

## Tomato *Phytophthora* root & fruit rot (157)

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### Common Name

Phytophthora root & fruit rot, buckeye rot

### Scientific Name

*Phytophthora nicotianae*; previously, *Phytophthora parasitica* var. *nicotianae*

### Distribution

*Phytophthora nicotianae* is recorded from tomato from Australia, American Samoa, Cook Islands, Federated States of Micronesia, Fiji, Papua New Guinea, and Samoa.

*Phytophthora nicotianae* is also reported on other hosts from Australia, American Samoa, Cook Islands, Federated States of Micronesia, Fiji, New Caledonia, Niue, Papua New Guinea, Samoa, Tonga, and Wallis & Futuna (**see Fact sheet nos. 149, 152 & 264**).

### Hosts

Tomato, passionfruit, *bele* (Fiji). Note, that the oomycete (water mould) causes a similar disease on capsicum, citrus, papaya, pineapple and tobacco.

### Symptoms & Life Cycle

The disease is caused by a species of *Phytophthora*; it is an oomycete or water mould, not a fungus. Although they look like fungi, *Phytophthora* species are related to algae.

A dark-brown rot develops in the taproot and lower stem (called the crown). Brown areas of rot may develop on the stem above and below soil level. Eventually, these areas of rot girdle the stems and roots. As the roots rot the plants wilt and die. Low hanging fruit or those touching the soil become infected by greyish-green rots, which expand quickly and show broad dark rings (Photo 1). The skin of the fruit stays firm at first. Under humid conditions white cottony growth of the oomycete develops on the surface of the fruit. Later, the fruit develops soft rots as bacteria and fungi invade.

Water moulds survive in the soil as thick-walled resting spores called 'chlamydospores'. When conditions are right, the chlamydospores germinate and produce spores called 'sporangia'. Another spore is produced inside the sporangia called 'zoospores', and these are capable of swimming short distances in the water between soil particles. If they reach the root or stem, they infect and the disease begins.

The water mould spreads in rain splash, surface water, in water within the soil, and in soil on machinery and shoes over long distances.

### Impact

The water mould causes root rots, infects the stem causing a wilt, and also attacks the fruits. Depending on rainfall, the disease may spread quickly causing plants to wilt and die. In general, it is a minor disease.

In Samoa, it is an uncommon disease, sometimes occurring in areas with poor drainage.

### Detection & inspection

Look for plants that wilt during the warmest part of the day although the soil is still moist. Look for rots on the stem or on the root. Look at the fruits to see firm, grey-green rots near the ground, which may be covered in cottony growth in humid conditions.

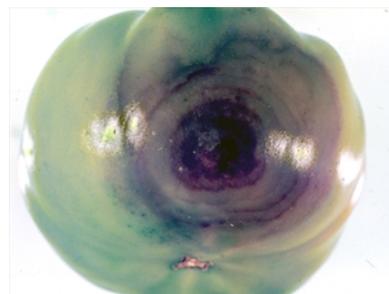


Photo 1. Grey-green rot on tomato caused by buckeye or *Phytophthora* root and fruit rot, showing the broad dark rings typically caused by this water mould.

## Management

### CULTURAL CONTROL

In general, this is not a common disease, but in wet areas where it is known to occur attention should be paid to cultural control measures.

Before planting:

- *Site*: Grow tomatoes only in areas with well-drained soil. Avoid low-lying areas where drainage is poor.

During growth:

- *Soil drainage*: Plant tomato seedlings or cuttings on ridges or raised beds, surrounded by ditches, to prevent waterlogging.
- *Mulch*: Spread coconut fronds or use another mulch to prevent heavy rains from splashing soil onto low hanging fruit.

After harvest:

- *Hygiene*: Remove infected fruit as soon as they are seen, and before spores are produced.
- *Crop rotation*: Use crop rotations of at least 4 years because *Phytophthora* produces thick-walled resting spores ('oospores'). During intervals between crops of tomatoes, do not grow Solanaceous crops, or others that are known to be hosts of the oomycete.

### RESISTANT VARIETIES

Roma varieties (plumb tomatoes) are reported to have resistance.

### CHEMICAL CONTROL

Use systemic fungicides, such as those containing metalaxyl, or protectant fungicides, such as those containing copper, mancozeb or chlorothalonil. Apply as a foliar spray when fruit are about a third of their final size, and continue at 1-2-week intervals depending on the rainfall.

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*When using a pesticide, always wear protective clothing and follow the instructions on the product label, such as dosage, timing of application, and pre-harvest interval. Recommendations will vary with the crop and system of cultivation. Expert advice on the most appropriate pesticide to use should always be sought from local agricultural authorities.*

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Information from Gerlach WWP (1988) *Plant diseases of Western Samoa*. Samoan German Crop Protection Project, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Germany; and (with Photo 1) *Diseases of vegetable crops in Australia* (2010). Editors, Denis Persley, et al. CSIRO Publishing.

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