

Phytophthora Disease Management in Citrus

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Citrus Diseases

- *Phytophthora* Root Rot
- *Phytophthora* Gummosis
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New or ongoing concerns

- *Hendersonula* Dieback
- *Coniophora* wood decay

Phytophthora Root Rot



Susceptible Rootstock *Phytophthora* spp.



Phytophthora Gummosis



Causal Organisms

- *Phytophthora parasitica*
 - Warm season pathogen: active May – November
 - Causes gummosis and root rot
- *Phytophthora citrophthora*
 - Cool season pathogen: active November – March
 - Causes gummosis, root rot and fruit rot

Root rot symptoms

- The disease destroys the feeder roots of susceptible rootstocks.
- The fungus infects the root cortex, which turns soft and separates from the stele.
- Water uptake of water and nutrients will be (severely) limited.
- Tree will grow poorly, stored energy reserves will be depleted, and production will decline.

General Symptoms

- Slow decline
- Foliage light green
- Leaves cup toward each other as in water stress
- Little leaf syndrome with severe zinc deficiency
- Canopy thinning – leaf loss
- Sap oozing from the lower trunk (gummosis)
- Dieback
- Death

Management

- Rootstock selection
- Irrigation practices
- Fungicides

Rootstock selection

Rootstock	Gummosis	Root rot	Nematode
Lemon			
Macrophylla	Tolerant	Tolerant	Susceptible
Volkameriana	Susceptible	Susceptible	? Susceptible
Others			
C-35	Tolerant	Tolerant	Tolerant
Carrizo	Intermediate	Tolerant	Tolerant
Sour orange	Tolerant	Intermediate	Susceptible
Trifoliolate orange	Tolerant	Tolerant	Tolerant

What lemon rootstock should I use?

- If there is a history of root rot – Macrophylla
- If soils are heavy – Macrophylla

Irrigation Management

Gummosis

- Irrigate away from the tree trunk so that the tree scion stays dry

Root Rot

- Apply water evenly:
 - Excessive water helps the fungus
 - Excessive dry causes roots to crack

Other management strategies for replant situations

- Sample for *Phytophthora* and Citrus nematode (*Tylenchulus*)
- History of root rot – fumigate
- Uncertain if there was a history of root rot – preventive fungicides
 - Aliette
 - Ridomil

Management of Gummosis

- Change emitters if they are causing the water to come in contact with the trunk
- Treat lesions with a fungicide when gumming is active, 2 times/year for 1 to 2 years
- If the lesion covers more than 50% of the tree, consider replacing the tree

Summary

- *Phytophthora* spp. are common in California and it is the number one disease of citrus
- These diseases is controllable especially with appropriate rootstock selection and water management practices

Useful Web Sites

- UC Pest Management Guidelines
<http://www.ipm.ucdavis.edu>
- Newsletters and publications:
<http://ceriverside.ucdavis.edu/>
- UC Entomology Biocontrol:
<http://www.biocontrol.ucr.edu>
- UC Fruit & Nut Center:
<http://fruitsandnuts.ucdavis.edu>