



Diplodia tip blight of pines (*Diplodia sapinea*)

Hosts: Austrian (*Pinus nigra*), mugo (*P. mugo*), ponderosa (*P. ponderosa*), red (*P. resinosa*), Scots (*P. sylvestris*) pines.

General Information: Diplodia tip blight is commonly found in Maine and is often associated with red pine (*Pinus resinosa*) plantations; however, it is also found in the natural forest and ornamental settings. The fungus causes cankers and kills new growth in spring/early summer. Symptomology includes new growth that is partially elongated, brown and brittle, scattered throughout the lower crown and branch dieback that may be traced back to stem cankers further back on the branch. Infection severity tends to increase in response to longer-term stress events like drought or inundation of roots and especially acute stress events like hail injury. Spores are spread by rain splash during prolonged periods of high relative humidity. There is also indication that insects, especially those that feed on cones, may vector the fungus from one tree to the next.

Symptoms and Signs: Symptoms begin to appear in May/June as new shoots are attacked. Blighted shoots often are stunted (indicating that they were infected soon after shoot elongation) or wilted. Vascular tissues (inner bark) may be stained a brownish color. Repeated years of blighted shoots cause the branch ends to appear crooked as new shoots are killed, and adjacent lateral shoots take over as terminals. This buildup of dead branch tips at the ends of branches is referred to as 'lion's tailing' and can often be observed from the ground looking up at the fringes of canopies. While cankers are sometimes difficult to locate and confirm as being caused by *D. sapinea*, it is often fairly easy to find spore-producing structures (pycnidia) growing on cone scales, as the fungus readily invades the cones after infecting branches. Spore-producing structures are also found less often/less easily beneath the papery sheath that holds together the base of bunches of needles (the fascicle). When *D. sapinea* pycnidia are squashed on a glass slide and viewed under magnification, very characteristic large (for spores), dark-brown oval spores can be seen. Branches chronically infected by *D. sapinea* in the lower crown typically die due to the infection or secondary reasons. This leads to low live crown ratios, which may have management implications.

Management: Avoid injuring trees during management. In plantation situations, removing suppressed trees may be beneficial to overall stand health and improve airflow in the stand (increased airflow improves drying conditions and can lower infection). Do not plant susceptible species near already infested trees. Management activities should be limited to wintertime to avoid the risk of Annosus root disease establishment (see MFS fact sheet, [Heterobasidion Root Disease](#)) and minimize other stressors like root compaction. Diplodia tip blight may be mistaken for Sirococcus shoot blight (and vice versa) and therefore proper identification of the causal agent is important (see MFS fact sheet, [Sirococcus Shoot Blight of Red Pine](#)). However, both diseases can be found in the same stand, and even on the same tree. Stands where both diseases are present may decline more rapidly than stands where only one of the diseases is present. In landscape situations, support tree vigor and prevent water stress, as vigorous trees are more resilient in response to infections. Also, protective fungicides can be applied in spring and early summer to prevent the infection of new growing shoots. Although this may be beneficial in landscape settings, fungicide application is seldom practical in larger and older plantings and stands. Since heavily infected trees can become attractive to mass attack by bark beetles, it is recommended to remove the worst infected trees. Finally, trees with lower live crown ratios may not respond positively to management. Thinning of such health-compromised stands may lead to subsequent high mortality. In these cases, stand replacement may be the preferred management option.



Left Panel Images: (top) Thin crowns with low percent of live crown due to chronic and severe *Diplodia* tip blight infestation as seen from the ground in a planted red pine stand; (bottom) *Diplodia* tip blight on mugo pine in a landscape setting causing blighted, discolored branch tips.

Middle Panel Images: (top) A dead branch tip due to infection by *D. Sapinea*. The shoots were killed not long after shoot elongation, early in the growing season. Also note the multiple dead ends on this branch tip. This symptom, called lion's tailing, results from serial episodes of new-shoot infection and mortality. The tree's response to the tip death is to initiate new shoots below the dead tip; (bottom) A side-by-side comparison of a cone from an uninfected branch (left) and an infected branch. The latter shows small black spore-producing structures erupting through the cone scale surface (pycnidia).

Right Panel Image: Naturally regenerated red pine trees weakened by chronic *Diplodia* tip blight infection. Trees impacted by this primary chronic disease stressor often are more susceptible to damage from other agents of decline.

All images: Maine Forest Service



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