



by Nora Catlin
nora.catlin@cornell.edu

Black Root Rot

Irregular patterns of stunt, poor root growth, chlorotic foliage may be caused by black root rot

Uneven or irregular growth on a bench? Chlorotic new growth? The trouble might be *Thielaviopsis* root rot, also known as black root rot, caused by the fungus *Thielaviopsis basicola*. This disease continues to be a challenge for many, so be aware of what symptoms to look for and what to do when you find them.

Uneven growth or scattered stunted plants in a seedling or liner tray, or only 1-2 stunted or wilted plants in a larger container or hanging basket can often indicate that there may be a *T. basicola* infection. Also watch for plants appearing chlorotic or nutrient deficient. Before you get out the fertilizer, realize that the symptoms might be a result of a compromised root system instead of solely a nutrient deficiency. (Compromised roots mean that root function,

i.e., water and nutrient uptake, will also be compromised). Always keep an eye on the patterns of occurrence – if all the plants on the bench are uniformly affected then the cause is more likely a deficiency, but if the pattern is more random in occurrence then the cause is more likely a pathogen.



One plant affected out of a larger container can often a symptom of root rot.

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CONTRIBUTORS

Dr. Nora Catlin
Floriculture Specialist
Cornell Cooperative Extension -
Suffolk County
nora.catlin@cornell.edu

Dr. Chris Currey
Assistant Professor of Floriculture
Iowa State University
ccurrey@iastate.edu

Dr. Kristin Getter
Floriculture Outreach Specialist
Michigan State University
getterk@msu.edu

Dan Gilrein
Entomology Specialist
Cornell Cooperative Extension -
Suffolk County
dog1@cornell.edu

Dr. Brian Krug
Floriculture Ext. Specialist
Univ. New Hampshire
brian.krug@unh.edu

Dr. Joyce Latimer
Floriculture Extension & Research
Virginia Tech
jlatime@vt.edu

Dr. Roberto Lopez
Floriculture Extension & Research
Purdue University
rglopez@purdue.edu

Dr. Neil Mattson
Greenhouse Research & Extension
Cornell University
neil.mattson@cornell.edu

Dr. Paul Thomas
Floriculture Extension & Research
University of Georgia
pathomas@uga.edu

Dr. Brian Whipker
Floriculture Extension & Research
NC State University
bwhipker@ncsu.edu

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Irregular pattern of symptoms, typical of an infection by a pathogen.

Where you see irregular stunting, wilting, and/or chlorosis, be sure to check the root systems. *T. basicola*-infected plants will have poorly developed roots with darkened lesions on the roots. Sometimes it may be necessary to rinse the soil off of the root system in order to clearly see the lesions. For transplants, don't just look at the roots on the outer surface of the media, break apart the soil to see how the roots of the plug or cutting are rooting into the media; often the most obvious signs of infection will be found here. When diagnosing problems, it is always a good idea to compare the roots of a healthy looking plant to sickly looking plant.

In some cases the foliage of plugs, liners, or newly transplanted plants may appear healthy, but the roots will show symptoms of infection. Always scout your incoming plant material for any signs or symptoms of pests or diseases. Catching problems early can save you a lot of trouble later. Pay very close attention to the roots of crops that are most susceptible to black root rot.

It is always recommended to seek the help of a diagnostic lab, as it can be difficult to visually discern between root rots.

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*Darkened lesions on roots caused by black root rot.
(Photos courtesy of Margery Daughtrey)*

Thielaviopsis basicola can infect a wide range of hosts, though calibrachoa, pansy, viola, vinca, petunia are most the most commonly affected spring crops. Geranium, diascia, bacopa, cyclamen, fuchsia, gerbera, begonia, and many others can also be troubled by this disease.

Black root rot can be favored by high pH; a pH of 5.6 or below will inhibit *T. basicola*, so keeping the growing media pH on the low side will help to manage this disease. Over-fertilization and waterlogged or poorly drained growing mix will also favor the disease, so try to avoid these conditions. Fungus gnats can help spread the fungus around the greenhouse; keep these insects in check to help prevent further spread of the disease.

Fungicides are effective when used preventively or when the disease is identified early in the crop. If you suspect black root rot is affecting your crops, do not sit and wait – get a diagnosis and start addressing the problem as soon as possible. Realize that the best course of action might be to discard the infected plants, as plants will not likely recover from a well established infection even with the use of fungicides. Regular protective fungicide treatments are recommended for plugs and liners of highly susceptible species in greenhouses where the disease has historically been a problem. Products with thiophanate-methyl have been shown to be the most reliable fungicides in research trials. Products with polyoxin-D, triflumizole or fludioxonil have

also been shown to have good efficacy. Other products are also labeled and may provide some protection.

Sanitation is crucial for preventing black root rot, since once the pathogen is established in a greenhouse it can be difficult to eradicate. *T. basicola* can form a thick-walled survival spore, or chlamydospore, which can easily survive in a greenhouse in soil or debris, and on infested benches, growing surfaces, floors, trays, and pots.

Any surface on which *T. basicola*-infected plants were grown should be thoroughly cleaned, then sanitized. Ideally, pots and trays known to be contaminated with *T. basicola* should not be re-used, or at least not for the most susceptible crops. When sanitizing, make sure to give a thorough cleaning prior to using a sanitizer. KleenGrow, GreenShield or ZeroTol, or a dilute bleach solution are some options - follow label directions.



Thick walled chlamydospores of Theilaviopsis basicola.
(Photo courtesy of Margery Daughtrey)