AVRDC - The World Vegetable Center
Fact Sheet

Pepper 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 low parts of fields.

Seedlings may be infected before or after emergence. If infected before emergence, the germinating plants become soft, brown, and decompose. If infected after emergence, water-soaked lesions form about 1 cm above or below the soil line. The stem softens and cannot support the seedling, which collapses and dies.

Stunting of plants due to root rot may also occur. In this case, the root system rots, becomes brown and develops few if any secondary roots.

Symptoms may vary with age and stage of development of the pepper plant. Sometimes, infection by the pathogen(s) occurs much later after emergence. The infections are not lethal but plant growth and yield may be affected with foliar yellowing, reduced vigor, and some stunting. Plants severely affected in the root region may wilt in warm or windy weather. Symptoms of nutrient deficiency may occur in the foliage because nutrients are prevented from moving up the plant by extensive root rotting.

How to Identify Damping Off

Infected stem and root tissues

Dieback of seedlings

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Damping-off symptoms may be confused with other symptoms arising from excessive fertilization, high levels of soluble salts, stress due to excess water, pesticide residues or excessive heat or cold. In all these cases, symptoms arise on the leaves before root damage occurs.

Conditions for Disease Development

Seedlings during the first three weeks after sowing are particularly susceptible. Factors which favor the disease are sowing seeds in disease-infested soils or growth medium, overwatering, poor drainage, inadequate light, overcrowding, poor ventilation, and applying excess levels of nitrogen to soil. The presence of nematodes may exacerbate disease development.

Overwintering spores of these fungi are resistant to desiccation and can survive in soil for long periods. The different fungi that cause damping off have different environmental requirements for disease development (e.g. *Pythium ultimum* prefers low temperature while *Pythium aphanidermatum* prefers high temperature). *Pythium* and *Phytophthora* can cause damping-off in cool, wet soils while *Fusarium* and *Rhizoctonia* are more aggressive under warmer, drier conditions.

Control

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 plants 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 (e.g. 10% sodium hypochlorite for 30 min), or steam-sterilized (71ºC for 30 min) or washed with very hot water. Keep seed flats raised, away from splashing water or soil, and away from dirty benches or floors. Treat surfaces with a disinfectant before placing flats there.

For seedbeds, choose well-drained nursery locations. Keep the seedbed well ventilated and dry. To reduce soil moisture, sow seeds on raised beds, and provide appropriate drainage in the field to avoid waterlogged conditions.

Avoid overcrowding of plants. Avoid the movement of infested soil or contaminated plant material into the nursery bed. Workers should clean their hands and tools before handling healthy plants. Surface irrigation ponds may be a source of fungal contamination.

Treat seed with hot water, followed by application of a fungicidal seed protectant, and sow into pasteurized soil (71°C for 30 min) or another growth medium that is free of damping-off fungi. Alternatively, incorporate fungicides into the planting mix to control soil-borne seedling diseases. It is important to determine which fungus is responsible for disease development. This will influence the chemical(s) that is used. Consider both broad-spectrum and systemic fungicides. Fumigate nursery beds or apply a fungicidal soil drench if the disease appears.

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

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