THE OHIO STATE UNIVERSITY EXTENSION

Extension FactSheet

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Plant Pathology, 2021 Coffey Road, Columbus, OH 43210-1087

Black Root Rot of Greenhouse Floral Crops

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Black root rot is a common and destructive fungal disease on greenhouse floral crops. The disease is widespread, having been reported on many different plants including poinsettia, geranium, fuchsia, pansy, vincas, petunia, etc. The fungus is soil-borne and is capable of living in soils as a saprophyte (without causing disease) and surviving in soil and dust for years via tiny, thick-walled spores called chlamydospores. Plants may be infected but not show symptoms until the plant undergoes some form of stress.

Symptoms

Black root rot is commonly confused with *Pythium* root rot. Above-ground symptoms of both diseases include yellowing, stunting and under certain conditions wilting or death of the plant. Sometimes, plants affected with black root rot may have black stem lesions at or near the soil line. A close examination of the roots will reveal different symptoms for each disease. *Pythium* usually attacks roots from the ends or tips, causing a soft, brown rotting as it progresses. Oospores of *Pythium* can be seen in the infected roots with a microscope. Black root rot begins by attacking the middle of the root and forms cankers. The black root cankers can be seen relatively easily by washing roots free of growing media and then viewing them carefully with a hand lens. A plant diagnostic lab can be consulted if you suspect black root rot. Be sure and tell them you think black root rot may be involved so that the lab will examine the roots through a microscope. If *Thielaviopsis* is there, the black, barrel-shaped spores will be easily seen. There are also methods to culture the fungus from the tissue. Since the pathogen grows slowly onto the culture plate, culturing is rarely done in a diagnostic lab.

Figure 1. Above ground symptoms of black root rot on pansies.

Causal Fungus and Disease Development

Black root rot is caused by the fungus, *Thielaviopsis basicola*. As mentioned earlier, the fungus is very common and widespread. It has a wide host range and affects many other hosts besides greenhouse floral crops. *Thielaviopsis* can spread between greenhouses or between crops within a greenhouse in many ways. Long distance spread between greenhouses occurs via the movement of infested—but not necessarily diseased—plant material. Many of our specialized plug producers control crop stresses so well that an infestation of their material goes undetected by all parties until the plants are stressed in shipment or transplanting.

Infested plugs are not the only way your crop can get black root rot. *Thielaviopsis* also has the potential to enter a greenhouse via wind blown dust or in growing media. Once within a greenhouse, there are many situations that can result in the pathogen becoming a long term resident. *Thielaviopsis* has a broad host range, and its saprophytic nature may allow it to continue to grow, spread and survive on many plants in the greenhouse that may appear symptomless or nearly so.

Thielaviopsis produces resistant "resting" spores on infected host tissue in tremendous numbers. These spores can be splashed about or blown about in dust in the air. They will be present on flats, pots, or trays that may be brought into a work area for reuse. In addition, the pathogen produces a second type of spore that is spread by splashing water. It may be the spread of these small spores that allows the disease to develop so quickly once it gets started. All in all, the black root rot pathogen is well suited to becoming a permanent, though unwelcome, resident in your greenhouse.

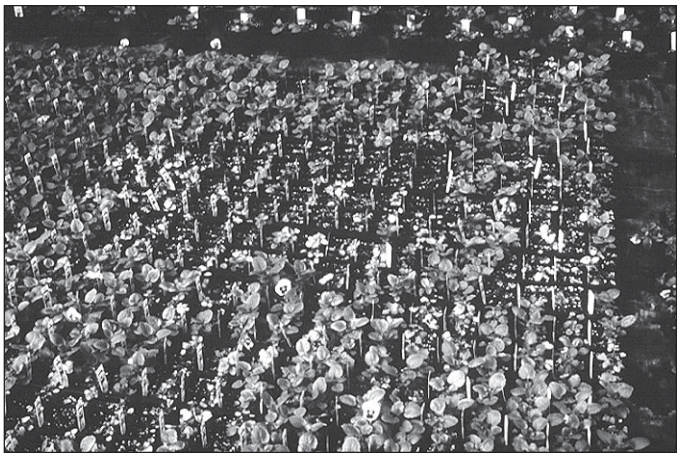

Figure 2. Black root rot spreading through pansies on a greenhouse bench.

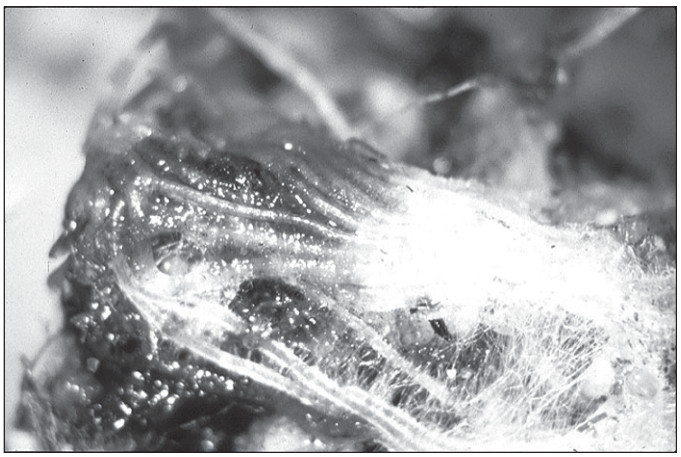

Figure 3. Pansy roots rotted by black root rot.

Disease Management

Avoid Plant Stress

Almost any factor that stresses the host plant can lead to further parasitic development of this disease. On the other hand, correcting plant stress can allow infested plants to "outgrow" the disease and eventually recover.

Crops grown under conditions that are too cool or too warm are often subject to this disease. Nutritional imbalances are also frequently associated with disease development. Excess of ammonia nitrogen appears to be particularly troublesome for pansy growers dealing with black root rot. Growing media with a pH above 5.5–6.0 are also conducive to black root rot development.

A well-drained medium provides an environment favorable for the seedling and somewhat less favorable for the pathogen. Carefully executed watering practices are very important. When the medium is irrigated thoroughly and less often, conditions at or near the surface of the medium tend to remain slightly drier and are less favorable for growth of the pathogen. Plug trays must be kept evenly moist and sufficiently warm to enable seed to germinate rapidly and seedlings to emerge promptly.

Figure 4. Dark, barrel-shaped spores of the black root rot fungus. With microscopic examination, these spores can be seen in infected roots.

Sanitation

Thielaviopsis is well adapted to survival in the greenhouse. Some relatively simple practices are crucial for controlling this disease. Do not reuse containers or trays. Do not create dust, especially when the dust can settle on piles of growing media nearby. Disinfesting potting media will eliminate the organism and should be carried out if there is any topsoil or sand to be used in the growing media. Sanitize benches when possible.

Chemicals

There are quit a few good chemicals with efficacy against *Thielaviopsis*. Routine, monthly drenches at labeled rates with chemicals such as Cleary's 3336, Domain, Banner, and Terragard will help protect your crops. With bedding plants, you must have the fungicide present at seeding. Plug crops can be infected within only a few days after seeding. Continue a regular monthly schedule throughout transplanting and finishing the crop.

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