

Pathogens

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OVERVIEW

- Pathogens are microorganisms, including bacteria, viruses, protozoa, and parasites, that can cause diseases in plants of production nurseries.
- These organisms can impair plant growth by disrupting nutrient and water uptake, reducing yield and overall plant health (**Figure 1**).
- Infected plants often exhibit increased vulnerability to environmental stress and secondary pests or diseases.

KEY FACTORS

- Pathogens such as *Phytophthora*, *Phytophthium*, and *Pythium* are widespread in nursery soils, water bodies (e.g., dams and tanks) and irrigation systems, and can cause severe root and stem diseases (**Figure 2**).
- Fungal infections, including powdery mildew and downy mildew, affect aboveground tissues like leaves and stems, resulting in lesions, wilting, or discoloration.
- Soil-borne pathogens such as root-knot nematodes and pathogenic fungi cause diseases like damping-off and root rot, weakening root systems and limiting plant access to water and nutrients.
- Pathogens may enter water supplies through surface runoff from agricultural and urban areas, especially after rain events.
- Damaged or poorly maintained irrigation infrastructure (e.g., cracked pipes, leaks) can become entry points or reservoirs for pathogens.



Figure 1. Fusarium wilt symptoms on leaflets. Source: UC Cooperative Extension, Los Angeles County. Accessed September 9, 2024.

HIGHLIGHTS

- Production nursery water sources can be a major vector for pathogen spread, affecting both plant health and water quality.
- Preventive action and infrastructure hygiene are critical for reducing pathogen load in nurseries.
- Management approaches combining water treatment, sanitation, and monitoring are the most effective way to protect plant health.

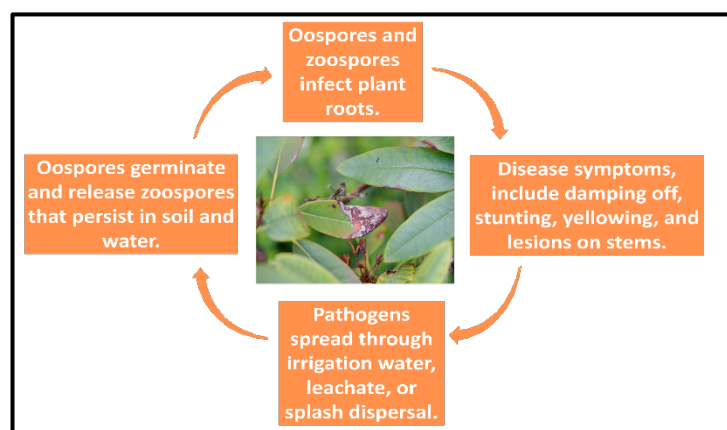


Figure 2. Example of *Phytophthora* infection and its lifecycle.

MANAGEMENT

- Routinely inspect plants for symptoms of disease. Quarantine new stock before integrating with existing nursery plants to limit pathogen introduction.
- Avoid excess watering because saturated soils promote pathogen proliferation. Use drip irrigation where possible to reduce moisture on foliage and soil surfaces.
- Treat irrigation water using UV disinfection, chlorination, ozonation, or filtration to inactivate or remove pathogens.
- Practice strict hygiene and regularly clean equipment, remove diseased plant material and standing water to limit pathogen persistence.
- Adopt an integrated pathogen management strategy that combines preventive practices, ongoing monitoring and testing, and targeted control measures to minimise impacts.