

Managing *Phytophthora* on Summer Squash and Zucchini

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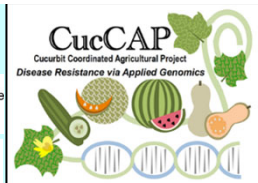


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Vegetables that are susceptible to *Phytophthora capsici* include cucumber, zucchini, summer and winter squash, watermelon, cantaloupe, pumpkin, pepper, eggplant, tomato, and succulent bean. The pathogen may overwinter in the soil and persist for >10 years. *Phytophthora capsici* is favored by rain and warm temperatures and spreads readily via water. It has also been found in irrigation ponds and surface water sources.

Recognizing *Phytophthora* on SUMMER SQUASH and ZUCCHINI

- Wilted or dead plants
- Water-soaked lesions on fruits, stems, and leaves
- White, “powdered sugar” layer of spores on fruit

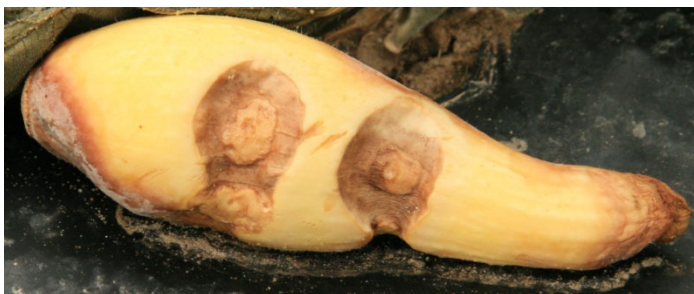
Summer squash and zucchini are very susceptible to *Phytophthora*, and symptoms are usually visible on both the plant and fruit. Most often, the first noticeable sign of *Phytophthora* is water-soaking of the crown and/or roots that are black or brown in color. The plant appears wilted. In many situations, the roots may appear healthy yet the crown and

petioles are infected. Fruit symptoms include dark, water-soaked lesions and a white, “powdered sugar” layer of spores.

It is possible to harvest infected fruits that look healthy, but these fruits may be infected and deteriorate in transit or on grocers’ shelves. This can happen because symptoms can take several days to appear on fruits once infection has occurred. Take preventive measures before a problem occurs to avoid a disease outbreak. Do not plant crops susceptible to *Phytophthora* in a field with a history of the disease.

Summer squash and zucchini should be planted into raised beds at least six inches in height whenever possible. Green zucchini are less susceptible than yellow straight neck squash. It is extremely important to only plant in well-drained fields since *Phytophthora* is spread via water; drip irrigation is recommended.

Fungicides can help manage *Phytophthora*, and may need to be applied frequently when weather is



Top, water-soaking and white spores on summer squash. Bottom, white spores on zucchini.



Top, water-soaking of stems and immature fruit, and bottom, wilting of infected summer squash.

Management Strategies

- Plant into well-drained, tiled fields
- Use raised beds and drip irrigation
- Avoid using surface water for irrigation
- Irrigate sparingly from a well
- Rotate crops
- Scout fields regularly for *Phytophthora*
- Remove any diseased plants and adjacent healthy plants
- Apply fungicides preventively and at short intervals when needed
- Powerwash equipment after it has been in infested fields
- Do not dump diseased culls in production fields

wet and conducive to disease. Rotating fungicide chemistries among FRAC groups is vital to avoid the development of resistance.

Scouting fields early and often can be helpful in preventing disease, especially during wet and warm periods. If *Phytophthora* is spotted in a field, remove the diseased plants and the healthy-looking plants that border the diseased area. Never dump diseased fruits back onto a production field. Clean all equipment with a power washer to remove soil.

Remember that the pesticide label is the legal document on pesticide use. Read the label and follow all instructions closely. The use of a pesticide in a manner not consistent with the label can lead to the injury of crops, humans, animals, and the environment, and can also lead to civil or criminal fines and/or condemnation of the crop. Pesticides are good management tools for the control of pests on crops, but only when they are used in a safe, effective and prudent manner according to the label.

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Preferred *Phytophthora* Fungicides for SUMMER SQUASH and ZUCCHINI

Product	A.I.	FRAC*	Comment
Elumin	ethaboxam	22	Rotate between applications. Apply as a soil or foliar spray or via drip.
Orondis Gold	oxathiapiprolin/ mefenoxam	49/4	Apply at-planting in-furrow, as a banded surface spray following transplanting or during seeding, or via drip. If applied via drip on direct-seeded crops delay application until after emergence.
Orondis Ultra	oxathiapiprolin/ mandipropamid	49/40	Rotate to a fungicide with a different FRAC after 2 sequential applications. For disease control, use either soil or foliar applications of oxathiapiprolin products, but not both
Presidio 4SC	fluopicolide	43	Use in a fungicide tank mix. Apply via drip or as a foliar spray.
Revus 2.08SC	mandipropamid	40	Include surfactant.
**Apron XL	mefenoxam	4	Seed treatment. Wait 6 weeks after transplant to apply mefenoxam products
**Ridomil Gold SL	mefenoxam	4	Apply as preplant-incorporated, at-plant soil spray, or via drip.

Phytophthora 'B' Team for SUMMER SQUASH and ZUCCHINI

Forum 4.18SC	dimethomorph	40	Use in a fungicide tank mix.
Gavel 75DF	mancozeb/ zoxamide	M03/22	Relatively long PHI.
Ranman 400SC	cyazofamid	21	See label about surfactant.
Zampro 4.4SC	ametoctradin/ dimethomorph	45/40	Apply via drip or as a foliar spray.

*The FRAC code is an alphanumeric code assigned by the Fungicide Resistance Action Committee and is based on the mode of action of the active ingredient.

**Preplant incorporation of Ridomil Gold SL is not labeled for *Phytophthora*, it is labeled for control of *Pythium*. Ridomil Gold Bravo SC and Ridomil Gold Copper may be useful in protecting fruits from *Phytophthora* and are labeled as foliar applications for downy mildew control in cucurbits. Fungicide resistance has been detected in *Phytophthora* where mefenoxam has been used frequently.