



Phymatotrichopsis Root Rot of Grape

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Introduction

Phymatotrichopsis root rot of grape (PRR) is commonly known as cotton root rot, Texas root rot or Phymatotrichum root rot. PRR is a destructive disease of many economic crops including wine grape grown in calcareous clay soils with a high pH range of 7.0 – 8.5 in central and southern Arizona. Significant number of vine losses to PRR occur annually in many vineyards in Cochise, Santa Cruz, and Yavapai counties.

Pathogen

Phymatotrichopsis omnivora (soilborne fungus)

Host Range

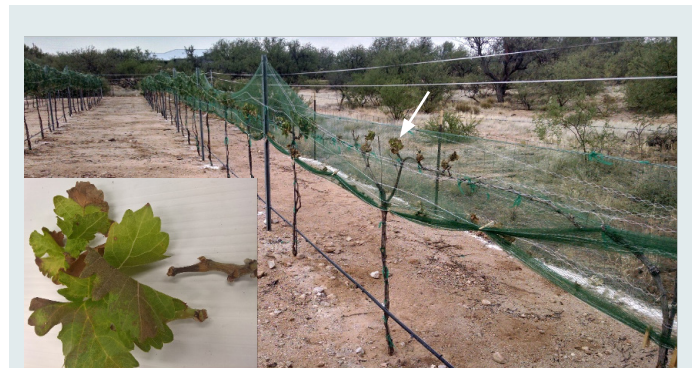
Wide host range with over 2,000 plant species that are tap-rooted dicots. Monocots such as grasses and palm trees are considered immune to the fungus.

Spread

Long distance by contaminated nursery stock or soil; from vine to vine by mycelial strands that grow along roots and into the soil. The fungus overwinters in infected root residue of grapevine and other alternate host plants or as sclerotia (black, small seed-like resistant structure) that can persist at various soil depths for decades. The sclerotia can be activated by root exudate and germinated as fungal hyphae that attacks root bark directly.

Symptoms And Diagnosis

A wide range of symptomology can be expressed on affected vines, depending on combinations of rootstock and scion, vine growth stage at infection, elevation of vineyards, fungal inoculum density in the soil, and weather conditions. Typical symptoms include leaf yellowing and scorching, leaf browning and possible defoliation, gradual decline, and sudden wilt and death of vines. The symptomology depends on how much of roots are affected and how quickly roots are destroyed by the fungus.



Leaf scorch symptoms on declined vines



Vine death with dry berry bunches in hot summer

The Symptoms Can Be Confused With

Drought stresses, salt burn, Pierce's disease. A laboratory testing via microscopy, culture isolation, and polymerase chain reaction (PCR) is required for definitive diagnosis. Symptomatic leaves and roots should be collected and wrapped in a dry paper towel, placed in a plastic bag, and shipped OVERNIGHT to the University of Arizona's Extension Plant Pathology Laboratory in Tucson. All submissions should be accompanied by completed [Plant Disease Diagnostic Form](#).

Management

PRR is difficult to manage and previous research on cotton, nut trees, and landscape plants showed various methods with varying degree of success. An integrated approach is needed to reduce the disease occurrence and severity in grape: 1) for new vineyards, the best strategy is to avoid establishing vineyards in ground planted to cotton or alfalfa with a history of the disease; 2) plant tolerant rootstocks; 3) use cultural practices to increase organic matter in soil and lower soil pH to below 6.5; 4) increase soil microbial diversity and improve soil health; and 4) suppress the fungus with Rhyme fungicide (flutriafol) by following the manufacturer's label.

References

- Appel, D.N. and McBride, S.A. 2018. Management strategies for cotton root rot disease in Texas Winegrapes. Texas A&M Agrilife Extension publication EPLP-040
- Kilby, M.W. 1987. *Phymatotrichum* (Cotton Root Rot) Resistant Grape Rootstocks. University of Arizona. Retrieved from <http://hdl.handle.net/10150/215735>
- Lyda, S.D. 1978. Ecology of *Phymatotrichum omnivorum*. Annual Review Phytopathology 16:193-209



Leaf scorching



Leaf browning and defoliation



Rapid decline of affected vine



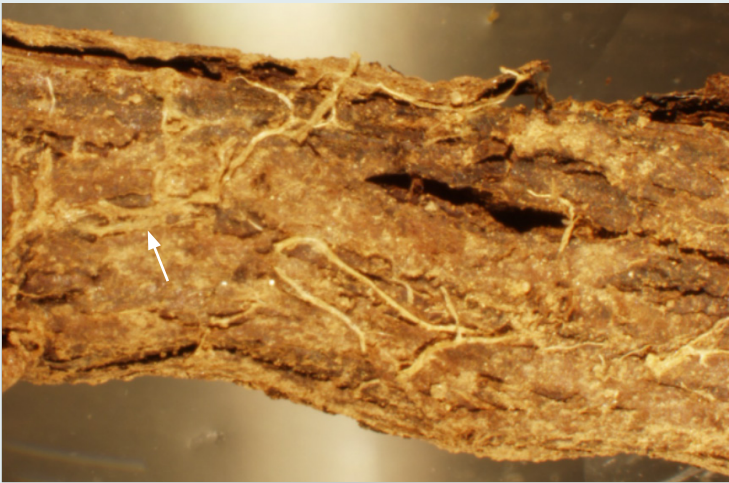
Sudden wilt and death of affected vine



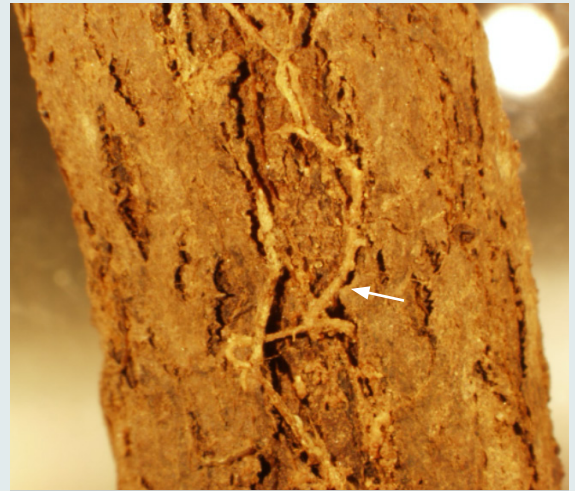
Dead vine clusters tends to occur down a row and spore mat formed under heavy rains and high soil moisture



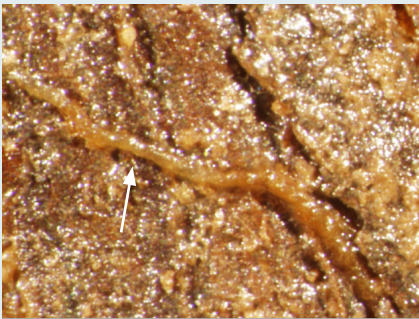
Rotted root bark sloughed off readily



Mature fungal mycelial strands



Mature fungal mycelial strands



Young mycelial strand under magnification



Tapered hyphae network along the mycelial strand



Cruciform-branched hyphae along mycelial strand



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