



AVRDC - The World Vegetable Center

Fact Sheet

Tomato Diseases

Buckeye Rot

(*Phytophthora Root and Crown Rot*)

Phytophthora parasitica, *P. capsici*

Found worldwide



Symptoms

Brown spots appear on green and ripe fruit, often at the blossom end. The spots have bands of dark and light brown rings. These spots remain firm and smooth, although internally the rotted tissue turns mushy and can cover half the fruit. Young green fruit, when infected, usually become mummified. A white cottony fungal growth appears under moist conditions. Fruit touching or near the soil are most likely to become infected.

Phytophthora can cause a root and crown rot of tomato plants at all ages. Damping-off symptoms occur on seedlings while infections of the roots and crowns of young plants cause rapid wilt. On established plants,

brown water-soaked lesions appear on roots, extending into the lower part of the stem. Severely affected roots become necrotic and decayed. The leaves become bronze and later dieback from the tip.

On stems, the canker that develops is pale green to brown and may extend more than 15 cm. A fine weft of fungal growth may be evident under wet conditions. The canker girdles the stem and causes wilting and death.

Foliage is not directly affected by *P. parasitica*, but *P. capsici* can cause a blight of foliage and defoliate the plant during extended rainy weather and warm temperatures, followed by complete plant collapse.

How to Identify Buckeye Rot



Smooth, brown concentric rings may enlarge to cover half or more of a fruit. Generally the vine is not affected, but root rot, stem cankers and leaf blight can occur during warm, wet weather.

Conditions for Disease Development

Phytophthora is a soil-borne pathogen that infects many solanaceous crops, including tobacco, tomato, pepper and eggplant. Once the fungus is introduced into the field it may remain indefinitely, although cold soil temperatures will kill the spores. The disease is favored by warm, wet weather. Soil temperatures of 18–30 °C are needed for disease development, and 27 °C is ideal for fruit rot. Periods of extended rainfall or excessive irrigation will promote the disease.

Spores can germinate in soil or on decaying debris. Splashing rain can disperse spores, including spores in soil, onto healthy plants. Spores can also spread via surface water. Susceptible tomato plants can be killed within 3 weeks if transplanted into an infected soil.

Root rot is more serious in compact or poorly drained soil. It is more serious in soil where excessive applications of nitrogen have occurred. Applications of potassium retard infection.

The fungus may spread among harvested fruit if temperatures are 21 °C or above.

The fungus is also seed-borne (both internally and externally in seeds) and may be spread by contaminated seed. Infected seed may fail to germinate.

Control

Disease-resistant varieties are available. Check with your local extension agent to determine the varieties best adapted to your region. Avoid using seed from affected fruit.

Avoid poorly drained, heavy, compacted soils. Grow plants in well-drained soil on elevated beds (at least 18 cm high) 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 other affected fields.

Remove diseased fruit or diseased plants from the field and destroy them. Observe neighboring plants for any symptom development.

Do not dump culls or diseased fruit into or near production fields.

Use straw mulch to reduce soil splash. Stake tomatoes to get fruit off the soil surface. Harvest fruit as soon as possible from problem fields. Keep harvested fruit dry and cool.

Fungicide sprays similar to those used to control late blight (*Phytophthora infestans*) are helpful when applied preventatively or at an early stage of symptom development. Growers should avoid relying on a single fungicide so as to prevent the pathogen developing resistance to the chemical. A pre-plant banded fungicide application for fields with previous problems with *Phytophthora* may be helpful. Contact your local extension agent to determine the fungicides that are available for your region.

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