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KEEP *PHYTOPHTHORA* OUT OF YOUR ORCHARD

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Phytophthora species are common fungal pathogens of ornamental, forest and fruit trees. Mostly Collar rot and crown rot of apple trees (*Malus domestica*), but rarely pear trees (*Pyrus* spp.) and trunk rot of stone-fruit trees (*Prunus* spp.) are serious soil-borne diseases world-wide. Diseased trees are mostly found where soil type, topography, climate and irrigation have contributed to long periods of saturated soil. The pathogens survive and spread in saturated soil, infect roots, trunks and can eventually kill the trees. In winter, the fungus survives as thick-walled resting-spores (oospores) in soil and in roots. In spring, the oospores germinate to form sporangia which release many zoospores that move in water in the soil and infect and damage the roots so that they can no longer take up water and nutrients. In the southern hemisphere, *Phytophthora cactorum* is active in deciduous fruit trees from October to May in warm (18°–20°C) saturated soil and the roots are susceptible from August to December. In apple orchards, collar rot and crown rot are first noticed during spring, when the trees are growing poorly, buds are developing slowly and leaves are chlorotic. With stone-fruit e.g., mainly peach and apricot, gum is exuded from the bark of infected trees, which are eventually girdled and killed. The best and

cheapest ways to prevent from infecting and killing the trees are to improve surface drainage of the soil before the trees are planted, and to irrigate the soil carefully to avoid saturated soil. Phosphorus acid sprayed once in spring, summer and autumn, helps to protect the trees from early stages of the disease, but chemicals cannot resurrect trees that are badly damaged by *Phytophthora*.

Biography

Judith Tisdall is broadly experienced in basic and applied research in soils. In 2012, she was awarded the JK Taylor Gold Medal for excellence in research and communication. She is the leading scientist on aggregate hierarchy and management that increases stable aggregation. Her paper organic matter and water-stable aggregates in soils published in the *Journal of Soil Science* is the most cited paper (2714 citations) in 68 years of the *European Journal of Soil Science* (predecessor of *Journal of Soil Science*) the paper was re-published as Landmark paper in the *European Journal of Soil Science* in 2012. She was the first to show the effect of mycorrhizal hyphae on soil aggregation, and that the mechanisms of salt-exclusion and potassium - exclusion in grapevine root stocks operate in the roots. Her 52 papers have been cited a total of 4438 times in the scientific literature.

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