UK COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY — COLLEGE OF AGRICULTURE

PPFS-OR-W-03

Plant Pathology Fact Sheet

Black Root Rot of Ornamentals

Nicole A. Ward, *Extension Plant Pathologist*
Paul R. Bachi and Julie W. Beale, *Plant Disease Diagnosticians*
Cheryl A. Kaiser, *Extension Associate*

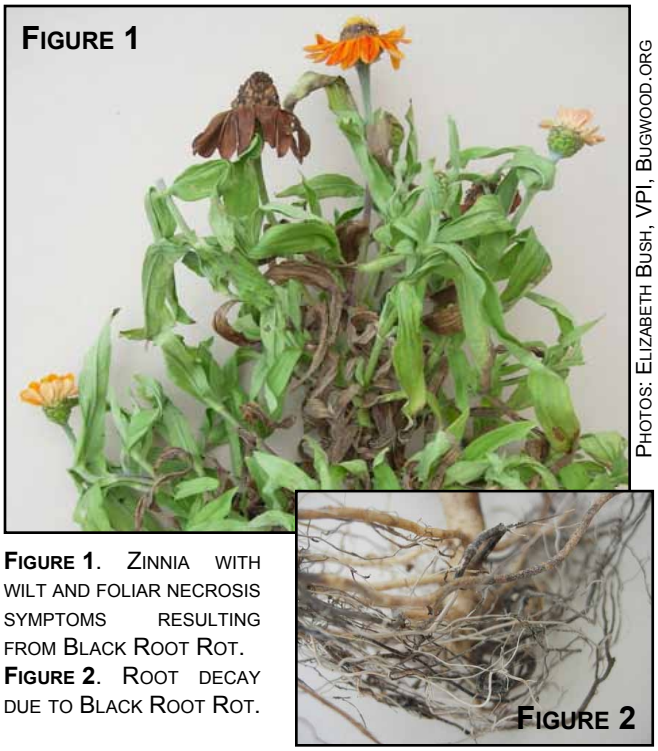
Introduction

Black root rot can affect a wide range of ornamentals in home and commercial landscapes, nurseries, and greenhouses. In Kentucky, this disease is commonly observed on Japanese and blue hollies, inkberry, pansy, petunia, and vinca. In addition to ornamentals, numerous vegetable and agronomic crops are susceptible. Refer to TABLE 1 for a partial listing of some of the hosts susceptible to black root rot.

Symptoms

Black root rot results in the decay of root systems; however, the most obvious symptoms are observed on above-ground portions of the plant. Plants may initially appear stunted, slow-growing, or less vigorous when compared to healthy plants. Foliar symptoms include yellowing, wilting, and necrosis (death) of foliage (FIGURE 1). Herbaceous plants may collapse, while dieback (FIGURE 3) is often observed on woody plants. Severely infected plants eventually die.

Above-ground foliar symptoms are the result of root decay (FIGURES 2 & 4); as a result, the reduced root system is unable to take up sufficient water and nutrients to support foliage and stems. Root symptoms begin as dark brown to black lesions that contrast sharply to otherwise healthy white portions of roots (FIGURE 5). Black root rot lesions often begin in the middles of roots and expand in both directions. As the disease progresses,



PHOTOS: ELIZABETH BUSH, VPI, BUGWOOD.ORG

FIGURE 1. ZINNIA WITH WILT AND FOLIAR NECROSIS SYMPTOMS RESULTING FROM BLACK ROOT ROT.
FIGURE 2. ROOT DECAY DUE TO BLACK ROOT ROT.

FIGURE 3. DIEBACK SYMPTOMS ON HOLLY. **FIGURE 4.** POTTED HOLLY WITH DECAYING ROOTS. **FIGURE 5**. DARK BLACK ROOT ROT LESIONS CONTRAST SHARPLY WITH THE HEALTHY WHITE PORTIONS OF THE ROOT.

larger portions of roots are affected until the entire root system appears black and decayed (FIGURE 4).

Cause and Spread

Black root rot is caused by the fungus *Thielaviopsis basicola*. This pathogen can persist indefinitely in soils or survive on plant debris as a saprobe (an organism that obtains its nourishment from decaying organic matter). While this organism is widespread, it may be present in higher levels in soils where black root rot was previously a problem on other crops, such as tobacco. For example, when old agricultural lands are developed for housing, homeowners may find they have also "purchased" a black root rot problem.

The fungus can be spread through contaminated soil and via infested (but not necessarily diseased) plant material. Spores can also be easily moved in water. Black root rot is favored by:

- Wet soils
- Soil temperatures between 55° and 65° F
- High soil pH (over 5.8)
- Cultural conditions which induce stress (e.g. high soluble salts, excessive nitrogen fertilizer, low organic matter, etc.)

Disease Management

In landscapes

- Avoid planting susceptible plants in soils known to be infested with the fungus. Refer to the table below for a listing of hollies that are resistant to this disease.
- Plant only disease-free plants in the landscape. Examine planting material carefully prior to planting to ensure that roots appear healthy and white in color. Plants with blackened roots should not be used.
- Heavily infected plants should be removed from the landscape and destroyed. However, good cultural practices may enable some plants, such as hollies with mild symptoms, to continue to grow in spite of the disease. Plants in the early stages of infection should be well-fertilized and watered. Avoid excess water.

- There are no effective fungicide drenches available for homeowner use. Established landscape plants may be treated with fungicides by licensed landscape contractors, if infection is not severe. Fungicides will suppress but not cure black root rot.

In greenhouses and nurseries

- Strict sanitation is crucial in nurseries and greenhouses where black root rot can be a serious problem. Do not reuse soil. Disinfest all tools, equipment, containers, and greenhouse floors and benches.
- Use disease-free stock plants.
- Monitor plants regularly, particularly if the greenhouse or nursery has a history of black root rot.
- Greenhouses and nurseries should dispose of all infected plants regardless of disease severity.
- A soil drench using approved fungicides may be applied as a preventative in nurseries, greenhouses, and commercial landscapes. There is no curative fungicide available.

Additional Resources

- Poinsettia Diseases, PPFS-OR-H-02
http://www.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-OR-H-2.pdf
- Woody Plant Disease Management Guide for Nurseries and Landscapes, ID-88
http://www.ca.uky.edu/agc/pubs/id/id88/id88.pdf

Revised May 2012

(Original publication by John R. Hartman & Paul R. Bachi)

TABLE 1. PLANTS RESISTANT AND SUSCEPTIBLE TO BLACK ROOT ROT.

Susceptible plants		
Woody ornamentals	*Herbaceous ornamentals*	*Agronomic crops*
Barberry	Astilbe	Alfalfa
English boxwood	Begonia	Cotton
Euonymus	Dianthus	Cowpea
Holly, blue (including these cultivars)	Fuchsia	Soybean
▪ Blue Angel	Gloxinia	Tobacco
▪ Blue Maid	Impatiens	
▪ Blue Prince	Pansy/Viola	
▪ Blue Princess	Petunia	*Vegetable crops*
▪ Blue Stallion	Phlox	Cucurbits
▪ China Boy	Poinsettia	Eggplant
▪ China Girl	Rosemary	Okra
▪ Dragon Lady	Sweet pea	Peanut
Holly, Japanese	Vinca/Catharanus	Snap bean
Inkberry	Zinnia	Tomato

Resistant hollies	**Moderately resistant hollies**
English holly	American holly
Chinese holly	Yaupon holly