The Plant Doctor's LANDSCAPE TIPS

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

TRELLIS RUST MANAGEMENT: TESTIMONIALS FROM THE ARBORISTS

Photo 1: Pear trees were widely planted after ash trees were killed by the Emerald Ash Borer. Pear trees are still widely requested in landscape designs because of their spectacular early spring foliage. I suspect this tree is being used too widely, especially with the invasive Trellis Rust now in the state.

Photos 2A & 2B: Spring flowering is severely inhibited by prior Trellis Rust infections (top). Foliage during the spring and summer is also devastated (bottom).

INTRODUCTION

Ornamental pear was probably the most common replacement tree after the destruction of the ashes by the Emerald Ash Borer. Ornamental pear is widely admired for its early spring blooms (Photo 1), bringing color to the long, drab Michigan winters and signaling the start of spring. Trellis Rust (TR), aka European Pear Rust, is a relatively new disease introduced into southeastern Michigan several years ago. Perhaps considered unique among plant diseases, TR has evolved to require two different species of trees to complete its disease/life cycle: Juniperus sp. and Pyrus sp. (Pear). The disease can devastate ornamental pear trees in the landscape to such a degree that afflicted trees may become undesirable for their ornamental value (Photos 2A & 2B). The disease seems to have little impact on its juniper host. To my knowledge, there has been very little research on the management of Trellis Rust on Pear. Over the past several years I have followed several sites, which contain pear trees affected by TR, in order to provide professional plant health care providers with knowledge about the disease cycle and to help contribute information to make management options more feasible.

Photo 3: I often hear many claims about control of pests and diseases by various treatments. I've wondered whether Trellis Wine might have some effect upon Trellis Rust disease development? It might be a wasted effort however.

Note: The Plant Doctor does not recommend the consumption of alcoholic products except for medicinal reasons.

SCIENCE VS. ANECDOTES

Science is a highly structured process whereby hypotheses are tested using replicated design and statistical analysis aimed at getting at the facts and, hence, the truth about our natural world. This rigorous procedure is usually subjected to strict peer review before results are published in scientific journals. Even with these rigorous procedures to minimize variables that can affect the results and conclusions, peer-reviewed, scientifically published articles are sometimes proven unreliable. Even with these mistakes, the process of science eventually gets to the truth, provided the egos of scientists don't get in the way.

Many individuals immediately dismiss observational or anecdotal evidence as "faulty science." However, with over 40 years' experience as a scientist, I can attest to the fact that careful observations can lead to some valuable information and conclusions about our natural world. In fact, I have often thought that "careful observations" are sometimes more reliable than poorly designed and biased science. "Careful observations" is the key phrase because we must be extremely cautious about our observations before making broad-ranging pronouncements. As an example, a couple of years ago I encountered an arborist who had been injecting oak trees and elm trees with fungicides on a college campus in Michigan. He claimed his injections worked because the oaks and elms never became infected with Oak Wilt and Dutch Elm Disease, respectively. That might be a good marketing ploy for his business, but it would not be considered good science or even good observational/anecdotal evidence because those trees might never have contracted Oak Wilt or Dutch Elm Disease even if untreated! Likewise, someone might be inclined to test Trellis Wine (Photo 3) for its potential as "natural control" for TR, but that will probably result in waste of a good, "healthy" adult beverage.

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ANECDOTES FROM THE ARBORISTS

In 2017, the spring (degree day accumulation) arrived ahead of schedule; in 2018, spring arrived somewhat behind schedule. This year (2018) was a little unusual for Trellis Rust. Many arborists reported lower levels of TR infections than in previous seasons . . . at least in some locales. The same was reported for other foliar diseases such as scab on Malus and anthracnose on various shade trees. The lower incidence of some foliar diseases in some locales this past spring was very likely due to the weather conditions; drier, warmer conditions tend to inhibit the development of some diseases in the spring landscape. Even so, TR was quite prevalent in other areas. Over the last several years, I have tried to provide advice to arborists in my articles and conference programs about proper timing of fungicide applications for control of TR. Because TR is caused by a "basidiomycete rust" fungus, I have also been concerned about how effective some of the more commonly applied fungicides would be. Hence, I have sometimes suggested using a well-known turf fungicide (with an ornamental label) in a mixture with other fungicides; that fungicide, which is known to be very effective against rust and powdery mildew fungi, is triadimefon (Bayleton). While I have received quite a few "anecdotes" about TR management over the past several years, I thought I'd highlight a couple of examples herein of what I consider to be credible evidence of TR management by fungicides.

Photo 4: When Sheryl Hockney from Mike's Tree Surgeons arrived at a condominium site in Birmingham to treat this pear tree for Trellis Rust, she observed an open window in the nearby condo (red arrow). Not wanting to cause a drift of her pesticide concoction through the window, she treated only half of the tree, the half closest to the drive/parking area (away from the condo). Unknowingly, Sheryl had created an interesting "experiment," from which she reaped the rewards several weeks later (See Photos 5A & 5B).

Photos 5A & 5B: Foliage on the driveway side of the tree in Photo #4 contained no infections (lesions) of Trellis Rust (top), while unsprayed areas of the tree nearest the condo contained abundant lesions (bottom). In reality, Sheryl had achieved 100% control of TR on the treated half of the tree with one well-timed application of her fungicide mixture.

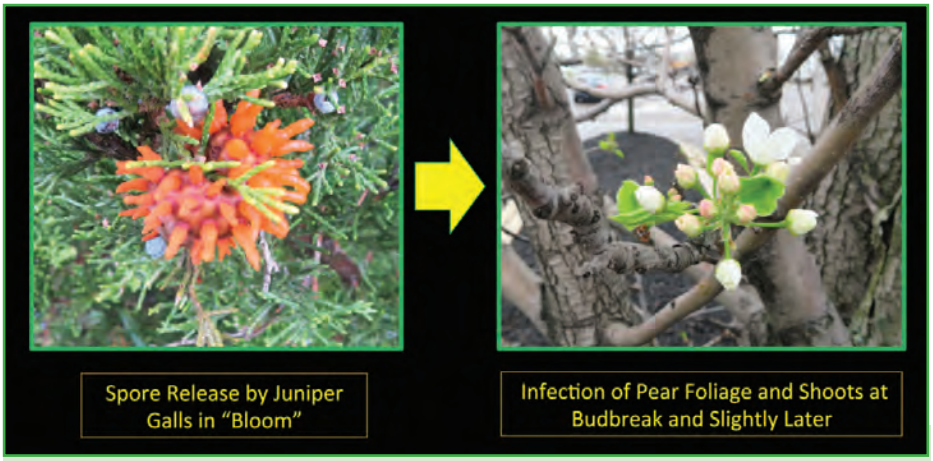
Photo 6: The Trellis Rust "perfect storm," junipers planted in close proximity to pear trees, is a common landscape design at many locations around Michigan. Note browning/blackening and sparseness of foliage. (Photo by Gary Olgart)

Mike's Tree Surgeons: Gary Eichen designs the management programs for the company. In this particular example of TR, Sheryl Hockney performed the applications of fungicides at a condominium complex in Birmingham, MI. When Sheryl arrived on May 18 to make the first application for TR, she noticed a window was open on the 1st floor (Photo 4). Not wanting to cause any spray drift into the condo, she elected to spray only half of the tree, the half farthest away from the open window (toward the street). This first treatment was done on May 18, 2018 using a mixture of Chlorothalonil, T-Methyl, and Bayleton. When she returned on June 19, Sheryl noticed the stark contrast between the sprayed and unsprayed portions of the tree (Photos 5A & 5B). The sprayed portion of the tree contained no lesions of TR while the unsprayed portion contained abundant lesions of TR on the foliage. While I would normally consider May 18 to be late for a first application for TR management, due to the late development of spring in 2018, Sheryl's application was apparently perfect timing. What is most remarkable is that she achieved essentially 100% control of TR with one, well-timed treatment!!!

Land and Lake Management: Gary Olgart sent me a couple photos of Trellis Rust in 2017 showing the "perfect storm"-junipers planted beneath/adjacent to pear trees (Photo 6); note the brown, devastated and sparse foliage. Gary offered to treat several of his customers' trees in 2018. His first treatment was applied at "budbreak"

Photo 7: A similar "perfect storm" tree that was severely affected in 2017 showed remarkable recovery from Gary's treatments in 2018. Photo was taken late in the season and shows full foliage compared to nontreated trees. (Photo by Gary Olgart)

Photo 8: Untreated trees in close proximity to treated ones exhibited severe foliage loss by early to mid-summer, 2018. According to Gary, many of the branches on these trees exhibited no bud set for 2019, foretelling possible branch dieback from Trellis Rust. (Photo by Gary Olgart)



Schematic #1: Trellis rust infections occur during the spring when the fungal juniper galls "bloom" and pear foliage and shoots begin to emerge. It is critical to understand that this period of infection is relatively short compared to other diseases such as crabapple scab. The only time infection can take place is when the juniper galls and pear foliage are in "bloom." For effective management of TR on pear, the foliage and shoots need to be protected with fungicides before spores are released from juniper galls and land on pear foliage/shoots.

Photos 9A, 9B & 9C: When I visited a Trellis Rust site in Livonia on May 3, 2018, I witnessed these different stages of TR juniper gall development. It is this differential development by the TR fungus over a 2-3-week period that ensures the fungus will have the greatest probability of infection of pear during variable environmental conditions of the spring. Precipitation (leaf wetness) favor infections of pear trees by the TR fungal spores.

and consisted of the following combination: Mancozeb, Bayleton and Tebuconazole. Gary's second treatment was timed with flower petal drop. Of the trees at the two sites (with junipers) devastated by TR in 2017, Gary treated one of the sites in 2018 and achieved 100% control (Photo 7); no TR lesions were found on any of the foliage. Trees not receiving treatments but in the same vicinity as treated trees were severely defoliated (Photo 8). While these observations by Gary might be dismissed by scientists as "anecdotal", they are important for many arborists who must rely upon their own business management decisions.

TRELLIS RUST MANAGEMENT DETAILS

Compared to most diseases we treat in the landscape, TR, a "monocyclic" disease, exhibits a relatively narrow window of opportunity for effective treatment. That window of treatment opportunity depends on the dissemination of spores from the "blooming" juniper galls (Photos 9A, 9B & 9C). Schematic #1 shows the most opportune timing of treatments . . . at or slightly before juniper gall blooming, which happens to coincide with pear budbreak and slightly later. At this time, the pear flower and vegetative (leaf) buds have begun to emerge. I have encountered quite a few cases where some treatments (2nd or 3rd?) are being applied way too late – see Schematic #2. Such treatments will have little to no effect on the management of the disease. I suspect that the late treatments are executed with treatment schedules for other diseases such as Scab on Apple/Crabapple and Diplodia Tip Blight. The challenge for arborists in the management of Trellis Rust will be to provide well-timed treatments during a

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more abbreviated window of opportunity than necessary for other tree maladies.

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The Plant Doctor, LLC does not endorse any particular company or products. Examples provided in this article.

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Schematic #2: At this stage of Trellis Rust, the juniper galls have ceased the release of spores and the lesions of TR have developed on the pear foliage and shoots . . . fungicide treatments would be useless at this time. Contrary to extensive "fake news" on the internet, these rusty lesions on pear leaves do not produce spores and continue a cycle of spread and infection such as that observed with scab on crabapple/apple. "What you see is what you got." Sometimes, severely affected foliage will turn brown/black and drop from pear trees; newly emerging foliage after this leaf drop will be disease-free.