The Plant Doctor's LANDSCAPE TIPS

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ARBORVITAE AND CHARCOAL ROOT ROT

INTRODUCTION:

Arborvitae *(Thuja occidentalis)*, a.k.a. Northern White Cedar, is a commonly used plant in Michigan landscapes. The tree is native to Michigan. Its dense foliage makes a great barrier plant for blocking views and wind. Arborvitae is very hardy, exhibiting good resistance to winter injury and desiccation, while providing an evergreen alternative to the Midwest's rather drab winter colors. Arborvitae can be severely pruned into hedges and other artful shapes, generally without detrimental effects. Except for arborvitae leaf miner and a couple of foliar diseases, arborvitae exhibits few serious problems with diseases and insects.

One lethal disease that I occasionally to rarely encounter with arborvitae is Charcoal Root rot, caused by the fungus Macrophomina phaseolina. M. phaseolina attacks more than 300 species of plants. All conifers are known to be susceptible but in varying degrees. Many deciduous plants, such as maple, are also attacked by the fungus. Curiously, the fungus obtained its "phaseolina" name because it also attacks a variety of field crops, especially beans and soybeans. Charcoal root rot is primarily a problem with smaller plants and nursery-produced seedlings, but occasionally the fungus is found on larger landscape plants.

SYMPTOMS AND DISEASE ATTRIBUTES:

Arborvitae plants affected by the Charcoal Root Rot disease tend to fade over time. Initial symptoms may appear on particular branches or on one side first. Those initial symptoms begin as a gradual pale green color of the foliage that eventually becomes brown. With time, the entire plant becomes brown (Photo 1). In addition to a color change, the foliage dries out. In a planting of arborvitae, usually a row of trees, one or several plants may be affected. If an arborvitae has succumbed to charcoal root rot, replanting with another arborvitae into the same site will likely result in similar decline and death. The disease may spread from tree to tree through colonization and infection of root systems.

Macrophomina survives very well in soils. It may survive for years without its host plant. This long survival is due to unique survival structures called microsclerotia. Microsclerotia may help in the diagnosis of the disease. In addition to the plant symptoms, if charcoal root rot is suspected, the lower stem and roots can be scraped to remove the bark. The presence of powdery masses of bluish-black spores (microsclerotia) probably indicates charcoal root rot (Photos 2 and 3).

CHARCOAL ROOT ROT MANAGEMENT:

Because the charcoal root rot fungus is a great soil inhabitant and can survive long periods in the soil, managing this disease is very difficult. Charcoal root rot can be a serious problem in nurseries; nurseries can manage the problem by sterilizing soil, thoroughly composting soil and organic matter or by soil replacement. For landscape situations, first and foremost, avoid purchasing diseased plants from nurseries. Nursery plants which exhibit any decline symptoms should be avoided unless an accurate diagnosis proves otherwise. The disease may be transported from the nursery to the landscape and remain at the site for decades. An accurate diagnosis is essential to differentiate charcoal root rot from other problems in landscapes (Photo 4). The fungus can potentially be transported from landscape to landscape on contaminated tools and in soil particles. In replant cases, the use of alternative or less-susceptible plants may be advised. In rare situations, where economics can justify an aggressive approach, soil replacement in isolated areas of landscapes can be considered. Some research has indicated that maintaining high organic matter content in soils tends to inhibit the pathogen. In general, no chemical controls are feasible.

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Development of Landscape Tips was sponsored by MSU and MGIA.

Photo 1. Typical decline and death from infection by the root rot fungus Macrophomina phaseolina of a northern white cedar plant in a row of northern white cedar (arborvitae). The fungus may colonize the roots of adjacent plants and with time move down the row.

Photo 2. Diagnosis of charcoal root rot involves checking the lower stem and roots for the presence of microsclerotia, the survival structure of the fungus. Note powdery masses of dark bluish spores (microsclerotia) beneath the bark of this arborvitae stem.

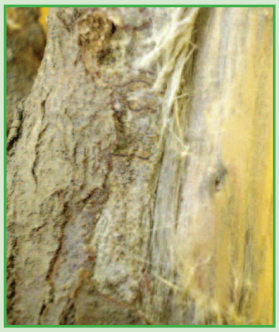

Photo 3. A close-up photo of the lower stem that exhibits the bluish-black flecks of microsclerotia of Macrophomina phaseolina.

Photo 4. The widespread decline and death of so many recently installed arborvitaes in this landscape probably does not indicate charcoal root rot. Rather, this is likely a drought problem after new transplants were installed. However, accurate diagnosis is essential.