

Black Root Rot of Greenhouse Ornamentals

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Introduction

Black root rot disease is caused by the soil-borne fungus *Thielaviopsis basicola*. This particular fungus can cause root disease on many greenhouse ornamentals, including petunia, pansy, annual vinca, geranium and poinsettia. Black root rot can also be an important root disease of eggplant, cotton, peanut and soybean.

The fungus is considered an opportunistic fungus, capable of aggressively attacking and infecting a stressed plant. Consequently, black root rot is more prevalent under stressful growing conditions. Extreme high and low temperatures in the greenhouse, drought, over-fertilization and pH extremes during plant production often create sufficient stress for disease onset. The fungus can easily become a long-term “resident” in the greenhouse.

Long distance spread of the fungus is usually by movement of infested soil, growing containers or infested plant material. Within the

greenhouse, the fungus usually spreads by splashing water or by spores blown in dust. Fungus gnats can be vectors of the fungus in greenhouses.

Black root rot can be confused with Pythium root rot and Rhizoctonia root diseases that can also damage greenhouse crops.

Symptoms

Black root rot gets its name from the black root lesions that result from infection. These black “lesions” are quite obvious in contrast to the normal white color of healthy roots (FIG. 1). The presence of distinct root lesions is characteristic for the disease and is often used as a diagnostic tool. Unlike Pythium, *T. basicola* lesions often originate near the root middle and can expand rapidly to the remainder of the root. Lesions can easily be seen with a hand lens after the feeder roots are washed in running water. Barrel-shaped chlamydospores (FIG. 2), which are produced in infected root tissue, are useful in confirming the disease. These structures

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FIG. 1. Black root lesions of Japanese holly (Courtesy FDACES/www.bugwood.org)



FIG. 2. Chlamydospores of *Thielaviopsis* within root tissue

enable the fungus to survive long periods in the soil or in infected plant debris on the greenhouse floor or on benches.

Aboveground symptoms of black root rot are often mistaken for a nutrient deficiency (FIG. 3). As the disease progresses, stems may die back following defoliation. Plant yellowing, stunting, wilting and sometimes plant death may result from root dysfunction caused by fungal colonization and subsequent infection of the root system. Greenhouse plants may become infected but show no symptoms until the plant becomes stressed during shipment or after being transplanted into the landscape.



FIG. 3. Black root rot symptoms of pansy

Management

Since the occurrence of black root rot is directly related to plant stress, growers should manage plants to avoid unfavorable growing conditions. Sanitation methods should be an integral part of disease

management and should be used in conjunction with growing crops in a stress-free environment. Contaminated containers are a major source of disease in the greenhouse. Trays or containers should not be reused without a thorough cleaning and disinfection, and sanitizing benches frequently with a good disinfectant to remove possible sources of the fungus will help ensure healthy plants. Steam pasteurization or chemical fumigation is an effective management tool for propagation and growing media, especially if the medium contains a field soil component such as topsoil or sand.

Soil drenches of fungicides containing the active ingredients thiophanate-methyl, triflumizole or propiconazole may also be effective. These active ingredients work best when applied on a preventative schedule. Fungicide applications to infected plants in the landscape are of limited value in disease management. Consult Extension publication MP154, *Arkansas Plant Disease Control Products Guide*, for available fungicides for greenhouse use.

Additional Information

An effective disease management program begins with an accurate diagnosis. A microscopic laboratory exam in conjunction with background information about the disease situation may be required for an accurate diagnosis. For further information about black root rot and other ornamental diseases in the greenhouse or landscape, contact your local county Extension office or the Arkansas Plant Disease Clinic at ssmith@uaex.edu.

Additional fact sheets are available at <http://www.uaex.edu>.