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Introduction:

Phytophthora root rot and gummosis caused by *Phytophthora nicotianae* var. *parasitica* and *P. citrophthora*. They are root and trunk pathogens causes slow decline of the tree (Fig 1). *Phytophthora* species are present in most citrus groves. They can survive adverse conditions as persistent spores in the soil. During moist conditions, large numbers of motile zoospores, which can swim in water for short distances, are produced. Zoospores are the infective agents that are carried in irrigation or rainwater to the roots. *Phytophthora nicotianae* is active during warm weather when roots are actively growing. *Phytophthora citrophthora* is active during cool seasons when citrus roots are inactive and their resistance to infection is low.

Symptoms:

The leaves turn light green or yellow and may drop, depending on the amount of infection (Fig 1). The disease destroys the feeder roots of susceptible rootstocks (Fig 3). The pathogen infects the root cortex, which turns soft and separates from the stele. If the destruction of feeder roots occurs faster than their regeneration, the uptake of water and nutrients will be severely limited. The tree will grow poorly, stored energy reserves will be depleted, and production will decline.

Disease Management:

Management of Phytophthora induced diseases involves the use of resistant rootstocks, irrigation management and effective fungicides.

Cultural Control

- Use clean plant material,
- Provide adequate soil drainage and avoid over irrigation.
- Keep graft union above soil level
- Adjust sprinkler so that crowns are protected from water
- Avoid mechanical injuries into trunk (girdling, weeding)

Resistant Rootstocks

When replanting or establishing new plantings, choose resistant rootstocks where possible, but also consider tolerance to other diseases, nematodes, and cold. The most tolerant common rootstocks are Swingle, C35, Trifoliate and also Furr (C57).

Monitoring and Treatment Decisions

Phytophthora populations of greater than 15 to 20 propagules per gram of root zone soil may warrant treatment.
Current Available Fungicides:

- A- Mefenoxam (Ridomil Gold SL) (Soil drench or foliar spray)
- B- Fosetyl-AI (Aliette) 80WDG (Plant dip treatment for transplants, and foliar spray,

-For detail information of fungicide treatments on nonbearing and bearing trees visit

<http://www.ipm.ucdavis.edu/PMG/r107100111.html>

Ref. (1) <http://www.ipm.ucdavis.edu/>, (2) Federici et al. 2012. Phytophthora Root Rot Tolerance of citrus rootstocks and Hybrids. <http://plantbiology.ucr.edu/faculty/roose.html>, (3) Compendium of Citrus Diseases



Fig 1. Crown thinning symptoms caused by Phytophthora root rot on a citrus



Fig 2. Phytophthora gummosis symptoms on the trunk



Fig 3. Phytophthora root rot symptoms on feeder roots