

Important Diseases of Tomato and Their Management

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The tomato (*Solanum lycopersicum* L.), a member of the Solanaceae family, is an herbaceous plant, reaching 1-3 meters with yellow blooms and fruits ranging from small cherry to beefsteak tomatoes. Native to Peruvian and Mexican regions, its introduction to India, possibly by the Portuguese, remains uncertain. Renowned for unique nutritional value, tomatoes are versatile in Indian

cuisine, used in soups, salads, pickles, ketchup, purees, and more. With yields varying from 20-25 t/ha on average, hybrid varieties can reach 50-60 t/ha. Disease poses a significant challenge, categorized into infectious (fungi, bacteria, viruses, nematodes) and non-infectious (environmental, nutritional, herbicide). Non-infectious diseases, though not contagious, can impact entire plantings uniformly if exposed.



Healthy Plant



Damping-off



Early Blight



Mosaic Virus

Damping-off: *Pythium aphanidermatum*

Symptoms: The damping-off occurred on seedling stage. In early stage, plants became stunted with typical discoloration at roots and formed small lesions on roots near to soil level. The spots coalesced together and formed large areas. In severe infection, the entire root found rotted and plants dried.

Management

1. Used raised seed bed. Provide light, but frequent irrigation for better drainage.
2. 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. Spray 0.2%

Metalaxyl when there is cloudy weather

Early blight: *Alternaria solani*

Symptoms: Include small to irregular brown spots that give “bull eye” appearance on older plant leaves. These spots enlarge in diameter lead to concentric rings surrounded by yellow

halo under suitable environmental conditions. Seedling, stem, blossom blight and fruit drop symptoms also produced by this pathogen.

Management

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

Bacterial wilt: *Burkholderia solanacearum*

Symptoms: At the early stages of disease, the first visible symptoms of bacterial wilt are usually seen on the foliage of plants. These symptoms consist of wilting of the youngest leaves at the ends of the branches during the hottest part of the day. At this stage, only one or half a leaflet may wilt, and plants may appear to recover at night, when the temperatures are cooler. As the disease develops under favorable conditions, the entire plant may wilt quickly and desiccate although dried leaves remain green, leading to general wilting and yellowing of foliage and eventually plant death. Another common symptom that can be associated with bacterial wilt in the field is stunting of plants. These symptoms may appear at any stage of plant growth, although in the field it is common for healthy-appearing plants to suddenly wilt when fruits are rapidly expanding.

Management

1. Avoid damage to seedling while transplanting.
2. Apply bleaching powder @ 10kg/ha.
3. 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.

Fusarium wilt: *Fusarium oxysporum f. sp. Lycopersici*

Symptoms: Symptoms of attack first appear as slight vein clearing on the outer portion of the young leaves followed by epinasty of the older leaves. This symptom often occurs on one side of the plant or on one shoot. Successive leaves yellow wilt and die, often before the plant reaches maturity. As the disease progresses, growth is typically stunted, and little or no fruit develops. If the main stem is cut, dark brown streaks may be seen running lengthwise through the stem. The browning of the vascular system is characteristic of the disease and generally can be used for its identification. On the outside of affected stems, white, pink or orange fungal growth can be seen especially in wet conditions.

Management

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

Bacterial Leaf Spot: *Xanthomonas campestris pv. Vesicatoria***Symptoms:**

Symptoms: The most striking symptoms are on the green fruit. Small, water-soaked spots first appear which later become raised and enlarge until they are one-eighth to one-fourth inch in diameter. Centers of these lesions become irregular, light brown and slightly

sunken with a rough, scabby surface. Ripe fruits are not susceptible to the disease. Surface of the seed becomes contaminated with the bacteria, remaining on the seed surface for some time. The organism survives in alternate hosts, on volunteer tomato plants and on infected plant debris.

Management

1. Disease-free seed and seedlings should always be used and the crop should be rotated with non-host crops so as to avoid last year's crop residue.
2. Spraying with a combination of copper and organic fungicides in a regular preventative spray program at 5 to 10 day intervals or Spraying with Agrimycin-100 (100 ppm) thrice at 10 days intervals effectively controls the disease.

Mosaic: Tomato Mosaic Virus (TMV)

Symptoms: The disease is characterized by light and day green mottling on the leaves often accompanied by wilting of young leaves in sunny days when plants first become infected. The leaflets of affected leaves are usually distorted, puckered and smaller than normal. Sometimes the leaflets become indented resulting in "fern leaf" symptoms. The affected plant appears

stunted, pale green and spindly. The virus is spread by contact with clothes, hand of working labour, touching of infected plants with healthy ones, plant debris and implements.

Management

1. Seeds from disease free healthy plants should be selected for sowing.
2. Soaking of the seeds in a solution of Trisodium Phosphate a day before sowing helps to reduce the disease incidence.
3. The seeds should be thoroughly rinsed and dried in shade. In the nursery all the infected plants should be removed carefully and destroyed.

Conclusions

In conclusion, an optimal disease management strategy is indispensable for cultivating robust tomato (*Lycopersicon esculentum*) crops. Precision fungicide applications, strategic crop rotations, and meticulous disease-free practices are paramount, ensuring effective control and prevention against infectious and non-infectious challenges, securing long-term crop health and productivity.

References

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