



## DISEASE MANAGEMENT: Pythium Damping-off, Root Rot and Stem Rot



### *Pythium* spp.

#### SIGNS & SYMPTOMS:

- On seeds, infected seeds may not germinate and seeds may turn brown and decompose.
- The stems of young seedlings are constricted near the soil line, develop a soft, dark lesion, and frequently topple over.
- On roots, brown discoloration and thinning of roots can be observed. Top lateral root growth may be more prevalent since lower roots are rotted and degraded.
- A less severe root infection of older plants may result in stunted growth only.
- Fruit rot caused by *Pythium* spp. usually starts as a small water-soaked lesion on mature green or ripe fruit in contact with or in proximity to the soil.
- *Pythium myriotylum* has been associated with dark, aerial lesions on tomato stems or leaves.

#### DISEASE CYCLE & EPIDEMIOLOGY:

- *Pythium* spp. are good soil saprophytes and can grow as vegetative mycelium in the soil indefinitely on various types of organic substrates.
- Tomato fruit growing in very wet soil conditions may be invaded by certain *Pythium* spp. when the fruit touch the soil or soil is splashed onto the fruit surface.
- Sporangia and zoospores are produced when conditions are optimal, particularly in regards to free moisture.

#### FIELD SIGNATURE:

- White, cottony mycelial growth may be visible on plant parts under humid and moist conditions.
- Some plants will show stunted growth but no other symptoms.
- Infected tissue, particularly roots and stems, is usually dark brown, soft and rotted.

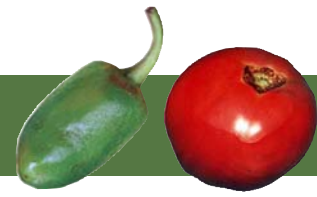
#### PHOTOS:

**Figure 1.** Seedling damping off caused by *Pythium* sp. on pepper in a pepper. Photograph by: Shubin Saha.

**Figure 2.** Root rot and stem rot of infected seedlings. Photograph by: Richard Cullin.

**Figure 3.** Stem rot of tomato. Photograph by: Pam Roberts.

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### CULTURAL CONTROLS:

- Use disease-free transplants.
- In transplant production, sterilize soil and production equipment, such as flats and benches.
- Avoid excessive water and maintain good soil drainage.
- Plant when temperatures are favorable for rapid plant growth to avoid plants 'sitting' in the field.
- Use plastic mulch to prevent splashing of soil onto fruit.



**Figure 4.** Topple from stem rot in tomato. Photograph by: Pamela Roberts.

### CONTACT INFORMATION:

Dr. Pamela D. Roberts  
UF/IFAS SWFREC  
2686 SR 29 N  
Immokalee, FL 34142  
pdr@ifas.ufl.edu  
239-658-3400

Dr. Ronald D. French-Monar  
UF/IFAS SWFREC  
2686 SR 29 N  
Immokalee, FL 34142  
rdf@ifas.ufl.edu  
239-658-3400

### CHEMICAL CONTROL:

- Use a pre-plant soil fumigant.
- Apply a fungicide drench at transplanting.
- Several fungi and bacteria in addition to *Pythium* spp. cause damping-off symptoms on seeds and seedlings; therefore, proper identification of the causal agent is necessary prior to fungicide selection.
- Fungicides containing mefenoxam, fludioxonil and copper compounds are labeled for this disease. Some of these are labeled for use as a soil drench at time of transplanting.

### RESISTANT MANAGEMENT:

- If chemicals used for the management of *Pythium* spp. are known to develop resistance by the pathogen population, these compounds should be rotated with other chemistries.

### References:

- McCarter, S.M. 1991. *Pythium* Diseases. In J.B. Jones, J.P. Jones, R.E. Stall and T.A. Zitter (eds). Compendium of Tomato Diseases. APS Press. St. Paul, MN. 73 pp.
- MacNab, A. A. and A.F. Sherf. 1986. Vegetable Diseases and Their Control, 2nd Ed. John Wiley & Sons, New York. 728 pp.
- Roberts, P.D. 2003. Damping-off and root rot. In K. Pernezny, P.D. Roberts, J.F. Murphy and N.P. Goldberg (eds), Compendium of Pepper Diseases. APS Press. St. Paul, MN.
- Roberts, P.D., R.R. Urs, R.D. French-Monar, M.S. Hoffine, T.E. Seijo and R.J. McGovern. 2005. Survival and recovery of *Phytophthora capsici* and oomycetes in tailwater and soil from vegetable fields in Florida. *Ann. Appl. Biol.* 146:351-359.