

PEST, DISEASE & PHYSIOLOGICAL DISORDERS OF TOMATO



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Physiological disorders of tomato:

Blossom end rot:

Brown water soaked discoloration appears at the blossom end of the fruit where the senescent petals are attached while the fruit is still green. The spots enlarge and darken rapidly and the affected portion of the fruit becomes sunken, leathery and dark coloured. This disorder may occur due to

- i) Sudden change in the rate of transpiration specially in moisture stress condition
- ii) Continuously high evapotranspiration regime and a large leaf area
- iii) Increasing level of nitrogen content in the fruits

Control

- 1) This disorder is decreased by increasing the frequency of irrigation
- 2) Judicial fertilizer application. Increase in the level of phosphate fertilization application decline the incidence of this disorder.
- 3) Liming decreases the incidence
- 4) Single foliar spray of 0.5% calcium chloride (CaCl_2) at the time of fruit development.

Fruit cracking:

Two types of fruit cracking are seen. Radial cracking, where surface of the mostly full ripe fruits cracks radially from the stem end of the fruit and concentric cracking, where surface of mostly mature green fruits cracks concentrically around the shoulder of the fruit. Radial cracking is more common and causes greater loss than concentric cracking. Cracking may occur due to

- Irrigation or rainfall after long dry spell
- Exposure of fruits to sun due to pruning and staking
- Boron deficiency
- Genetic factor which is reported to be inherited polygenically

Control

- 1) Irrigation at regular intervals
- 2) Pruning and staking during summer season should be avoided
- 3) Spraying seedlings before transplanting with 0.3-0.4% borax solution.
- 5) Growing resistant varieties like Sioux, Roma, Punjab chuhara, Pusa ruby, Arka Saurabh, Pant T1 etc.

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Sun scald:

Exposed portion of either green or nearly ripe fruits get blistered and water soaked due to extreme heat of scorching sunshine. This problem is common in plants that have lost considerable foliage. For this reason, training and pruning in tomato aggravate this disorder.

Control:

- 1) Protection of plants from defoliation by diseases and insect pests
- 2) Training and pruning in summer months should be avoided

Puffiness:

Outer wall of the grown up fruits (two-third normal size) continues to develop normally but growth of the remaining internal tissues (Placenta, mesocarp) is retarded resulting in partially filled fruit which is light in weight and lacks in firmness.

- Non fertilization of ovules
- Embryo abortion after normal fertilization
- High temperature and high soil moisture are the primary factors responsible for this disorder.

Control

- 1) Over irrigation should be avoided
- 2) Less nitrogen should be applied
- 3) Boron should be applied by spraying 0.3-0.4% borax solution.

Cat face:

- Distortion of the blossom end of the fruit gives rise to various ridges, furrows and indentation in a localized area of the fruit. Cat face is named due to these ridges and indentations.

Unfruitfulness:

- Temperature particularly a night temperature has profound effect on fruit setting in tomato. High day temperature (above 32C) and high night temperature (above 20C) is not congenial to fruit set. On the other hand fruits normally fail to set at or below 13 C. Both high and low temperature adversely affects fruit set mainly by reducing pollen viability and pollen germination on stigma.

Control

- 1) Growing high temperature tolerant varieties like HS-102, Punjab Kesar, Punjab Chuhara, and Hot set etc.
- 2) Growing low temperature tolerant varieties like Pusa Sheetal, Cold set.
- 3) Application of growth substances like parachlorophenoxy acetic acid (PCPA) 50 ppm at full bloom stage or 2,4 D, 1-2 ppm prior to anthesis.

Gold fleck:

In the fruit surface around the calyx and fruit shoulder, tiny yellow spots often appear which are called gold flecks. These gold flecks appear due to deposition of calcium oxalate.

- With high incidence, fruits become non attractive and their shelf life also get reduced.
- Increased magnesium concentration in the fruits

Silvering:

This disorder affect stems, leaves and flowers. In the stem silvering, grey-green stripes of varying number and width appears. This disorder may be caused due to exposure of plants to low temperature (<21 C) for some times.

Pithy stem:

Large air spaces are formed in the pith accompanied by the increase in abscisic acid levels in the leaves.

Pest and diseases

PESTS :

- Aphids
- Thrips
- Whitefly
- Leaf miner
- Pin worm
- Fruit borer

DISEASES:

- Damping off
- Early blight
- Late blight
- Fusarium wilt
- Bacterial wilt
- Mosaic

Thrips: *Thrips tabaci*



Management

- Mechanically uproot the diseased plants and destroy them
- Use yellow sticky traps @ 15/ha
- Release larvae of *Chrysoperla cornea* @10,000/ha
- Spray methyl demeton 25 EC @1lit/ha or dimethoate 30 EC @1lit/ha

Serpentine leaf miner: *Liriomyza trifolii*



Leaf miner damage



Mining in the leaf



Dried leaves

Management

- Collect and destroy mined leaves
- Spray NSKE 5%

Whitefly: *Bemisia tabaci*



Fruit damage



Silvery damage



Tomato leaf curling



Management

- Uproot and destroy the diseased leaf curl plants
- Use nitrogen and irrigation judiciously.
- Use yellow sticky traps at 12/ha to attract and kill insects.
- Apply carbofuran 3% G @ 40 kg /ha
- Spray of dimethoate 30% E C @1ml/lt or malathion 1.5ml/lt.

Pinworm: *Tuta absoluta*



Symptoms

Pinhole in fruit

Management

- Collect and destroy the pinworm affected plants and fruits
- Avoid solanaceous crops after tomato
- Use healthy seedlings for transplanting
- Keep pheromone traps @ 16 nos./ac to attract and kill the adult moths
- Spray of Flubendiamide 20% WG @ 60 ml or Indoxacarb 14.5% SC @ 100ml or Neem formulation (Azadirachtin 1% or 5%) @ 400 – 600 ml/ac.

Fruit Borer: *Helicoverpa armigera*



Management

- Growing of trap crop -40 days old American tall marigold and 25 days old tomato seedling at 1:16 rows
- Set up pheromone trap with Helilure at 12/ha
- Collection and destruction of damaged fruits and grown up caterpillars
- Release *Trichogramma* @ 1 lakh nos. /ha release at an interval of 7 days starting from flower initiation.
- Spray *Bacillus thuringiensis* 2g/lit.

Damping off : *Pythium aphanidermatum*



Management

- Use raised seed bed
- Drench with Copper oxychloride 0.2% or Bordeaux mixture 1%.
- Seed treatment with fungal culture *Trichoderma viride* (4 g/kg of seed) or Thiram (3 g/kg of seed) is the only preventive measure to control the pre-emergence damping off.

Early Blight: *Alternaria solani*



Early symptom



Affected plant at advanced stage

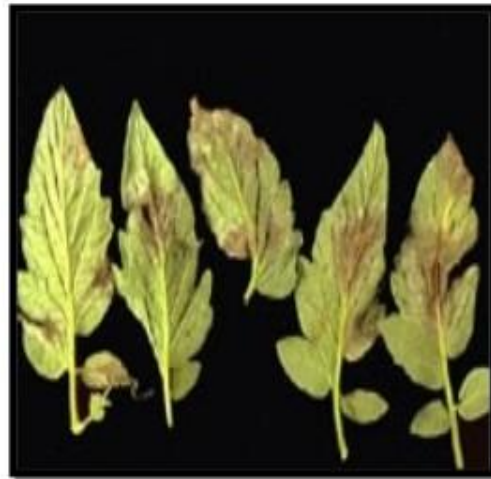


Concentric ring on infected part

Management

- Removal and destruction of crop debris.
- Practicing crop rotation helps to minimize the disease incidence.
- Spray the crop with Mancozeb 0.2 % for effective disease control.

Late blight - *Phytophthora infestans*



Management

- The affected plants should be removed and destroyed.
- Practicing crop rotation helps to minimize the disease incidence.
- Drench with Copper oxychloride 0.2% or Bordeaux mixture 1%.

Fusarium Wilt : *Fusarium oxysporum* fsp. *lycopersici*



Affected
plants

Management

- The affected plants should be removed and destroyed.
- Spot drench with Carbendazim (0.1%)
- Crop rotation with a non-host crop such as cereals.

Bacterial Wilt: *Ralstonia solanacearum*



infected plant

Management

- Crop rotations, viz., cowpea-maize-cabbage, okra-cowpea-maize, maize-cowpea-maize and finger millet-egg plant are reported effective in reducing bacterial wilt of tomato.
- Use of disease resistant varieties like Arka Abha, Arka Alok, Arka Rakshak

Mosaic: *Tomato mosaic virus* (TMV)



Affected leaves

Management

- Use of disease-free seed and seedlings.
- Crop rotation with non-host crops.
- Soaking of the seeds in a solution of Trisodium Phosphate (90 g/litre of water) a day before sowing.
- Spray Imidachloprid 0.05 % or Dimethoate 0.05% to control vector

Leaf curl: Tomato leaf curl virus (ToLCV)



Foliar symptom



Yellowing between veins and an upward curling of their margins



Leaf curl symptom

Management

- Keep yellow sticky traps @ 12/ha to control white fly.
- Raise barrier crops-cereals around the field.
- Spray Imidachloprid 0.5 % or Dimethoate 0.5% @ 15, 25, 45 DAT to control vector.

Conclusion:

Tomato is one of the most popular vegetable crops with high economic value. As a processing crop, tomato ranks first among vegetables. The production of this crop has tremendously increased due to its multifarious uses in raw, cooked and processed forms as soups, sauces, ketchups, preserves and pickles. Cultivated area of tomato is increasing but its low yield cannot fulfil our demand. The yield of tomato is decreased due to the absence of proper cultural practices like pruning. One stem pruning gives maximum plant height while unpruned plant produces minimum plant height. Three stem pruning is effective in producing more flower cluster and maximum yield but unpruned plant produces less flower cluster and low yield. Poor farmers are not able to apply all the management practices, therefore proper pruning method can help them to get high marketable yield which will fetch them good prices.

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Thank you...