The Plant Doctor's LANDSCAPE TIPS

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Photo 1: The foliage on these Bradford pear trees is being devastated by what we believe to be Trellis Rust. The foliage on the tree on the right is especially devastated.

Photo 2: Infected foliage was peppered with rather "pretty" lesions caused by the rust fungus.

Photo 3: Extensive lesion development often resulted in necrotic foliage. Such extensive lesions that kill the foliage also kill the fungus—a suicide of sorts.

TRELLIS RUST ON ORNAMENTAL PEAR

INTRODUCTION:

Trellis Rust (aka European Pear Rust), caused by the fungus *Gymnosporangium sabinae (= Gymnosprangium fuscan)*, is a relatively new disease in North America. Being very common in, and probably having originated from, Europe, Trellis Rust (TR) was found in portions of Canada since the 1960s and in the Pacific Northwest since the late 1990s. The disease was first reported in Ontario in 2007, in Michigan in 2009, in New York State in 2011, and more recently in Connecticut in 2012. TR is only capable of attacking Pear (Pyrus sp.) and can cause extensive harm to both orchard producing pears *(Pyrus communis)* and landscape ornamental pears *(Pyrus calleryana)*.

Early this summer, Mark Baldwin of Mark Baldwin and Associates, vectored me into a corporate site near Livonia Michigan, where Bradford and Cleveland Select pear trees were being ravaged by an apparent rust disease (Photo 1). By early June, Mark and I noticed that the foliage of these pear trees was literally plastered with rust lesions (Photo 2). Lesions were also noted on leaf petioles and twigs. We both agreed that we had never previously witnessed such extensive rust lesions on ornamental pear. The lesions on some foliage were so dense that much of the foliage turned black and either hung on the trees (Photo 3) or dropped to the ground. Although the fungus that causes Cedar Hawthorn Rust (*Gymnosporangium globosum*) may attack pear, we presumed that the rust witnessed at this Livonia location was likely Trellis Rust. The obvious sources of these rust infections on the pears were two junipers directly across the street (Photo 4). Despite the abundant lesions on the pear hosts, only a few of the spent galls (Photo 4 Insert) could be found on the juniper hosts, indicating the extreme prolific nature of the fungus (each lesion on the pear leaf is the product of infection by ONE spore from the juniper gall).

Following this rust disease through the summer into mid-August, many of the pear trees continued to defoliate (Photo 5). On viable foliage, the yellow lesions turned deep reddish-orange. Infections also occurred on and continued to develop on leaf petioles and small twigs (Photo 6). Because ornamental pears were often planted as replacements for ash trees devastated by the Emerald Ash Borer, the spread and establishment of Trellis Rust in some locales could make ornamental Pyrus undesirable as landscapes trees.

DISEASE CYCLE:

As with many rust diseases (Cedar-Apple, Cedar-Hawthorn, Cedar Quince) Trellis Rust requires two (alternate) hosts to complete its life/disease cycle: juniper and pear. In the spring during wet weather, overwintered and maturing galls on the *Juniperus* host "grow" gelatinous horns (Photo 7) that release teliospores, which are wind-borne to the deciduous host, in this case, pear. If pear leaves are wet, spores will germinate on the leaf surface and penetrate the cuticle and epidermis, eventually creating a lesion. As the initially tiny lesion expands in size through the early summer, the coalescence of many lesions may cause the leaf to become necrotic and drop from the tree (Photo 3). This defoliation can weaken trees. If defoliation is extensive, the tree may attempt to re-foliate. Later emerging foliage will not be infected by the fungus unless there are (prior) extensive stem infections. Later in the summer and fall, aeciospores will be produced from the undersides of green, viable pear leaves (aeciospores will not be produced on necrotic leaves whether fallen or hanging on the trees); these aeciospores will be wind-borne to the juniper host where galls will form (Photo 8) and overwinter, thus repeating the cycle. Trellis Rust is considered a macrocyclic (both major spore types present: teliospores & aeciospores) and heteroecious (requiring two taxonomically different host plants) rust disease.

Photo 4: These two junipers were the apparent source of infection for the Bradford Pears. Despite the abundant infections on the pear leaves, very few of these spent galls could be found on the junipers (Insert).

Photo 5: By mid-August, the Bradford pear trees have worsened; compare with Photo 1. Mark Baldwin (in photo) contemplates corrective measures for his client's trees.

Photo 6: By mid-August, the advanced infections on leaflets, petioles and twigs have turned into rather "pretty" infections (see Photo 2) UUUUGLY!

MANAGEMENT OF TRELLIS RUST:

The management of Trellis Rust, as with any heteroecious, macrocyclic rust disease, can be challenging. Following are some tips that may be helpful.

Elimination of One Host: To break the disease cycle of a multi-host (heteroecious) rust disease, one of the most effective methods is to eliminate one of the host plants. In some fruit growing states, laws have been adopted allowing the destruction of junipers from natural areas and landscapes, casing some consternation (ever hear of "Stand Your Ground!"?) from some juniper owners. In the case of landscape situations, the proposed or actual destruction of one host can be a source of some serious neighbor (hood) disputes. The elimination of a nearby alternate host can drastically reduce, but not necessarily eliminate, the incidence of rust infections. In some scientific observations, juniper-derived teliospores have been known to travel more than 14 miles (24 km).

Eliminate Infected Plant Material: Perhaps the most effective strategy in this category is to locate and remove rust galls (Photo 8) on the juniper host ***before*** they open and produce teliospores in the spring. Simply discard the galls in the trash or compost pile (or burn the dastardly creatures!). Because rust diseases are caused by fungi which are obligate parasites, raking and destroying pear leaves in the fall ***will not*** reduce the incidence of Trellis Rust the following year.

Fungicidal Sprays: Broad-spectrum fungicidal sprays to pears during the infection period in the spring can reduce the number of lesions on pear leaves. The fungicide must be present before the rust spores are deposited on leaves by the wind. Theoretically, spraying the junipers in the late summer or fall when aeciospores are capable of infecting junipers should be helpful as well. Fungicide sprays are not particularly effective for rust control in landscapes unless sufficient sprays are applied and other attempted control procedures cannot be implemented.

Resistant Plants: Where abundant Trellis Rust (or other rust disease) is prevalent, it may be wise to avoid planting susceptible species of plants. For example, arborvitae may make a viable alternative for juniper, and Linden may be an acceptable replacement for pear; neither linden nor arborvitae is susceptible to Trellis Rust. L

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

Development of Landscape Tips was sponsored by MSU and MGIA.

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Photo 7: In the spring, the overwintered galls (see Photo 8) on juniper develop "telial horns," which release wind-borne teliospores that subsequently infect the pears.

Photo 8: As a management strategy, the rust galls on juniper can be located and destroyed *before* they release teliospores, thus disrupting the disease cycle.