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Perspective

Ecology and Disease Cycle of *Fusarium oxysporum*

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DESCRIPTION

Fusarium oxysporum occurs, survives and grows in soils of all types, but sandy soils provide conditions that are most favourable for growth and developments. The pathogen is soil borne and remains in infested soil for up to ten years. Soil and air temperatures of 28°C are optimum for disease. If soil temperatures are optimum but air temperatures below optimum, the pathogen will extend into the lower parts of the stem, but the plants will not exhibit external symptoms. Disease development in Fusarium wilt is favoured by warm soil temperature and low soil moisture. Fusarium wilt tends to be most severe in sandy soils and generally less of a problem in heavier clay soils. Natural suppression of Fusarium wilt disease is known to occur in many soils. Soil borne plant pathogen initially, it reaches in to root tips through soil, water and other agriculture equipment. But can also be spread over long distances either in infected transplant or soil. The disease or infection can also be transmitted through infected plant material and through contaminated soil. Other means of spreading the disease is through human movement around the infected field, or the use of irrigation water and implements previously used on an infected crop. *Fusarium oxysporum* remains in soil for a long time as chlamydospores particularly in plant residues. Chlamydospore germination is stimulated by host root excretions or contact with pieces of non-colonized plant remains.

Pathogenesis

F. oxysporum is an abundant and active saprophyte in soil and organic matter, with some specific forms that are plant pathogenic. Its saprophytic ability enables it to survive in the soil between crop cycles in infected plant debris. The fungus can survive either as mycelium, or as any of its three different spore types. Healthy plants can become infected by *F. oxysporum* if the soil in which they are growing is contaminated with the fungus. The fungus can invade a plant either with its sporangial germ tube or mycelium by invading the plant's roots. The roots can be infected directly through the root tips, through wounds in the roots, or at the formation point of lateral roots. Once inside the plant, the mycelium grows through the root cortex intercellulary. When the mycelium reaches the xylem, it invades the vessels through the xylem's pits. At this point, the mycelium remains in the vessels, where it usually advances upwards toward the stem and crown of the plant. As it grows the mycelium branches and produces microconidia, which are carried upward within the vessel by way of the plants sap stream. When the microconidia germinate, the mycelium can penetrate the upper wall of the xylem vessel, enabling more microconidia to be produced in the next vessel. The fungus can also advance laterally as the mycelium penetrates the adjacent xylem vessels through the xylem pits. Due to the growth of the fungus within the plant's vascular tissue, the plant's water supply is greatly affected. This lack of water induces the leaves' stomata to close, the leaves wilt, and the plant eventually dies. It is at this point that the fungus invades the plant's parenchymatous tissue, until it finally reaches the surface of the dead tissue, where it sporulates abundantly. The resulting spores can then be used as new inoculum for further spread of the fungus.

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