



## Tomato Diseases: Identification and Management

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Knowing how to identify and treat common tomato diseases is critical for growing successful crops. Tomato plants are susceptible to fungus, bacteria, mildew, viruses, and fruit disorders such as sunscald and blossom end rot. Creating suitable circumstances for the growth of robust, disease-resistant plants is the first line of protection. The most prevalent diseases are caused by fungus that grow under specific environmental conditions. Excessive rain during cold or warm seasons produces an optimal climate. When adverse growing conditions persist, treating your plants proactively gives you a head start on problems that spread and are difficult to eradicate once they appear.

### Damping off

Damping off (*Pythium sp.*, *Rhizoctonia sp.*, *Fusarium sp.*, *Phytophthora parasitica*). It causes damage both at pre-emergence death of seedling. It is characterised by rapid shrinking and rotting at collar region resulting in toppling down of infected seedlings.

### Management

- Provide proper drainage facility to stagnation of water.
- Deep ploughing during summer.
- Thin sowing of seed to avoid overcrowding.
- Seed treatment with captan or Thiram@2g/kg seed.
- Fumigate the soil with formalin at 7% by drenching 10-15 cm deep soil.

### Early Blight

Symptoms of early blight can occur on the foliage, fruit, and stem at any stage of development. Though the disease is more frequently seen in the field, collar rot (also caused by species of *Alternaria*) can harm seedlings in a greenhouse. Lesions appear as tiny, brownish-black spots on lower leaves at first. They can grow to a diameter of between 1/4 and 1/2 inch, with typical concentric rings in the darker region. As the situation grows more severe, the leaf as a whole may turn yellow as well as the region around the lesions. In later stages, lesions may appear in the upper leaves and defoliation may occur in the lower part of the plant leaving the fruit susceptible to sunscald. Fruit that is green or red in colour may get infected through the calyx surrounding the stem attachment. Lesions can expand to cover the entire fruit and are typically sunken, leathery, and dark brown to black with concentric rings.

### Management

- Proper field sanitation.
- Grow varieties tolerant to early blight.
- Adopt crop rotation with non- Solanaceous crop.
- Prevent early blight by watering at soil level and mulching.
- Seed treatment with captan or Thiram@3g/kg seed.
- Spray Dithane M-45 or Captan 0.2% at 15-day interval.

### Late Blight

Water-Soaked spot appear on leaves and stem which later enlarge and become pale green to brown lesion and paper like. Complete brightening of the leaf occurs under high humidity condition. White fructification of the fungus in the form of white mass appears on the lower side of the leaves. The young fruits also have irregular brownish green lesions, with white fungus growth followed by rotting of fruit.

#### Management

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- Grow varieties tolerant to early blight.
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- Prevent early blight by watering at soil level and mulching.
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### Fusarium Wilt

Symptoms of Fusarium wilt may first appear as yellowing and wilting of leaves on one side of the leaf midrib or plant; one-sided symptoms are caused by a blockage in the vascular system supplying the symptomatic side of the plant; as the disease progresses, older leaves become necrotic and the plant begins to wilt; fruit on infected plants is smaller and yield is reduced; damage to leaves makes fruit susceptible to sunscald; stem symptoms may be mistaken for bacterial wilt but a bacterial ooze test will be negative; stem tissue becomes discoloured brown

#### Management

- Plant resistant varieties
- sanitize all equipment regularly.
- Adopt crops rotation excluding Solanaceous spp.
- Avoid excessive nitrogen fertilizers which encourage disease.
- Use disease free seed.
- Drench the soil with a mixture of Bavistin 0.1% + Dithane M-450.25%.
- Seed treatment with Agrosan GN or Thiram @2g/kg seed.
- Spray the crop with Dithane M-45 0.25% at 15 days interval.

### Septoria Leaf Spot

Septoria leaf spot is caused by the *Septoria* fungus and appears on leaves as multiple small, dark, round circles. Symptoms are like early blight, however Septoria often emerges at the first fruit set. It spreads instantly, causing the demise of older leaves before infecting fresh foliage and rapidly moving across a whole crop. Insects, tools and water all spread fungus spores which remain in soil for up to two years Early leaf drop leads to fruit loss and sunscald.

#### Management

- Destroy the infected plant debris after harvesting the crop.
- Seed treatment with captan or Thiram 3g/kg before seed sowing.
- Spray Dithane M-45 (0.2%) or Bavistin (0.1%) at 10-15 days interval.

### Bacterial wilt

(*Pseudomonas solanacearum*) Wilting of lower leaves followed by sudden and permanent wilting of entire plant are the typical symptoms. The vascular tissue of lower stem and roots exclude slimy bacterial ooze.

#### Management

- Adopt 3-year crop rotation with non-solanaceous crops.

- Raise nursery in disease free area.
- Uproot infected plant and burn them
- Use resistant varieties like Arka Abhijit, Arka Shresta, BT-1, BT-10, Arka Alok, Arka Vardan.
- Dip seeds in Streptocycline suspension @150 ppm for 90 minutes.
- Fumigate the soil by drenching Formalin 7% before sowing to a depth of 10-15 cm.
- Spray Streptocycline 0.25% at 10 days interval.

### **Leaf curl**

The most obvious symptoms in tomato plants are small leaves that become yellow between the veins. The leaves also curl upwards and towards the middle of the leaf. In seedlings, the shoots become shortened and give the young plants a bushy appearance. In mature plants only new growths produced after infection is reduced in size. Although tomato production is reduced by the infection, the fruit appears unaffected.

### **Management**

- Rogue out infected plants.
- Uproot the weeds
- Raise nursery in disease free area.
- Treat the nursery beds before sowing with Furadan @1 kg a.i/ha.
- Spray Dimethoate 0.05% or Monocrotophos 0.05% at 10 days interval.
- Sow border crops like jowar, maize about 2 months before transplanting.

### **Tomato mosaic virus**

The foliage of affected tomato plants shows mottling, with alternating yellowish and darker green areas, the latter often appearing thicker and raised giving a blister-like appearance. The leaves tend to be fern-like in appearance with pointed tips and younger leaves may be twisted. The fruit may be distorted, yellow blotches and necrotic spots may occur on both ripe and green fruit and there may be internal browning of the fruit wall. In young plants, the infection reduces the set of fruit and may cause distortions and blemishes. The entire plant may be dwarfed and the flowers discoloured. Environmental conditions influence the symptoms. These include temperature, day length and light intensity as well as the variety, the age of the plant at infection and the virulence of the strain of ToMV.

### **Management**

- Follow clean cultivation.
- Select virus free seeds.
- Follow crop rotation excluding tobacco, potato, brinjal, and chilli.
- Give the hot water treatment at 50<sup>0</sup>C for 30 minutes to the seed.
- Treat the seed either with hydrochloric acid, calcium hydrochloride or sodium hypochloride.