42. Dothiorella Wilt of Elm

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Dothiorella ulmi causes Dothiorella wilt (Cephalosporium wilt, native elm wilt, elm dieback) of elm species. Dothiorella wilt is a vascular disease whose symptoms are frequently confused with those of Dutch elm disease or Verticillium wilt.

Hosts and Distribution

This disease has been widely reported since 1929 from Oklahoma north to North Dakota and into Canada. The disease is present in native stands and planted elms throughout North America. It is commonly found on American elm, and occasionally on slippery, Siberian, and cedar elms. The fungus is often isolated from samples being processed for detection of the Dutch elm disease pathogen. Resistance to this pathogen has not been found in elms.

Symptoms and Signs

Symptoms of Dothiorella wilt include wilting, curling, and yellowing of foliage, followed by defoliation and gradual dieback of branches (figs. 42–1, 42–2). Internally, there is a brown, diffuse streaking of the vascular tissue (fig. 42–3). This discoloration is evident before external symptoms appear. Flat cankers may develop on small branches. Diseased bark turns reddish brown, then darkens and shrinks. Small black fungal fruiting structures (pycnidia) may develop on the dead bark associated with cankers. Dead branches are usually invaded by secondary fungi such as *Phoma, Cytospora,* and *Sphaeropsis*; close examination is required to identify pycnidia of *D. ulmi.*

Symptoms are similar to those of Dutch elm disease and Verticillium wilt; the diseases cannot be distinguished without making isolations. Isolation methods include placing infected wood chips on agar media and incubating them so the fungus can be recovered for identification.

Pycnidia of *D. ulmi* are black, and occur in groups of 2 to 12, occasionally single, and 63–160 μm in diameter. Conidia are 1-celled, hyaline, elongate, rounded at both ends, straight or slightly curved, and 2.9–5.4 by 0.5–1.0 μm (av. 3.6–0.8 μm). Cultures of *D. ulmi* growing on malt or potato-dextrose media are variable in color and growth rate, but are usually brown and slow-growing with a filamentous margin. The *Cephalosporium* stage of the fungus develops in culture. On potato-dextrose agar, *Cephalosporium* is characterized by a well-developed, hyaline, septate mycelium. The simple conidiophores are straight, mostly unbranched, and vary in length from 0.7 to 20.0 μm (av. 5.6 μm). The conidia are hyaline, unicellular, elliptic, and 4.5 by 1.9 μm. Conidia are held in place by a mucilaginous substance in which 50 to 80 spores may be massed into a globular head.

Figure 42-1. Wilting of elm branches infected with *Dothiorella ulmi.*

Disease Cycle

The fungus overwinters in infected tissue. In the spring, fungal spores exude from the pycnidia and are dispersed by wind, rain, or insects. The fungus invades through wounds in leaves and tender shoots, and then spreads to other parts of the tree through the vascular system. Affected branches develop dieback, cankers, and associated pycnidia.

Damage

The disease may progress slowly. Two to 4 years may be required to kill a large tree, whereas seedlings are often killed during one season. Some diseased trees may be symptomless for several years before symptoms reappear. The amount of damage caused by this disease in the Great Plains is unknown.

Control

Prune infected branches several feet below the last visible discoloration in the wood. Infected branches should be burned or buried in a landfill. Several prunings may be necessary. High-value trees should be kept vigorous by watering and fertilizing as needed.

Selected References

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Figure 42-2. Close-up of wilting foliage affected by *Dothiorella*, showing curling of leaves.

Figure 42-3. Brown streaks in wood of elm with Dothiorella wilt.