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UNIVERSITY OF KENTUCKY — COLLEGE OF AGRICULTURE

Plant Pathology Fact Sheet

Phytophthora Root Rot of Brambles

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Brambles that are subjected to wet soil conditions or periods of flooding are often predisposed to Phytophthora root rot. Excess water not only promotes susceptibility of roots to this disease, but also aids the fungus in moving to new infection sites. Phytophthora root rot is primarily a disease of raspberries; however, it can also occur on blackberries.

Symptoms

Disease symptoms may first become noticeable in the spring, initially occurring in areas of the planting that are low or poorly drained. Foliar symptoms can include marginal browning, red or purple coloration, and/or chlorosis (Figure 1). Off-color leaves may also be smaller than normal. Infected plants show low vigor, developing fewer canes than usual; the canes that are produced may be weak and stunted. Wilt is sometimes associated with this disease. Stressed plants become more susceptible to other diseases, as well as to winter injury. Severely infected plants collapse and die (Figure 2). None of these symptoms alone are definitive for Phytophthora root rot since other factors, such as prolonged flooding or canker diseases, can result in similar symptoms. Diagnosis requires a careful examination of the main roots and crown of dying (not yet dead) plants. The tissue beneath the root epidermis or bark is white on healthy roots, while a typical reddish-brown discoloration is evident with Phytophthora-infected roots

Figure 1. Raspberries showing scorch and chlorosis symptoms due to Phytophthora Root Rot

FIGURE 2. SEVERELY INFECTED RASPBERRY PLANTS

(FIGURE 3). Often a clear line of demarcation can be observed between diseased and healthy portions of the root. A laboratory test can confirm the presence of *Phytophthora*.

CAUSE AND DISEASE DEVELOPMENT

Phytophthora fragariae var. *rubi*, as well as several other *Phytophthora* species, have been implicated in this disease. These soilborne pathogens are most often associated with heavy soils and poorly-drained or slow-to-drain sites. Soils that are saturated from rain or over-watering provide the moist conditions necessary for *Phytophthora* spp. to thrive and spread.

Phytophthora spp. overwinter as dormant resting spores in the soil or as mycelium within infected root tissues. New infections occur when the pathogen releases motile spores that are carried via water to susceptible hosts. These swimming spores also enable the organism to spread from plant to plant. Spores may also be moved considerable distances in contaminated soil.

DISEASE MANAGEMENT

Phytophthora root rot control requires an integrated approach to disease management.

- **Site selection**

Plant brambles in sites with good soil drainage.

- **Improve soil drainage**

Prior to planting, install field drainage tiles in areas with persistent soil saturation problems. Slope soil away from rows and into alleyways so water does not puddle or collect around plants. Planting bramble crops on 10-inch raised beds or ridges has been shown to be effective in reducing problems associated with wet soils.

FIGURE 3. *PHYTOPHTHORA*-INFECTED RASPBERRY ROOTS SHOWING TYPICAL REDDISH-BROWN DISCOLORATION

- **Plant selection**

Plant only certified disease-free plants from a reputable nursery. Stock that has been propagated through tissue culture techniques or via greenhouse production in artificial soil mixes are less likely to introduce the *Phytophthora* organism into the field. Resistant varieties are available; avoid planting highly susceptible cultivars.

- **Fungicides**

A soil-applied fungicide can be used as a preventative treatment in conjunction with other disease management practices. Fungicides will not cure infected plants and should not be relied upon as the sole means of disease management.

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Photos: Wayne Wilcox, Geneva Agricultural Experiment Station, Cornell University