



The Plant Doctor's LANDSCAPE TIPS

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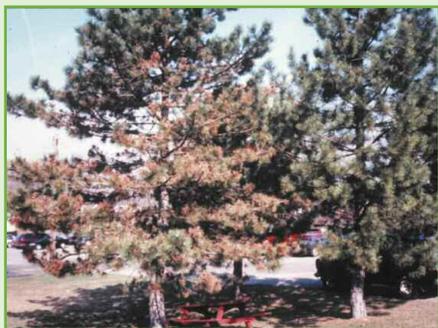


Photo 1: Diplodia Tip Blight kills shoots of pines. Advanced infections also may kill branches or entire trees. In this photo, the Austrian pine on the right is apparently resistant to the disease while the tree on the left is highly susceptible.



Photo 2: Other issues on pine may complicate Diplodia infections and treatments. The resinous secretions near the base of this pine may indicate Pine Root Collar Weevil or other boring insect attack.



Photo 3: This dead shoot appears very similar to a Diplodia Tip Blight disease. However, snapping the shoot reveals a hollow stem typical of a shoot boring insect attack (Inset: probably European Pine Shoot Borer). Diplodia-killed shoots will appear solid (not hollow) and black. No Diplodia fungicide treatments will manage this or other insect problems.

DIPLODIA TIP BLIGHT REDUX

INTRODUCTION:

Diplodia Tip Blight is caused by the fungus, *Diplodia sapinea*, (= *Sphaeropsis sapinea*). Many exotic (introduced) and native pines are affected by the disease. Austrian, Scotts and Mugo pines are, perhaps, the most susceptible but native red, Jack and other 2–3 needle pines are also affected (Photo 1). Five-needle pines tend to be resistant.

The disease affects trees by infecting newly emerging shoots in the spring. Cool, rainy conditions favor disease development. The moisture encourages spore germination and subsequent infection of swollen buds and tender expanding shoots. After infection, it may take several days or a week or more, depending on temperature, for the fungus to actually girdle the shoot. If shoots remain unaffected into June or whenever the shoots cease growth and “harden off,” the shoots tend to become more resistant to infection and death. Sufficient numbers of blighted shoots can disfigure trees and eventually cause significant branch death. Ultimately, trees may die as continual Diplodia disease stresses lead to attack by other insects and diseases. Pine seedlings may be severely affected by Diplodia in the nursery and Christmas tree farms. However, beyond the sapling stage, young trees are generally not as susceptible until trees mature to around cone bearing age; at that age, the Diplodia fungus colonizes cones and bark and with much more abundant spore production along with diminishing growth and vigor from tree maturity, the trees often contract more Diplodia Tip Blight disease. There is a great diversity of susceptibility to Diplodia within species of pine; for example, one Austrian pine may appear to be resistant to Diplodia while another adjacent Austrian pine may be highly susceptible (Photo 1). The variability of susceptibility is due to natural genetic diversity within the seed-propagated pines.

PROBLEMS WITH DIPLODIA MANAGEMENT:

I have received numerous complaints from arborists about their frustrations with managing Diplodia Tip Blight on pines. While a few arborists claim to achieve very good success, many more arborists experience a lack of desired results, which also complicates their relationships with clients. In some instances, arborists are expected to correct Diplodia Tip Blight on severely declined trees; once a pine reaches a certain stage of decline, it can be very difficult to reverse the tree's health. For valuable trees, it is important to treat trees before severe Diplodia infections occur.

I suspect that failures in Diplodia Tip Blight management can be attributed to several factors. It is advised that arborists who are experiencing difficulty with managing Diplodia review the following issues of Diplodia Tip Blight management.

- 1) **Timing of Treatments:** During the busy spring season, when arborists are extremely busy, it is often difficult to apply fungicide treatments for all clients at the appropriate time. Remember, if an infection period occurs before the application of a fungicide, no subsequent amount or frequency of application will help that infected shoot to recover. In general, fungicides act to protect against infection, not to cure plant shoot tissues after infection.
- 2) **Application Frequency:** Even if the first treatment in the spring is successful, for example in April, trees that are not receiving sufficient protection may succumb in May. Arborists often apply 2 or 3 treatments during the spring season but 4 or 5 treatments may be necessary during some seasons, particularly if valuable trees are to be protected and precipitation is abundant.
- 3) **Misdiagnosis/Complications:** There may be other issues associated with pines that can either complicate Diplodia infections or appear similar to Diplodia infections. For example, the Pine Root Collar Weevil (PRCW) and other borers frequently attack many species of pine (Photo 2). These insects may stress trees or cause death directly by disrupting the vascular system in the root collar region of the trees. Presumably, stressed trees are more predisposed to Diplodia tip blight than healthy trees. In addition, some other problems such as shoot borers may be mistaken for Diplodia tip blight (Photo 3 and Insert). No fungicide will correct these insect attacks.

ENHANCING DIPLODIA MANAGEMENT:

Several factors should be considered when Diplodia Tip Blight treatments are considered. If these recommendations are followed, I believe that good success for disease management will be more easily attainable.

Tree Evaluation: Closely examine trees to determine that Diplodia Tip Blight is the primary problem. Also check the tree for evidence of other problems that either may be mistaken for Diplodia Tip Blight or that may complicate Diplodia infections. As discussed above, check the tree for weevil infestations in the root collar area as well as other root problems such as construction damage, excess soil moisture etc. Also, perform a thorough inspection of the entire tree to minimize the potential of other causes of pine shoot death and decline. An earlier publication entitled "Diplodia Tip Blight of Pines" in the August 2008 issue of *the Landsculptor* may assist with Diplodia evaluations. Evaluate the tree overall; remember that trees that are so advanced in Diplodia Tip Blight infections may be difficult to return to good health. Clients should be advised about the potential for success or failure so they will not feel misled if their investments in treatments do not provide sufficient recovery of trees.

Treatment Application: Standard treatments for Diplodia Tip Blight management include fungicide applications beginning at bud break and repeating every 10 days to two weeks. Arborists usually apply two to four treatments per season. Additional treatments may be advised for those clients desiring a higher level of insurance for success. Typically, systemic broad spectrum fungicides such as propiconazole or thiophanate ethyl and/or contact fungicides such as coppers or mancozeb or chlorothalonil are utilized. A combination of systemic and contact fungicides may enhance efficacy. **Remember, the fungicide must coat the newly emerging shoots before infection occurs.**

Consider Trunk Injections: Some arborists are beginning to use trunk injections to avoid the timing issues so prevalent with sprays. Trunk injections offer the advantage of not having to worry about rainy spring weather which can prevent or delay spray treatments or make them ineffective due to wash off/dilution. Injection of Shepherd (propiconazole) with Arborsystems' new Wedgle portal injection system shows great potential for enhancing control of Diplodia Tip Blight of pines (Photo 4). Other injection systems may also work. Pines can be injected in the fall when business has slowed, for following spring control. I have followed several arborists who have used the Wedgle Portal system for several years and have initiated my own research as well. I am encouraged by the results we have been observing (Photo 5). While injections may initially appear to be more labor intensive than sprays, it is important to remember that for sprays to be effective, frequent visitations to the site for fungicide applications are necessary. Furthermore, at the 4mL rate per injection site, it appears we may be able to achieve two years of management of Diplodia on pines....from only one treatment.

"Cleaning" Pine Trees: Some arborists who manage very high value landscapes will perform the labor intensive procedure of removing Diplodia-infected dead shoots and cones. This not only enhances the appearance of pines, but removes some of the Diplodia infecting fructifications and spores, thereby lessening the chances of subsequent infections. Arborists who have used Shepherd in the Wedgle Portal System in conjunction with the tree cleaning exercise witness very few Diplodia infections over the next several years. 📌

For more information, please feel free to email me at robertsd@msu.edu or contact a professional plant health-care provider. The author, MSU or MGIA do not endorse any particular treatment procedure or products. If using pesticides, be sure to read and follow label directions.

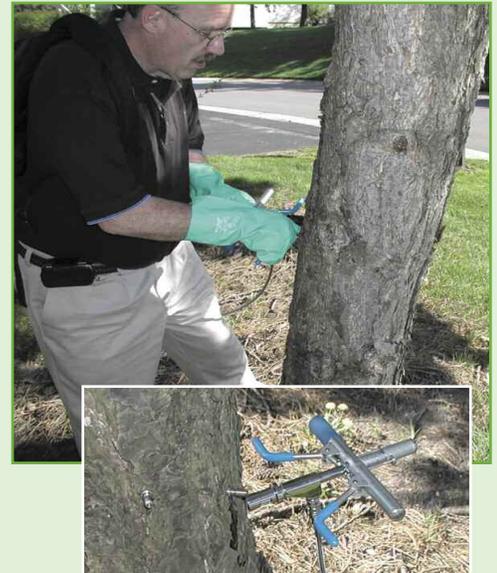


Photo 4: Photo 4: Chip Doolittle, President and Owner of Arborsystems, demonstrates the new Portal system (Insert) on pines for a Diplodia study began in Michigan in 2007. Trunk injections show great promise for Diplodia Tip Blight and perhaps other disease and insect issues.

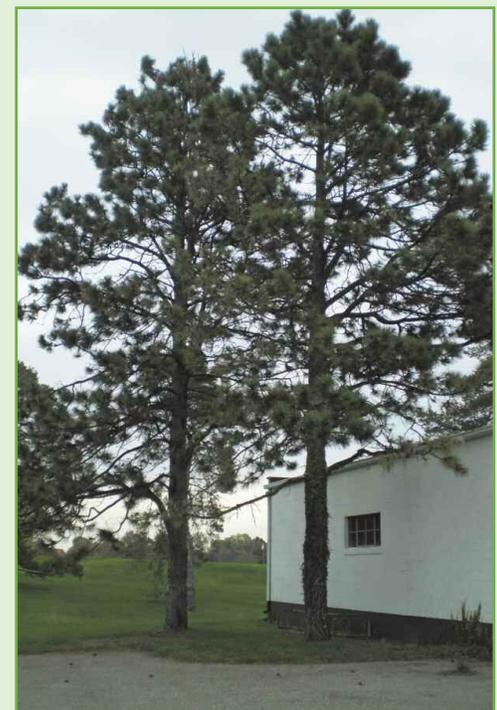


Photo 5: Although perhaps not visible from this distant photo, the tree on the right that was treated with the Wedgle Portal System shows far less Diplodia Tip Blight one year after treatment than the untreated tree on the left.



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