



# Fruit Diseases of Cucurbits

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## IMPORTANCE

Cucurbit fruit diseases can cause a complete loss of cucurbit yields in commercial fields, as well as in home gardens. Affected crops in the Cucurbitaceae family include cucumber, muskmelon (cantaloupe), pumpkin, summer squash, winter squash, and watermelon.

The major fruit diseases of cucurbits discussed in this fact sheet are belly rot, Choanephora rot, cotton leak (Pythium rot), Fusarium rot, and scab. Other cucurbit fruit rots (southern blight and Phytophthora blight) are discussed in separate fact sheets (see Resources at the end of this publication).

## BELLY ROT

### Hosts

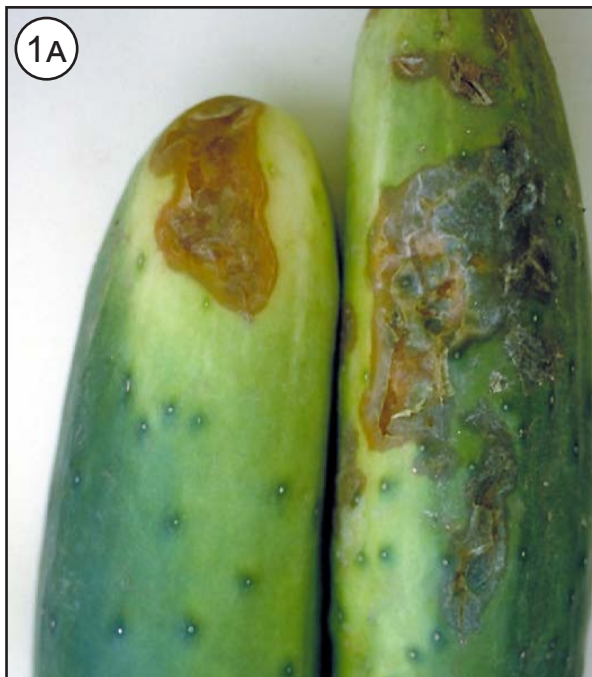
Mainly cucumber; rarely other cucurbits.

### Symptoms

The belly rot fungus infects portions of cucumber fruit that consistently contact soil. Immature fruit develop a yellowish brown, superficial discoloration, while infections of mature fruit result in large water-soaked, decayed areas (FIGURE 1A). Lesions eventually become sunken, dried, irregular spots on fruit undersides or “belly” (FIGURE 1B). Fruit remains firm, seldom succumbing to a soft rot.

### Cause & Disease Development

Belly rot is caused by the common soil-borne fungus, *Rhizoctonia solani*. This fungus survives in soil and infested crop debris as fungal strands (mycelia) and firm, hardy resting structures (sclerotia). Excessive moisture favors infection and disease development, along with warm temperatures and high humidity. Under favorable conditions, symptoms and signs can become evident within 24 hours of infection and fruits may decay quickly thereafter.



**FIGURE 1.** BELLY ROT LESIONS ARE INITIALLY WATER-SOAKED (A), BUT LATER BECOME SUNKEN AND DRIED (B).

## CHOANEPHORA FRUIT ROT

### Hosts

Common on summer squash; may also affect cucumber and pumpkin.

### Symptoms & Signs

Disease may first become evident when wilting blossoms suddenly collapse and decay (FIGURE 2A). Disease spreads to fruit, resulting in a rapidly progressing soft, watery rot at the blossom end. A profuse, fuzzy fungal growth with large masses of black spores forms on infected blossoms and fruit (FIGURE 2B). The pathogen's distinctive appearance (like numerous small black-headed pins sticking out of a pincushion) is diagnostic for this disease.

### Cause & Disease Development

The pathogen, *Choanephora cucurbitarum*, overwinters in soil on dead plant tissue as dormant spore structures (chlamydospores and zygospores). Spores (sporangiospores) released in spring are spread to squash blossoms by wind, rain splash, and insects. This fungus infects wilted blossoms and then spreads to the attached fruit; direct infections of fruit may also occur via wounds. High relative humidity and wet conditions favor disease development.



**FIGURE 2.** CHOANEPHORA INFECTIONS OFTEN START WITH WILTING BLOSSOMS (A) AND PROGRESS TO FRUIT (B).

## COTTONY LEAK (PYTHIUM ROT)

### Hosts

Most cucurbits; more common on cucumber and squash.

### Symptoms & Signs

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

### Cause & Disease Development

Several species of *Pythium*, an oomycete or water mold pathogen, have been implicated in this disease. These soil-borne organisms overwinter as dormant spore structures (oospores) in the residue of many different crops and weeds. Infection occurs through wounds or where the fruit contacts wet ground.

*Pythium* spp. are easily disseminated via water and soil particles. Wet conditions promote infection and decay.



**FIGURE 3.** COTTONY MYCELIUM IS EVIDENT ON CUCUMBERS AFFECTED BY PYTHIUM FRUIT ROT.

## FUSARIUM FRUIT ROT

### Hosts

Many cucurbits; particularly devastating on pumpkin.

### Symptoms & Signs

Infected fruit develop variously sized circular lesions (FIGURE 4A); lesions typically become sunken, and tissue beneath may be discolored and corky. Fungal growth (FIGURE 4B) on the surface of lesions is most often white in color, but may be pink to purple.



**FIGURE 4.** FUSARIUM FRUIT BEGINS AS VARIOUSLY SIZED CIRCULAR LESIONS (A) THAT EVENTUALLY BECOME COVERED WITH FUNGAL GROWTH (B).

## SCAB

### Hosts

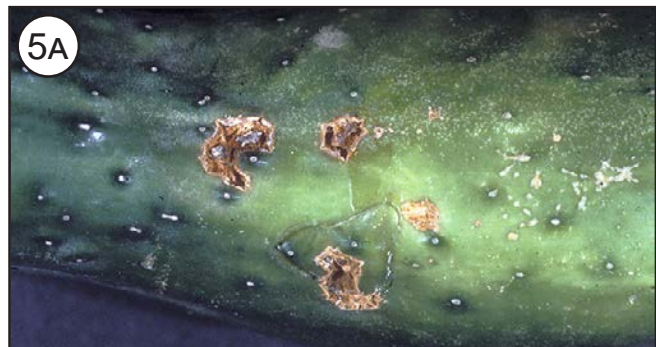
Cucumber, muskmelon, pumpkin, and squash.

### Symptoms

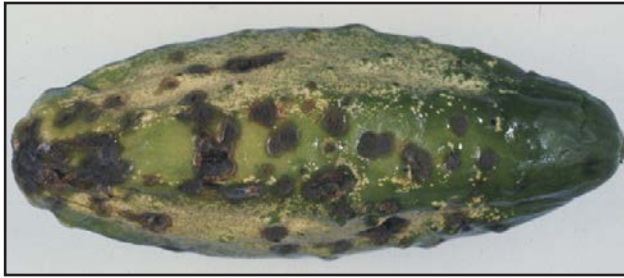
Small, sunken spots develop on fruit (FIGURE 5); lesions may become covered with an olive-green mass of spores (FIGURE 6). Leaves and stems may also be affected; however, the greatest losses occur when fruit are infected. Secondary pathogens may invade lesions, leading to fruit rot.

### Cause & Disease Development

The pathogen, *Cladosporium cucumerinum*, overwinters in cucurbit vines left in the field or garden, and in seeds. Spores (conidia) 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 disease.



**FIGURE 5.** SCAB RESULTS IN THE DEVELOPMENT OF SMALL, SUNKEN SPOTS, SHOWN HERE ON CUCUMBER (A) AND YELLOW SQUASH (B).



**FIGURE 6.** SCAB LESIONS BECOME COVERED WITH OLIVE GREEN FUNGAL GROWTH.

## DISEASE MANAGEMENT

### Cultural practices

- Purchase pathogen-free seed (scab).
- Plant resistant varieties (scab).
- Practice crop rotation using less susceptible plants such as corn, sorghum, small grains, and grasses.
- Deep plow plantings early to bury crop debris to allow for the complete decomposition of plant residues.
- Provide a physical barrier, such as black plastic mulch or dry, rolled straw, to minimize fruit contact with soil.
- Manage excess soil moisture by choosing well-drained sites or elevating plant beds.
- Monitor irrigation practices to avoid excessively wet soils. Avoid overhead irrigation or apply overhead watering in the morning to allow for rapid leaf drying.
- Space plants to allow good air movement, which quickens drying of plant tissues.
- Remove infected plants and fruit whenever practical and discard far off-site.
- Handle fruit carefully during harvest to avoid wounding (*Fusarium* fruit rot).

### Fungicides

- Start a fungicide program for cucurbits no later than when plants begin to vine. For current fungicide recommendations, refer to publications listed in Additional Resources (ID-36 for commercial plantings and ID-128 for home gardens), or contact a Kentucky county Extension office.
- Fungicides are not a practical management tool for *Choanephora* fruit rot because of the difficulty protecting developing blossoms throughout the season.

### ADDITIONAL RESOURCES

- Home Vegetable Gardening in Kentucky (ID-128) <http://www.ca.uky.edu/agc/pubs/id/id128/id128.pdf>
- IPM Scouting Guide for Common Problems of Cucurbit Crops in Kentucky (ID-91) <http://www.ca.uky.edu/agc/pubs/id/id91/id91.pdf>
- Phytophthora Blight of Cucurbits and Peppers (PPFS-VG-04) <https://plantpathology.ca.uky.edu/files/ppfs-vg-04.pdf>
- Southern Blight (PPFS-GEN-16) <https://plantpathology.ca.uky.edu/files/ppfs-gen-16.pdf>
- Vegetable Production Guide for Commercial Growers (ID-36) <http://www2.ca.uky.edu/agcomm/pubs/id/id36/id36.pdf>

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**Photos:** University of Kentucky - Cheryl Kaiser (1A, 3); Kenny Seebold (2A), John Hartman (2B); Paul Bachi (4A), and Julie Beale (4B); Bugwood.org - Gerald Holmes, California Polytechnic State University at San Luis Obispo (1B), Clemson University-USDA Cooperative Extension Service Slide Series (5A), University of Georgia Plant Pathology, University of Georgia (5B), and Mary Ann Hansen, Virginia Tech (6)

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