

Managing *Phytophthora capsici* Diseases on Vegetables

Anthony P. Keinath, Extension Plant Pathologist, Clemson University, Coastal Research and Education Center, Charleston, SC.

Phytophthora blight, crown and root rot, and fruit rot are serious problems on cucurbit and fruiting (solanaceous) vegetables in the eastern half of the United States. Short vegetable crop rotations, center-pivot irrigation, and heavy rainfall create conditions favorable for *Phytophthora* diseases.

In South Carolina, *Phytophthora* diseases occur on vegetables in all parts of the state in clay, loam, and sandy soils. The disease occurs most often on summer squash and pepper, two of the most susceptible crops. Fruit rot on watermelon and pumpkin has been serious in some fields.

Symptoms



On summer squash and pumpkin, the first symptom is usually a soft rot in the crown of the plant that quickly leads to wilting and collapse. Root rot is usually not seen. Fruit are very susceptible to a soft rot that starts as large, circular, tan, beige, or salmon spots. Fruit rot may develop post-harvest.

On peppers, *Phytophthora* blight often begins with a dry,



corky canker on the main stem at the soil line. Roots may turn chocolate brown and rot. Stem branch points turn black. Diseased fruit are covered with a thin, dense layer of white mold.

All cucurbits (squash, pumpkin, cucumber, melon, and watermelon) and solanaceous vegetables (pepper, tomato, and eggplant) are susceptible. Lima bean and snap bean also may be attacked by this pathogen when grown in infested soil during wet weather.

The Disease Cycle

The water mold that causes *Phytophthora* blight is *Phytophthora capsici*, named after pepper (*Capsicum*), the first host on which it was found. This organism is actually a type of algae that has adapted to living in and on plants.

Phytophthora produces two types of spores: sporangia and oospores. Sporangia are short-lived spores that are spread by wind or water. Oospores are long-lived spores that survive in soil and are moved with soil, run-off, and drainage water.

The main source of the pathogen is infested soil. The pathogen survives in contaminated soil for many years. Other sources are surface water (ponds and streams) and infested crop debris, particularly cull piles of rotten fruit.

Phytophthora is only active in waterlogged soils. Wet soil triggers oospores to germinate and produce sporangia, which germinate and produce swimming spores within 30 minutes. When the swimming spores land on plant tissues, disease begins and spreads quickly. Sporangia produced above ground are blown or splashed onto fruit and to other plants in the field.

Management

Five options help reduce the occurrence and severity of *Phytophthora* diseases: water management, crop rotation, soil management, resistance (in pepper only), and fungicides. Combine as many of these practices as possible for the best control.

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Water Management

Because *Phytophthora capsici* needs wet soil to be active, use every technique available to improve soil drainage.

- Subsoil and use raised beds for all crops. Cut water furrows across plastic-mulched raised beds.
- Do not plant in low areas in fields, because disease will start there. Consider land leveling, but avoid moving soil in fields already infested.
- Use caution with water-wheel transplanters so planting holes are not punched too deeply. Deep holes create areas where water will collect and provide ideal conditions for disease development.
- Use irrigation water from wells, not ponds, streams, or rivers. The pathogen can be introduced to noninfested (“clean”) fields by irrigating with contaminated water.

Crop Rotation

- Always rotate to a nonhost crop after cropping any susceptible vegetable. Even though crop rotation will not eliminate the pathogen from infested soil, it will keep the pathogen from increasing.
- Do not plant a fall susceptible crop in the same field after a spring susceptible crop.

Soil management

- Enter noninfested fields before entering infested fields.
- Power-wash soil from machinery after working in infested fields.
- Use plastic or organic mulches to act as a physical barrier between infested soil and fruit.
- On small acreages, remove diseased and rotting fruit to prevent build-up of *Phytophthora*.

Resistance

Bell pepper cultivars Vanguard, Paladin, Revolution, and Declaration are moderately resistant to *Phytophthora* blight. When these cultivars are grown, other

management practices should still be used to slow disease and lengthen the harvest period. Under certain growing conditions, these cultivars may show “silver skin,” a blistering of the skin of the fruit that is a type of cosmetic damage that lowers fruit quality.

Fungicides

Fungicides are not a “cure-all” for *Phytophthora* diseases. They do not work well against this disease once symptoms appear. Fungicides should be used preventively, but disease still may occur in treated fields.

Ridomil Gold is no longer registered against *Phytophthora*, because the pathogen becomes resistant to this fungicide relatively quickly. Resistant isolates have been found in South Carolina and many other states. Resistance to Ranman has been found in the southeastern U.S., so this fungicide is not recommended.

To prevent resistance to fungicides, rotate at least two recommended fungicides 1:1, observing the maximum number of applications on the label. Tank mix with another fungicide when required.

For more information on fungicides, see the current edition of the **Southeastern U.S. Vegetable Crop Handbook**:
growingproduce.com/southeasternvegetablecrophandbook

Fungicide	Application	Tank Mix	Max. Applic.
Orondis Gold*	Drip	Not required	4
Orondis Ultra*	Foliar	Copper fungicide	4
Presidio	Drip, foliar	Required	2
Revus**	Foliar	Copper fungicide	4
Zampro	Drench, drip, foliar	Not required	3

*Do not use both Orondis products on the same crop.

**Do not rotate Orondis Ultra and Revus.

Recommendations

If you have:	Water management	Crop rotation	Soil management	Resistant cultivars	Fungicides
Infested fields	☑	☑	☑	☑	☑
Noninfested fields on infested farm	☑	☑	☑	☑	☑
Organic farm	☑	☑	☑	☑	
Noninfested farm	☑	☑	☑		

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