

CORNELL COOPERATIVE EXTENSION

Leather Rot

Phytophthora cactorum (Lebert and Cohn) Schroeter

Wayne F. Wilcox

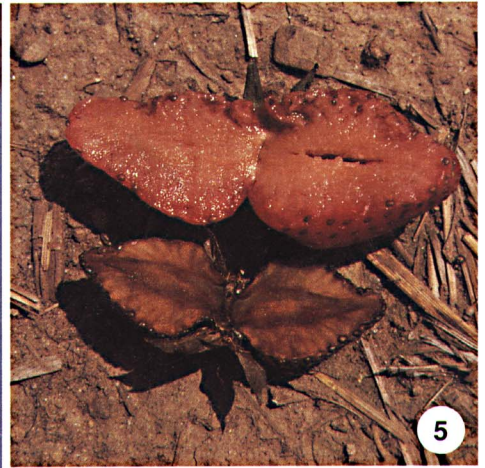
Department of Plant Pathology, NYS Agricultural
Experiment Station, Cornell University

Leather rot is a disease of strawberries that occurs sporadically throughout New York State. Although it is a less common cause of fruit decay than gray mold (*Botrytis* fruit rot), leather rot can cause significant damage when weather conditions are favorable for its development. The disease causes economic losses not only by reducing marketable yields but also by destroying the quality of processed products containing even a few infected berries. This is a particularly important consideration for pick-your-own operators, whose customers purchase bulk quantities for making jam.

Symptoms

Berries may become diseased at any time during their development. Infected portions of green berries turn brown (fig. 1), and the infection expands until the entire fruit is affected (fig. 2). Such fruit have a firm, leathery texture but do not become covered with the fuzzy gray spores characteristic of gray mold infections. Rather, a white fungal growth may appear on the surface of the berries following periods of wet weather (fig. 3). Infections are more difficult to detect in mature berries. Infected mature berries usually are somewhat softer than healthy fruit and are an inconspicuous dull pink to lavender or purple color (fig. 4). Slicing infected berries will reveal darkened inner tissues (fig. 5; green berry at top, ripe berry at bottom).

A diagnostic symptom of leather rot is a characteristic putrid odor that is noticeable when infected berries are sliced or broken apart. This odor is accompanied by the strong, unpleasant taste that is readily imparted to jams or other products made from such fruit.



Disease Cycle

Leather rot is caused by the soilborne fungus *Phytophthora cactorum*, the same organism that causes crown and collar rots of apple and other deciduous fruit trees. This fungus is present in many soils throughout New York, although it is not certain whether all strains are equally capable of infecting strawberry fruits.

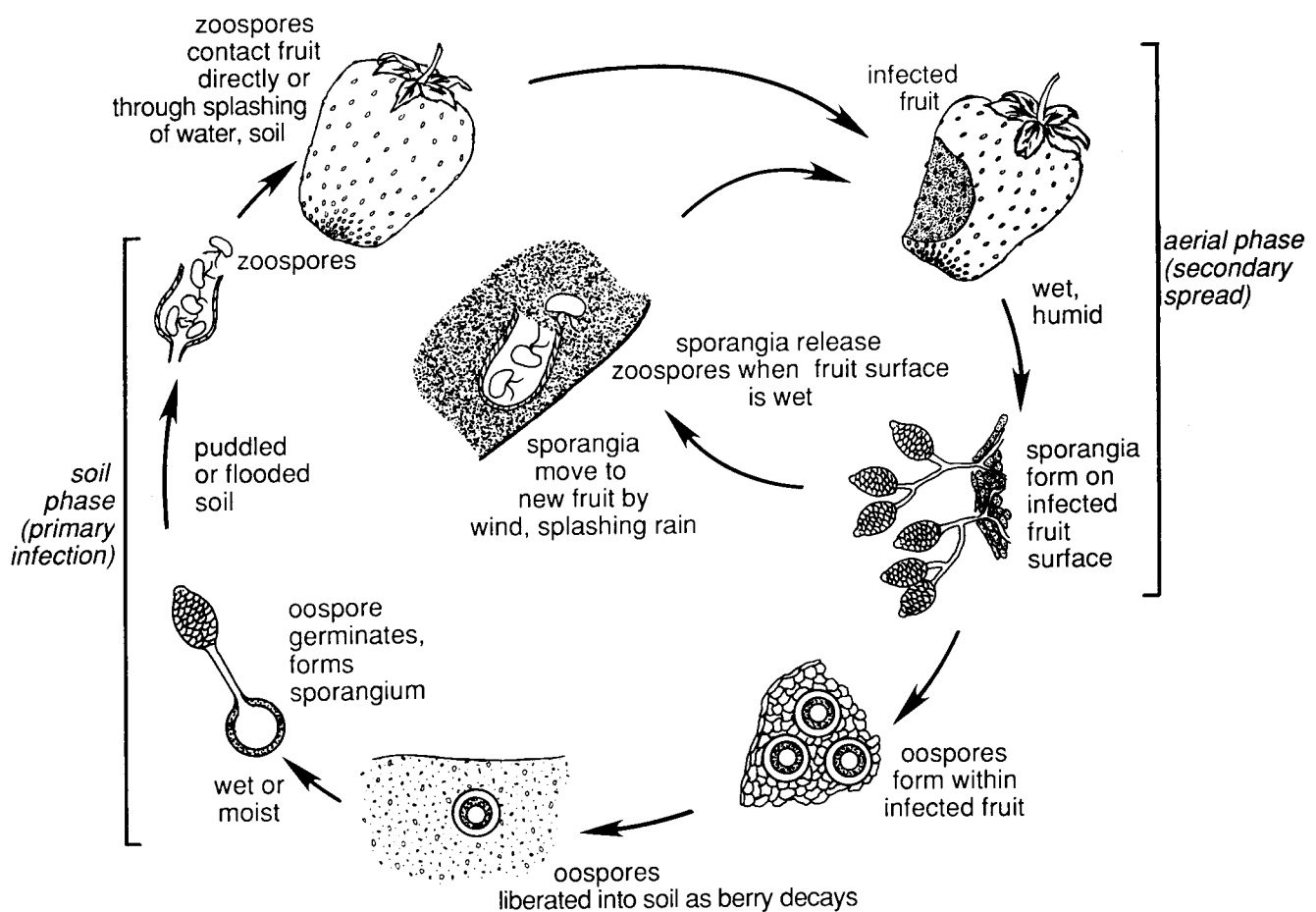
P. cactorum persists in the soil as thick-walled resting spores (oospores), which can survive in a dormant state for many years. When the soil is moist or wet, some of the oospores in the soil germinate and form structures called sporangia, which are filled with the infectious spores of the fungus (zoospores). These microscopic zoospores are released into the soil when it is flooded or puddled and swim to the surface using tail-like structures that they possess. A leather rot epidemic can begin when strawberry fruit become infected after lying in puddled water containing zoospores or when the puddled water is splashed onto them by rain or sprinklers.

Following initial infection, the leather rot fungus forms additional sporangia on the fruit surface during periods of plentiful rainfall and high relative humidity (sporangia are one component of the white fungal growth pictured in fig. 3). The sporangia are spread through the air by wind and rain and cause new infections if the fruit they land on remain wet for one to several hours and

temperature is within the optimal range of 15° to 28° C (59° to 82° F). Infection takes somewhat longer when temperature deviates from the optimal. Still more sporangia may be produced on newly infected fruit and continue to spread the disease as long as weather conditions remain favorable. The leather rot fungus eventually forms its resting spores (oospores) within infected fruit, and these spores are returned to the soil when the fruit falls to the ground and decays.

Control

Although leather rot can spread rapidly through the air once *P. cactorum* has become established on infected strawberries, the weak link in the disease cycle is the requirement that the fungus move from the soil to the fruit. This process can be greatly inhibited or prevented through a combination of site selection and water management that minimizes the formation of puddles while fruit are present and maintenance of a substantial mulch barrier between the fruit and the soil. Some fungicides can provide supplemental control to complement these management procedures and may be necessary in wet years, particularly in fields where the disease has occurred in the past. Not all strawberry fungicides are active against leather rot so check current recommendations for effective materials and restrictions.



LEATHER ROT DISEASE CYCLE