.



Tripura falls under the subtropical climate with a warm and humid condition. The maximum and minimum air temperature varies from 24.2°C to 35.10°C. The average rainfall is about 3000 mm in a year. Hence the commercial cultivation is possible only during winter (Nov-Jan). Upland or tilla land comprises of about 60% of the total area of the State and are poor in organic matter, P, Zn, Mo and B. Soil pH in Tripura varies from 4.05 to 6.05 and more than 90% of the soils are acidic. Hence the application of lime is very much essential to neutralize soil pH. This crop is susceptible to heavy rain and water logging. High humidity (> 80%) coupled with high soil moisture favours the occurrence of bacterial wilt. Moreover, acidic soil favours bacterial wilt (*Rolstonia solanacearum*).



Varieties suitable for Tripura

- Arka Abha
- Arka Shreshta
- Arka Abhijit
- Arka Alok
- Sakthi
- RCMT-6
- Udaipur local
- Sikkim local
- Tura local
- All rounder
- Swarashkha
- Samrudh
- CS-714

CULTIVATION PRACTICES

Nursery raising

The tomato seeds are very small but remain viable for 3-4 year with the germination of 85-90%. The soils of nursery area brought in to fine tilth and raised beds (0.8 M wide, 15 Cm height and of convenient length) are prepared. Five-ten Kg well rotten FYM, 100g of 15:15:15 complex fertilizer along with 2.5 g carbofuran/ 2 Sq.M are incorporated. To avoid damping off disease the beds can be drenched with Captan (2.5g/lit) or Copper oxy chloride (4g/lit). The seeds are mixed with sand and sown thinly in rows 10 Cm apart, 0.5 Cm deep. After sowing the seeds are covered with light soil with the use of light stick or finger followed by light irrigation. The beds are covered thinly with compost before mulching with dry straw or grass. The seeds germinate within a week. The irrigation should be given as and when necessary. During the last week, the seedlings may be hardened by slightly withholding water. The seedlings with 5-6 true leaves are transplanted after 25-30 days. About 5 cent nursery will be required to produce the seedlings to plant one hectare.

Land Preparation and Transplanting

Tomato should be planted in a well pulverized soil by ploughing the field 3-4 times. The soil should be brought in to fine tilth and weed free. Weeds need to be removed from the field manually. Application of well rotten FYM @ 25 tonnes, N: P: K @ 80:60:80 Kg/ha at the time of planting as basal dress. About 50% of the N and K dose can be applied as top dress to reduce the leaching loss of urea. The seedlings of 25-30 days are transplanted at a spacing of 60x 60 Cm.

Inter cultural operation

Regular weeding and weed free environment is needed for better production. Mulching is one of the easiest ways to control weeds in the field. Mulching can be done with black polythene sheet, glyricidia leaves or with chann leaves. Apart from weed control, mulching also helps in maintaining soil moisture which results in an increase in crop growth, early bearing and total yield.



PLANT PROTECTION

Leaf curl virus

This disease is caused by tobacco leaf curl virus.

Symptoms

- ❖ Severe stunting of the plants with down ward rolling and crinkling of the leaves
- ❖ Newly emerging leaves exhibit slight yellow discoloration and later show curling symptoms.

- ❖ Older leaves become leathery and brittle, nodes and internodes are significantly reduced in size.
- ❖ The infected plants become pale and produce more lateral branches giving bushy appearance
- ❖ The fruits from infected plants are small and deformed.



Control Measures

- ❖ Treat the nursery beds with granular insecticides like carbofuran or Disulfotam @ 1 Kg a.i/ha .The insecticides should be applied at the time of sowing the seeds. This treatment checks the white fly population builds up.
- ❖ Give dose of Carbofuran or Disulfitan @ 1.5 Kg a.i/ha one week after transplanting or at the time of planting. This should be followed by 2-3 foliar sprays of either Dimethoate (0.05%) or Monochrotophos(0.05%) or Metasystox(0.02%) at 10 days interval
- ❖ The barrier crops like maize, jowar and bajra are good to protect the crop from TLCV infection. Five -six rows of these crops all around the main field should sown atleast 50-60 days before transplanting the tomato. These crops check the incoming viruliferous white flies from entering in to tomato field.
- ❖ Use yellow polythene mulches.
- ❖ Use yellow sticky traps.

Serpentine leaf-miner

(*Liriomyza trifolii*)

The larvae mine leaves, particularly basal leaves 10-15% loss, causing in severe cases. Pest increases, if more sprays are given due to mortality of natural enemies. This can be suppressed by natural enemies; hence, the no of insecticide should be less to protect the population of natural enemies.



Control measures

- ❖ Spray neem seed-kernel extract (4%) or neem formulations (2-3 ml/litre) or Triazophos (0.05%).
- ❖ Apply neem seed-kernel extract (4%) Triazophos once in 3 weeks. Neem formulations once in 10-15 days.

White fly (*Bemisia tabaci*)

The white fly suck sap from leaves and transmit leaf curl virus, particularly during summer. Loss may be even 80-90%.

Control measure

- ❖ Spray chlorpyrifos @ 2ml + neem oil 2.5 ml/litre of water

Tomato fruit Borer (*Helicoverpa armigera*)

This is most destructive pest of tomato and the larva bore the young developing and matured fruits. The affected fruit subsequently gets rotten and fall down.

Control Measures

- ❖ Use of 250-500 LE /ha of NPV+ 0.5% jaggery + ranipal or 0.5 Kg/ha *Bacillus thuringensis* var. *Kurstaki* or *Trichogramma* 50000/ ha.

Damping-off (*Pythium* spp *Phytophthora* spp)

Symptoms

The pre-emergence damping-off results in the death of young seedlings before emergence. The radicle and the plumule completely rotten. Post-emergence damping-off is characterized by the toppling of the infected seedlings in nursery. Infection occurs at or below the ground level and infected tissue appears soft and water-soaked. The stem portion becomes constricted at the base and the plant collapse.

Control measures

- ❖ Treat seed-beds with Formalin @ 5 litres/100 litres water 15-20 days before sowing. Sow the seed only after the soil becomes free from fumes/vapours.
- ❖ Drench/irrigate nursery beds with Mancozeb (0.25%) and Carbendazim (0.05%) on the appearance of damping-off symptoms.
- ❖ Very thin line sowing is essential

Bacterial wilt

This disease is caused by *Pseudomonas solanacearum*, a soil living bacteria. This disease occurs starting from the seedling stage to reproductive stage, which is a major production constraint of tomato in Tripura.

The plants shows rapid and complete wilting of normal grown up plants. The pathogen is confined to vascular region; in advance cases it may invade the cortex and pith and cause yellowish brown discolouration of tissues. Infected plant parts when cut and immersed in clean water, a white streak of bacterial ooze coming out from cut ends is visible.



Control Measures

- ❖ Selection of resistant varieties like Arka Abha, Arka Alok, RCMT-6, Udaipur local and F1 hybrids like All rounder, Avinash-2, Gotya S-41 and Samrudh for cultivation.
- ❖ Crop rotations such as cow pea- maize- cabbage, okra-cowpea- maize, maize- cowpea- cabbage, maize-cowpea-maize are effective in reducing bacterial wilt of tomato.

- ❖ Seedling treatment with Streptocycline (1g/40litre water) for 30 minutes before planting is effective.
- ❖ Application of bleaching powder @ 15 kg/ ha and Ground nut Cake (200Kg/ha) before planting found effective against bacterial wilt.
- ❖ Incorporation of lime 500 kg/ha and flooding the field 45 days before planting would reduce the wilt disease.
- ❖ Foliar application of Chloramphenicol and Streptocycline sulphate(250 ppm) one day before planting controls bacterail witt.

Harvesting

Tomato are harvested at several stages- mature green, turning pink, red ripe and over ripe. The stage of maturity at which tomato should be harvested depends a upon the purpose for which they are used and distance over which they are to be transported.

Stage of Harvest	Purpose
Mature green to turning stage	Distant marketing
Pink to light red	Fresh consumption
Ripe tomatoes	Seed production, processing

Yield

The yield depends upon various agroclimatic factors, region and cultivars. However, the yield may ranges from 250-300 q/ha.

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