



Pacific Pests, Pathogens & Weeds - Fact Sheets

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Bean *Pythium* cottony leak (128)



Photo 1. *Pythium* sp. causing cottony leak disease on a bean pod. Note that the white cottony growth on the lower part of the pod is the mycelium of the water mould (it is not a fungus).



Photo 2. Cottony leak fungus, *Pythium* sp., developing on stored beans. The water mould develops in storage if the beans are not dried properly after harvest and/or they have been damaged.



Photo 3. *Pythium* sp. causing cottony leak disease on a cucumber fruit. Note that the white patch on the lower left of the fruit is the mycelium of the water mould (it is not a fungus).



Photo 4. Cottony leak, *Pythium* sp., on watermelon.

Common Name

Cottony leak and stem rot

Scientific Name

Pythium species, *Pythium deliense* and *Pythium aphanidermatum*.

Distribution

Worldwide. *Pythium deliense* is reported from Australia, Papua New Guinea (from soil, cucumber and tobacco damping off), and Samoa (beans, cucumber). *Pythium aphanidermatum* is reported from American Samoa (taro, cucumber, maize), Australia, Marshall Islands (cucumber), New Caledonia, Papua New Guinea (soil), Fiji (ginger), and Samoa (cucumber).

Hosts

Beans (and other food legumes), capsicum, cucumber, tomato, watermelon, and on many kinds of seedlings as *Pythium* species cause seedling damping-off.

Symptoms & Life Cycle

The two *Pythium* species are very similar in appearance and biology; however, molecular studies suggest they are different.

Symptoms occur on leaves, stems, roots and seedlings. On leaves, greyish patches are seen covered in fine, white cottony growth, becoming brown as they dry. The cottony growth spreads to the stems; rots occur and plants wilt. Below ground, minute spores (zoospores) swim in soil water and attack the fine roots and kill them; this, too, causes plants to wilt.

Bean pods are attacked on plants in the field or in storage (Photos 1&2). In both cases, thick, white, cottony growth binds the pods together. Later, the pods in transit or storage turn into a soft, watery mass known as "cottony leak". Where cucumber fruits touch the ground, watery rots develop, and these too become covered in a white cottony growth (Photo 3). Watermelon, is also susceptible to the disease (Photo 4).

Damping-off is seen when seeds are planted in unsterilised or unpasteurised soils contaminated with *Pythium*, especially *Pythium aphanidermatum*. Often, fungi are also present, such as *Rhizoctonia* (see **Fact Sheet no. 126**) and *Fusarium*. Seedlings are killed before emerging above soil level or afterwards (see **Fact Sheet no. 47**).

Pythium species are commonly found in soil, growing in plant remains or surviving as thick-walled, round, resting spores (oospores). They are spread when heavy rains splash soil containing the spores onto leaves and stems. Spread over longer distances is through movement of infested soil or contaminated plant parts.

Impact

Pythium is a water mould belonging to the oomycetes; it is not a fungus, although its appearance and life history are similar. Generally, the two species - *Pythium deliense* and *Pythium aphanidermatum* - cause a minor disease on beans and cucumber. Losses are sometimes high in Samoa during long periods of rain. Bush beans suffer more from the disease than those that climb and need to be staked, as they are closer to the soil. On cucumbers in Samoa, the disease is worse on poorly drained soils, and where the fruits touch the ground.

Detection & inspection

Look for the characteristic thick, white, cottony growth over leaves, stems and fruit. Look for blackened tips of the fine roots. Although this might be sufficient for a preliminary diagnosis of the disease, identification of the *Pythium* species requires use of morphological keys, antibody tests (ELISA) or molecular analyses.

Management

CULTURAL CONTROL

For damping-off in the nursery:

- Use soil-less potting mixes in nurseries, or sterilised/pasteurised soil, and prevent mixes/soil from being contaminated by raising pots and boxes aboveground, and by using clean tools.
- Alternatively, make compost with organic materials from the garden, kitchen waste, animal manure, and a little soil, and allow it to decompose for 3-4 weeks. Mix 1 part compost to 3 parts grated, rotten coconut husk (for germinating seed) or 2 to 1 (for raising seedlings).
- Do not plant seedlings too densely; thin them to allow air circulation.
- Do not over-water seedlings; waterlogging encourages damping-off.

For stem rot in the field:

- Avoid close planting; this will allow air to circulate around plants and reduce leaf wetness; it will also reduce spread of the disease between plants.
- Cultivate soil carefully, avoiding injury to plants, which could become sites of *Pythium* infection.
- Stake beans and cucumbers; and in the rainy season avoid bush beans, growing those varieties that need staking instead.
- Grow crops susceptible to cottony leak in soils that have good drainage, or grow crops on raised beds.
- Mulch plants to prevent heavy rains splashing spores of *Pythium* from the soil to the leaves.
- If cottony leak occurs, choose a rotation avoiding those that are most susceptible. Note, sweetpotato, cassava and yam are rarely affected by *Pythium* root diseases.

For cottony leak after harvest:

- Do not harvest and pack cucumbers and beans during wet weather.
- Harvest and pack only those cucumber and beans without damage.

CHEMICAL CONTROL

Commercial growers should consider using pesticides as follows:

- Treat seed with recommended fungicides (e.g., captan, metalaxyl or thiram).
- In commercial plantings, drench with products known to be effective against *Pythium* (e.g., captan and metalaxyl). They are generally used against *Pythium* on high value ornamentals.

AUTHOR Grahame Jackson

Information (and Photo 2) *Diseases of vegetable crops in Australia* (2010), Editors, Denis Persley, Tony Cooke, Susan House. CSIRO Publishing. Photos 1&3 Gerlach WWP (1988) *Plant diseases of Western Samoa*. Samoan German Crop Protection Project, Deutsche Gesellschaft für Technische Zusammenarbeit (GIZ) GmbH, Germany. Photo 4 Jacqie (Wright) Kami, formerly Plant Pathologist, Secretariat of the Pacific Community, Suva, Fiji.

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