The Plant Doctor's LANDSCAPE TIPS

By Dr. David L. Roberts, *The Plant Doctor LLC a.k.a. The Tree Doctor*

DOTHISTROMA NEEDLE BLIGHT OF PINES

INTRODUCTION

Conifers are an important component of Michigan landscapes (Photo 1) for both aesthetic value and environmental diversity. Unfortunately, many of the conifer species encounter disease and pest issues that can lead to their decline, even demise, and loss of landscape/property value, which can make them liabilities rather than enhancements (Photo 2). Dothistroma needle blight, caused by the fungus *Dothistroma pini* (aka *Mycophaerella pini* and *Dothistroma septosporum*), is one of those diseases that can result in conifer decline/death. The disease has been reported on more than twenty species and hybrids of two and three needle pines, including Ponderosa, Lodgepole, Monterey, Austrian and Mugo pines. In Michigan, Austrian, Ponderosa (where found) and Mugo pines are most often affected. Scotch and Red pines tend to be resistant to the disease. Over the last 40 years, the author has occasionally detected Dothistroma on five needle pines: Eastern White Pine and Flexible Pine (*Pinus flexilis*).

Photo 1: Various conifers truly enhance the value and diversity of Michigan landscapes, providing not only textural and color variations but also providing some greenery during the drab doldrums of Michigan winters. These Austrian pines have traditionally provided dense screens and exhibited fantastic tolerance to deicing salts.

Photo 2: While Austrian pines have been favorite "evergreens" for many landscapes, they have also developed several serious maladies over the last couple of decades. This large, old Austrian pine was once a grand specimen and a precious resident in this landscape but has steadily exhibited serious decline from Diplodia Tip Blight and Dothistroma Needle Blight in recent years.

Dothistroma Needle Blight is reported to be capable of killing trees when repeated, annual infections and blight occur. In the author's experience, Dothistroma Needle Blight typically does not kill established trees in Michigan; Diplodia tip blight is usually regarded as more serious but may work in conjunction with Dothistroma to severely debilitate trees, sometimes leading to death under certain conditions. If the disease is prevalent in landscapes, occasional applications of fungicides will generally bring the disease under control. Nurseries will want to manage the disease due to possible red tagging by inspection authorities. Christmas tree operations will want to manage the disease for aesthetic reasons. The disease is reported to be capable of killing young pine seedlings in these operations.

SYMPTOMS & DISEASE CYCLE

The most conspicuous evidence of the disease first witnessed by most individuals is the blighting of needles (Photo 3).

Photo 3: Dothistroma needle blight is a fungal disease that can be a contributing factor to Austrian pine's unseating as a desirable species for landscapes. Here, conspicuous symptoms of Needle Blight can be seen.

Photo 4: Austrian pines heavily afflicted with Dothistroma Needle Blight possess many brown needle tips and may exhibit an overall tannish cast.

Needles on afflicted trees appear tan or brown in coloration. Severely "infested" trees often exhibit an overall tannish-brown cast (Photo 4). Like many issues on trees in landscapes, individuals who (finally) noticed the blight often claimed that the symptoms appeared "overnight". In fact, needles are not blighted overnight; people were simply not paying attention to the disease that was likely slowly building up on their trees over the past several years. Nevertheless, tree owners often panic and demand immediate attention to save their trees. Some property owners become so hysterical that they often stipulate that trees be removed to prevent the disease from spreading to other trees in the landscape. The symptoms of Dothistroma Needle Blight are evident throughout the year, and in many cases, the timing is not conducive to implementation of disease management techniques. Nevertheless, arborists and landscapers are often faced with the prospect from their clients, "Can't you just spray something?"

Even though those conspicuously blighted needles are alarming to many of us, the fungal disease's initial infection occurred sometime previously as water-soaked spots where a spore has infected the needle. The water-soaked spots turn yellow (Photo 5) and then brown. With time, as the infection progresses, the brown spots expand through the needle tissue and girdle it, eventually causing a

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reddish-brown banding (Photo 6). Due to the red banding, the disease is often referred to as Red-Band Needle Blight by some sources. As the fungus continues to colonize the needle tissue, the tips of the needles external to the banding turn tan-brown; the needle bases usually remain green, at least initially (Photo 6). In many cases, this blight phase will signify the final disease expression before needles turn completely brown and are cast from the tree, effectively thinning the tree (Photo 4). Depending on when needles are cast, the tree may appear tufted if new growth emerges unharmed when there is little previous years' growth left on the tree. Or, severe blight may cause bare limbs (Photo 7).

Regarding the disease cycle, the fungus releases spores from previously infected needles in the spring and early summer. If conditions are favorable (leaf wetness and humidity), the spores may infect needles of all ages on afflicted trees. Usually older needles (previous years) on the inner and lower branches are most susceptible (Photo 8). Fresh symptoms of "blight" may develop in the late summer to fall; however, blighted needles may be found throughout the year on trees that have been repeatedly attacked.

Photo 5: Note the yellow spots that typically signify early stages of Dothistroma infections.

Photo 6: The needles in this photo show intermediate stages of blight caused by Dothistroma. Characteristic symptoms include banding and tan/brown needle tips beyond the banding, which girdled the needle. Please also consider a rather important diagnostic feature of Dothistroma Needle Blight: green needle bases, at least initially, before the entire needle turns brown and is cast from the tree.

Photo 7: Extreme cases of Dothistroma may result in severe needle loss and bare branches, not only defeating the original intention of a landscape screen but resulting in zero aesthetic value. The bare branches on the trees in this photo were caused by Dothistroma Needle Blight, Diplodia Tip Blight and shading.

Photo 8: In this photo, please note that last year's growth is severely affected but the present year's growth is not yet showing any symptoms.

Photo 9: All pine species are susceptible to winter desiccation and injury from deicing salts. In this photo, Eastern White Pine discloses its susceptibility to desiccation; it is occasionally (rarely?) affected by Dothistroma Needle Blight.

DOTHISTROMA-MISTAKEN MALADIES

Dothistroma Needle Blight may be confused with a variety of other maladies that affect Pinus species. For example, all pines are susceptible to needle desiccation from wind, winter injury and deicing salts (Photo 9). While Austrian pine is known to be more resistant to salt spray injury and winter desiccation than many species of pines, it still may develop tan needle tips under harsh conditions. Dothistroma Needle Blight may also be confused with Diplodia Tip Blight (Photo 10). Diplodia not only kills the shoots of many species of pines but may also infect needles, turning them brown. Sometimes, both Dothistroma and Diplodia conspire to harm pine trees (Photo 11). Herbicide injury,

Photo 10: Diplodia Tip Blight caused the death of these shoots. Diplodia Tip Blight is often found in association with Dothistroma Needle Blight. Diplodia may also attack and kill needles.

Photo 11: Both Diplodia Tip Blight and Dothistroma Needle Blight are apparent in this photo.

shoot borers and weevils that attack the root collar area among other pestilence may also cause needle death, sometimes mimicking Dothistroma Needle Blight.

MANAGEMENT OF DOTHISTROMA NEEDLE BLIGHT

When considering the treatment of any plant for diseases and pests, it is vitally important that we properly diagnose the maladies to justify their treatment(s). Once we have properly diagnosed the problem(s), we need to consider the options available for effective management of the problem. In the case of Dothistroma Needle Blight, there are several procedures we can consider.

Genetic: For areas with severe Dothistroma Needle Blight, it would be best to choose resistant trees as replacements. Many conifers are resistant.

Cultural Control: The design of a landscape impacts the diseases or the severity of those diseases. The proper spacing of trees so foliage may dry quickly after precipitation and allow for better light penetration can help discourage fungal infections. Many landscapes in Michigan are over-irrigated. Excessive irrigation provides not only the necessary moisture for enhanced fungal infections but the duration of leaf wetness that is necessary for fungal infections. Not only is "Over Irrigation" an issue, but "Overhead Irrigation" provides the necessary wetness and mists for fungal infections. Proper irrigation management can help reduce fungal disease infections such as Dothistroma- and Diplodia-incited diseases.

Photo 12: These pines at a condominium complex were slated to receive fungicide treatments for control of Dothistroma Needle Blight, even though there was no evidence of the disease (Inset). Routine preventative treatments may not be justified if the disease is not present.

Chemical: Apply a registered copper-based fungicide containing copper hydroxide, or copper sulfate, or Bordeaux mix or mancozeb in the spring as needles are emerging and as Dothistroma is releasing spores from fruiting (reproductive) bodies on previously infected needles. Applications later in the spring and summer may also protect other, older needles on afflicted trees.

Photo 13: Mugo Pines are very susceptible to Dothistroma Needle Blight, but this particular specimen was disease-free, meaning preventative treatments would not necessarily be warranted. Dothistroma Needle Blight is a good disease to "monitor" for its presence and potential buildup over years.

Dr. David Roberts has retired from Michigan State University but intends to remain active with the industry. He is CEO and CBW (Chief Bottle Washer) for The Plant Doctor, LLC. Contact information: 248/320-7124 and treedoctordave@gmail.com.