BUCKEYE ROT OF TOMATO

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Occurrence

Buckeye rot is observed with low to moderate levels in both winter and summer crop in Khyber Pakhtunkha. Generally its occurrence is more in winter crop and incidence can go up to 16%.

Cause and disease symptoms

Buckeye rot is caused by *Phytophthora parasitica.* Symptoms appear on the fruit as a grayish green to greenish brown, water-soaked spot near the blossom end, or where the fruit comes in contact with the soil (Fig 1). The infected area enlarges rapidly in warm weather until half or more of the fruit is affected. When the rot develops slowly, the decayed area shows definite, pale brown, somewhat concentric rings. The discoloration may extend to the fruit center. In staked or caged tomatoes, only the fruit clusters nearest the ground are affected. Commonly, older, diseased fruit is colonized by secondary bacteria and fungi that produce a soft, wet fruit rot. The buckeye-rot fungi may also cause a pale to dark brown, girdling stem canker which may be somewhat sunken. Affected plants usually wilt and die. In very wet weather a sparse white mildew appears on both the fruit and the stems.

Fig 1: Buckeye Rot

Disease Cycle

The fungi causing buckeye rot are primarily soilborne and cause disease only in warm, wet weather. The fungus forms two types of spores. The primary spore, or sporangium, develops first. These lemon-shaped spores are formed at the tips of simple sporangiophores that emerge through the stomates. The sporangia later give rise to motile zoospores. Sporangiophores and sporangia are not formed unless the soil is wet and above 65°F (18°C). At 70°F (21°C) the sporangia may be formed within 24 hours. The sporangia spread by surface or irrigation water and splashing rains. They may remain viable for days when conditions remain moist. During wet periods, zoospores are discharged from the sporangia and are readily splattered by rain from the soil to the fruit. The zoospores swim about in a film of water for a time, encyst, and infect the fruit. Penetration can occur through the unbroken skin. Visible symptoms of the disease may appear within 24 hours and fruit rot develops rapidly. A temperature of 80°F (26°C) or above is ideal for infection and development of the disease (optimum is 75° to 86°F or 23° to 30°C). Fruit with latent infections may decay during transit. The fungi may spread from fruit to fruit in transit and storage if the temperature is 70°F (21°C) or above. The fungi are carried from one part of a field or garden to another by runoff water, farm equipment and tools, and by workers.

Management

1. Before planting, destroy potato cull piles and prevent growth of volunteer potatoes. Plant tomatoes as far as possible from potatoes.
2 Purchase only certified disease-free transplants or seed. If potatoes are also planted purchase only certified and disease-free tubers.
3. Plant in a well-drained, porous soil. Follow a 3-year rotation excluding susceptible crops. Where possible, keep tomato fruit off the ground by staking or caging each plant or mulch the ground with black plastic, straw, hay, ground corn cobs, and so on.
4. The soil in plant beds should be disinfected with a soil fumigant.
5. When transplanting, discard and destroy all tomato seedlings with lesions on the stem and leaves.
6. Control all Solanaceous weeds in commercial fields and eradicate all diseased potato tubers

7. When the foliage is wet with fog, dew, or rain, do not cultivate or work with the plants because this spreads fungal spores from plant to plant.
8. The use of protective fungicides is essential in controlling buckeye rot. Spray Difolatan (0.2%) or Blue Copper/Blitox (0.4%) at 10 days interval and treat the seed with Captan (0.2%). It is important, however, to apply fungicides early, and to uniformly cover all fruit.
9. Harvest all ripe fruit at each picking. If left in the field, such fruit will decay, and serve as a source of infection for remaining fruit.
10. After harvest is completed, spade or plow under, compost, or burn all tomato vines. Destroy all potato cull piles, volunteer plants, and solanaceous weeds.
11. Rotate 3 or 4 years before planting tomatoes or potatoes in the same area. If buckeye rot is a problem, also exclude other vegetables, which are hosts of the causal fungus