



AVRDC - The World Vegetable Center

Fact Sheet

Pepper Diseases

Phytophthora Blight

Phytophthora capsici

Found worldwide



Symptoms

All parts of the plant can be affected, but the most common symptom is a stem or collar rot. Water-soaked, dark brown lesions on the lower stems usually extend upward for 2.5 cm or more above the soil line and may expand to girdle the stems, preventing upward movement of water and nutrients. A fine weft of fungal growth may be evident under very wet conditions. This stem girdling often results in a sudden wilting of foliage without foliar yellowing.

The foliar phase of this disease commonly occurs at forks in the branches, resulting in dark, girdling cankers and wilting of leaves and fruits. Infected leaves

can rapidly develop circular or irregular, dark green, water-soaked lesions, which dry and appear light tan. The fungus can defoliate the plant during extended rainy weather and warm temperatures, followed by complete plant collapse.

The fungus can cause a root and crown rot of pepper plants at all ages. Infection of older plants usually begins at or below the soil line. Damping-off symptoms may occur on seedlings while infection of the roots and crowns of young plants causes rapid wilting without foliar yellowing. On the taproots and lateral roots of older plants, brown water-soaked lesions appear which

How to Identify Phytophthora Blight



Damping-off of seedlings



Discoloration of stem beginning at fork of branch



Water-soaked, dull, wrinkled fruit tissue

gradually dry with the discoloration extending into the lower part of the stem. Severely affected roots become necrotic and decayed. Root infections may also occur that kill roots and cause wilting of the plant without the appearance of stem cankers.

Fruit lesions may also appear as enlarging, water-soaked areas, which then shrivel and darken. A mass of white fungal growth may develop inside the fruit, and seeds usually turn dark brown or black. A fine, grayish-white to tan fungal growth may also become evident over the lesion on the fruit surface under moist conditions. Under such conditions this fungal growth develops extensively over the entire fruit. Symptoms may originate with fruits that are in contact with the soil or where mud has been splashed onto fruits.

Conditions for Disease Development

The disease is favored by warm, wet weather. Overwintering spores in the soil allow the fungus to persist there in the absence of host plants for many months, depending upon the soil moisture content. The fungus will also survive in infected plant tissues. Survival in cold soil is poor. A low level of inoculum in the soil can rapidly increase through repeated cycles of spore production every 2–3 days. This secondary inoculum is very important in disease development. Fruit touching the ground or near the soil are most prone to infection. Spores or the overwintering spores can germinate in soil or on decaying debris. However, the fungus is dependent on free water in soil for infection. Because of this, initial infection by *P. capsici* usually occurs in plants growing in poorly drained areas of fields. Root rot is more serious in compact or poorly drained soil; for example, soil that is saturated for 5 hr or more. It is also more serious in soil where excessive applications of nitrogen have occurred. Applications of potassium retard infection.

Rain splash can disperse spores, including overwintering ones in soil, to stems or leaves of healthy plants. Spread can also occur via surface water. Once stem infection occurs, the fungus produces spores on infected stem tissues, which are then carried by splashed rain onto nearby plants. Lower branches of adjacent plants can also be infected by rain-splashed soil contaminated by run-off water. Fruits in contact with the soil are especially prone to infection. Spores are produced on newly infected fruit and stems, and new infections can develop quickly in a short time. Disease progress declines when dry weather returns.

Excess soil moisture due to excess rain or irrigation, and soil temperature of 18°C–30°C arising from high air temperature are needed for disease development. A temperature of 27°C is ideal for infection and development of fruit rot. Early disease symptoms may appear within 24 hr. The fungus may spread between

fruit in transit if temperatures are 21°C or above. The fungus is seed borne both internally and externally in pepper seeds, and may be spread by the contaminated seed. Infected seed may fail to germinate. The fungus may also be carried on transplants.

Control

A combination of measures should be practiced:

Avoidance – If possible, select fields with no history of Phytophthora blight and fields without any history of tomato, pepper, eggplant, or cucurbit production for at least three years. Keep current production fields away from fields previously infested with *P. capsici*. Avoid poorly drained and heavy, compacted soils.

Prevention – Do not use seed from affected fruit. Look for any disease symptoms in plants in low-lying areas of fields or after prolonged periods of leaf wetness or rainfall.

Sanitation – Remove diseased fruit or diseased plants from the field and burn them when early symptoms occur, if only a few plants are affected. Do not dump culls or diseased fruit into or near production fields. Once the fungus is introduced into the field it may remain indefinitely. Clean farm utensils and equipment when moving from one field to another. Work in healthy fields before working in affected fields. Do not work in wet fields.

Cultural – Grow plants in well-drained soil on elevated beds (18 cm minimum) to drain surface water away. If rainfall is heavy, even plants on raised beds in well-drained fields may have severe disease. Use furrow irrigation instead of sprinkler irrigation. Do not irrigate a field with water containing runoff from infested fields. Use straw mulch to reduce soil splash onto fruit. Harvest fruit as soon as possible from problem fields. Keep harvested fruit dry and cool.

Chemical – Use disease-free seed or treat the seed with a recommended fungicide.

Fungicide sprays similar to those used for late blight control in tomato are helpful when applied preventatively or at an early stage of symptom development. Growers should avoid relying on a single fungicide to delay development in Phytophthora of fungicide resistance. Good plant coverage is important. A pre-plant banded fungicide application for fields having a history of problems with Phytophthora may be helpful.

Resistance – Cultivars with resistance are available.

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