



AVRDC - The World Vegetable Center

Fact Sheet

Tomato Diseases

Damping Off

Pythium spp., *Phytophthora* spp., *Fusarium* spp.,
Rhizoctonia solani, and other fungi

Found worldwide



Symptoms

Affected plants usually occur in patches in nursery beds or in low parts of sloped fields. In level fields, affected plants are generally found in scattered areas.

Damping off may occur before and/or after emergence. In *pre-emergence* damping off, the seeds fail to emerge after sowing. They become soft, mushy, turn brown, and decompose as a consequence of seed infection. In *post-emergence* damping-off, the seedling emerges from the soil but dies shortly afterwards. The affected portions (roots, hypocotyls and perhaps the crown of the plant) are pale brown, soft, watersoaked, and thinner than non-affected tissue. Infected stems collapse. Stunting of plants due to root rot or collar rot may also occur.

Symptoms may vary with age and stage of development of the tomato plant. Infection by the pathogen(s) may occur much later after emergence; in this case, the infection is usually not lethal but plant growth and yield may be reduced.

Plants severely affected in the root region may wilt in warm or windy weather. Extensive root rotting causes symptoms of nutrient deficiencies in the plant since nutrients cannot move sufficiently from the soil up through the plant.

Since several pathogens can cause similar symptoms, pathogen isolation and identification is needed to confirm diagnosis.

Conditions for Disease Development

Seedlings during the first three weeks after sowing are susceptible, especially when any of the following occur:

- planting in heavily infested soil or growth medium;
- overwatering or poor drainage;
- overcrowding or poor ventilation of seedlings;
- excess application of nitrogen;
- stressful environmental conditions such as cloudy, wet weather that results in etiolated plants, prolonged soil moisture, or low light that prevents drying; or
- pathogenic nematodes are present.

These fungi attack a very wide array of plants. Different fungi and even different species of the same genera of fungi have different environmental requirements for disease development. For example, *Pythium* and *Phytophthora* can cause damping off in cool, wet soils while *Fusarium* and *Rhizoctonia* are more active under warmer, drier conditions. Within *Pythium* spp., *P. ultimum* thrives under low temperatures while *P. aphanidermatum* prefers high temperatures. Overwintering spores of these fungi can survive in soil for long periods in the absence of host plants. These fungi colonize various plant debris.

Control

If possible, use plug transplants and a soilless pathogen-free growth medium to avoid damping off. Mixing of local field soil or manure with soilless growth medium may result in severe damping off.

Water seedlings only when the soil or growth medium is dry, preferably in the morning to allow drying to occur by the late afternoon. Avoid contact with ground soil or other sources of contamination. Pots or transplant containers should be new or treated recently with a disinfectant (10% household bleach) or fungicide. Keep seed flats raised, away from splashing water and away from dirty benches or floors. Treat surfaces with a disinfectant before placing flats there.

For seedbeds, choose well-drained locations. Keep the seedbed well ventilated and dry. Sow on raised beds. Avoid overcrowding of plants and the movement of infested soil or contaminated plant material into the nursery bed. Workers should clean their hands and tools before handling healthy plants. Water plants in the late morning. Surface irrigation ponds may be a source of fungal contamination.

Treat seed with hot water 50° C for 30 minutes, followed by application of a fungicidal seed coating, and sow into soil that was pasteurized (71° C for 30 minutes) or another growth medium that is free of damping off fungi. Alternatively, for direct-seeded tomatoes, use fungicide-treated seed. Fumigate nursery beds or apply a fungicidal soil drench if the disease appears.

The type of fungus that is causing damping-off will determine the most suitable fungicide to use. Consult with your local extension agent to determine the most suitable fungicide to use.

For more information on the production of tomato and other vegetables, go to <www.avrdc.org>.