

## Plant Pathology Fact Sheet

# Fruit Rots of Cucurbits

Kenny Seebold

*Extension Plant Pathologist*

## INTRODUCTION

Vegetables in the cucurbit family include cucumber, muskmelon (cantaloupe), summer squash, winter squash, and pumpkin. The following diseases primarily affect the fruit of these crops and can result in losses in commercial fields and home gardens.

## BELLY ROT

Belly rot mainly affects cucumber; it is rarely found on other cucurbits.

### Symptoms and Signs

This rot develops where the fruits come into contact with the soil. Young infected fruit have a yellowish brown, superficial discoloration which later develops into sunken irregular spots on the underside or “belly” (FIGURE 1). Large water-soaked decayed areas may develop on mature fruit.

### Cause and Disease Development

Belly rot is caused by the common soil-borne fungus, *Rhizoctonia solani*. This fungus survives in soil and infested crop debris as mycelia and sclerotia. Warm temperatures, high humidity, and excessive moisture favor



FIGURE 1. BELLY ROT OF CUCUMBER.

infection and disease development. Under favorable conditions, symptoms can become evident within 24 hours of infection and entire fruits may decay in 72 hours.

### Disease Management

- Prior to planting, deeply till the soil.
- Provide a physical barrier, such as black plastic mulch, between the fruit and the soil.
- Manage irrigation practices to avoid excessively wet soils.
- Start a fungicide program when the cucumber plants begin to vine.

## CHOANEPHORA FRUIT ROT

This fungal disease is commonly observed on summer squash, but it may also affect cucumber and pumpkin.

### Symptoms and Signs

Symptoms begin as a soft, wet rot of flowers and the blossom end of fruit. Infected fruits decay rapidly, becoming soft and watery. A profuse, fuzzy fungal growth with large masses of black spores forms on infected tissues (FIGURE 2). The pathogen's distinctive appearance (like numerous small black-headed pins sticking out of a pincushion) is diagnostic for this disease.



FIGURE 2. CHOANEPHORA FRUIT ROT OF SUMMER SQUASH.

### Cause and Disease Development

The pathogen, *Choanephora cucurbitarum*, overwinters in the soil on dead plant tissue or as dormant spore structures. Spores released in the spring are spread by wind and insects to squash blossoms. This fungus infects wilted blossoms and then spreads to the attached fruit. High relative humidity and wet conditions favor disease development.

### Disease Management

There are no effective controls available; however, the following may help:

- Fungicides may reduce disease incidence; however, it can be difficult to protect developing blossoms throughout the season.
- Practices that reduce leaf wetness can be of benefit. Avoid overhead irrigation or time overhead watering to allow for leaf drying.

## COTTONY LEAK

Cottony leak, also referred to as *Pythium* fruit rot, affects most cucurbits; however, it is most common on cucumber and squash.

### Symptoms and Signs

This disease generally appears first on portions of fruit in contact with soil. Small, water-soaked spots expand rapidly until large portions of the fruit are necrotic and soft. Profuse, white fungal growth resembling tufts of cotton (FIGURE 3) can be found on rotted areas when the humidity is high.

### Cause and Disease Development

Several species of *Pythium*, a fungus-like organism, have been implicated in this disease. These soil-borne pathogens can overwinter as dormant spore structures in the residue of many different crops and weeds. Infection occurs through wounds or where the fruit touches the wet ground. *Pythium* spp. is easily disseminated via water and soil particles. Wet conditions promote infection and decay.



FIGURE 3. COTTONY BLIGHT OF CUCUMBER.

### Disease Management

- Manage excess soil moisture by providing good drainage and monitoring irrigation practices.
- Use plastic mulch.
- Fungicides may provide some disease suppression.

## FUSARIUM FRUIT ROT

Many cucurbits can be affected by *Fusarium* fruit rot, but it is particularly devastating on pumpkin. Decay can occur in the field or in storage after harvest.

### Symptoms and Signs

Infected fruit develop lesions, usually circular and of varying size (FIGURE 4). The tissue beneath the lesions may be discolored and corky. Fungal growth ranging from white to pink to purple in color may be seen on infected tissues.



FIGURE 4. FUSARIUM FRUIT ROT OF PUMPKIN.

### Cause and Disease Development

Several species of *Fusarium* are known to cause fruit decays in cucurbits. These soil-borne fungi overwinter as mycelium in plant debris or as thick-walled chlamydospores. Infection generally occurs through wounds.

### Disease Management

- Rotate out of cucurbits for several years.
- Provide physical barriers which minimize contact of the fruit with soil.
- Handle fruit carefully during harvest to avoid wounding.
- Cure fruit properly.

## SCAB

Scab may appear on cucumber, muskmelon, pumpkin, and squash. While leaves and stems can be affected, the greatest losses occur when fruit are infected.



FIGURE 5. SCAB LESIONS ON CUCUMBER

### Symptoms and Signs

Small, sunken spots develop on fruit; lesions may be covered with an olive-green mass of spores (FIGURE 5). Secondary pathogens may invade lesions, leading to fruit rot.

### Cause and Disease Development

The pathogen, *Cladosporium cucumerinum*, overwinters in cucurbit vines left in the field or garden, and in seeds. Spores produced by the fungus are easily spread via air currents to susceptible tissues. Wet conditions, including fogs and dews, along with moderate to cool temperatures, favor this disease.

### Disease Management

- Purchase pathogen-free seed.
- Plant resistant varieties.
- Practice crop rotation.
- Follow a good fungicide spray program.

## SOUTHERN BLIGHT

Southern blight can cause fruit decay of cucumber, muskmelon, pumpkin, and watermelon. The pathogen has an extremely wide host range that also includes other vegetable crops (e.g. pepper, tomato, carrots, and beans), tree fruits (e.g. apple), herbaceous ornamentals (e.g. ajuga and vinca), and tobacco.

## Symptoms and Signs

Symptoms begin where the fruit comes in contact with the soil surface. Affected areas are soft and water-soaked, later becoming covered with a dense mat of white, fan-like fungal growth. As the disease progresses, numerous small, round fungal survival structures (sclerotia) develop in the fungal mat (Figure 6). Initially the sclerotia are white; later becoming light brown, reddish brown, or golden brown in color. Each sclerotium is roughly the size of a mustard seed. The pathogen also attacks stems and crowns, resulting in sudden wilting of the foliage.



FIGURE 6. SOUTHERN BLIGHT ON PUMPKIN. NOTICE THE SMALL, ROUND SCLEROTIA DEVELOPING IN THE FUNGAL MAT.

## Cause and Disease Development

Southern blight is caused by the soil-borne fungus *Sclerotium rolfsii*. This fungus survives as mycelium and sclerotia in the soil and in decomposing plant residue. The fungus is moved by running water, on infested soil particles clinging to cultivating tools, on infected plant material, and as sclerotia mixed with seeds. Disease development is enhanced by high temperatures and humidity. Southern blight is also more severe where undecomposed organic matter is left on and in the soil. Sclerotia enable the fungus to survive adverse conditions and can persist in the upper layers of soil for many years.

## Disease Management

- Remove infected plants and fruit whenever practical.
- Deep plow plantings early to bury sclerotia and to allow for the complete decomposition of plant residues.
- Practice crop rotation using less susceptible plants such as corn, sorghum, small grains, and grasses.

## BACTERIAL RIND NECROSIS

Only watermelon is affected by bacterial rind necrosis.

## Symptoms and Signs

Hardened, brown to reddish-brown, corky, dry areas develop in the rind interior (FIGURE 7). These necrotic spots can expand or merge to affect large portions of the rind. Symptoms are rarely visible on the surface of the rind, and watermelon flesh is not commonly affected.



FIGURE 7. BACTERIAL RIND NECROSIS IN WATERMELON.

## Cause and Disease Development

Various bacterial pathogens, such as *Erwinia* spp., have been reported as the cause of this disease. Little is known about the conditions favoring infection and disease development.

## Disease Management

No controls are available; however, there is some indication that the pathogen can carry over in infested fields. Avoid fields where this disease has occurred in the past.

## **ADDITIONAL RESOURCES**

University of Kentucky publications are available at County Extension offices, as well as on the Internet.

- Home Vegetable Gardening in Kentucky, ID-128 (University of Kentucky)  
<http://www.ca.uky.edu/agc/pubs/id/id128/id128.pdf>
- IPM Scouting Guide for Common Problems of Cucurbit Crops in Kentucky (University of Kentucky, 2009)  
<http://www.ca.uky.edu/agc/pubs/id/id91/id91.pdf>
- Southern Blight, PPFS-VG-03 (2008)  
[http://www.ca.uky.edu/agcollege/plantpathology/ext\\_files/PPFShtml/PPFS-VG-3.pdf](http://www.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-VG-3.pdf)
- Vegetable Production Guide for Commercial Growers, ID-36 (University of Kentucky)  
<http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>

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*Photos by: Cheryl Kaiser (figs. 1 & 3), John Hartman (fig. 2), Julie Beale (fig. 4), Kenny Seebold (fig. 6); William Nesmith (fig. 7), University of Kentucky; and Mary Ann Hansen (fig. 5), Virginia Tech, Bugwood.org*

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