The Plant Doctor's LANDSCAPE TIPS

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Photo 1: Fire Blight of Bradford pear exhibits a localized shoot wilt caused by a bacterium.

Photo 2: Many of the infectious plant disease wilts exhibit vascular discoloration of the vascular system of plants. To ascertain that this is an abnormal discoloration, comparisons can be made with a healthy plant. This sample is from a smoke tree (Cotinus) infected with Verticillium.

Photo 3: Insects may cause wilts in plants. In this example, the serpentine tunneling by Emerald Ash Borer larvae has disrupted the vascular system of the plant, ultimately inhibiting the uptake of vital water and nutrients.

Photo 4: On this ash tree, the epicormic shoots are wilting due to abundant tunneling of EAB larvae beneath the bark.

UNDERSTANDING PLANT WILTS

INTRODUCTION:

When we discuss wilts in the plant world, we usually refer to infectious diseases, such as Verticillium Wilt and Dutch Elm Disease. There are, however, many other problems and causal agents that may initiate wilt symptoms in plants. Some of these other problems may be confused with the infectious plant wilts. Other diseases, such as root rots, cankers, insect injuries and physical problems, may cause plants to wilt. This article will provide a brief summary of some of the problems that may cause our plants to wilt, decline and die.

INFECTIOUS PLANT WILTS:

Various diseases may be classified as the classical plant wilts. Examples of these include Dutch Elm Disease (DED), Verticillium Wilt, Oak Wilt, Fire Blight, Fusarium Wilt and Pine Wilt. With infectious wilts, an infectious agent typically invades the vascular tissues of a plant. The infectious agent, called a pathogen, may become generally systemic within the plant or may be locally systemic. DED, Verticillium wilt, Oak wilt and Fusarium wilt are caused by fungi. Pine wilt is caused by a nematode, which are small worms that live in the soil or within plants. With the above mentioned fungal and nematode wilts, the pathogens become generally systemic within the plant. The plant wilts because of physical plugging by increasing populations of the pathogen or by physiological changes in the plant induced by the pathogen. Fire Blight is caused by a bacterium that is usually locally systemic, but may also cause the demise of other plant tissues that result in a "fire-blighted" appearance (Photo 1). Other bacterial wilts, such as geranium bacterial wilt, are characterized by extensive systemic activity of the pathogen throughout the plant. Many of these wilts can be diagnosed by searching for vascular discoloration (Photo 2).

INSECT WILTS:

Insects may induce wilts in plants by disrupting the vascular system of plants or by causing such severe stresses from their feeding habits that the infested plant may wilt. The Emerald Ash Borer (EAB) is a prime example of destruction of the ash tree's vascular system. As the destructive form of the insect, the larvae feed in the cambial tissues, disrupting the flow of water and nutrients (Photos 3 & 4). Symptoms of EAB larval feeding include serpentine tunneling, bark splits, wilt, decline and eventual death of the ash tree. With other insects, such as scale insects (Photo 5) and aphids, the extensive feeding injury may cause physical injury to plants but may also result in the loss of plant fluids that eventually result in plant wilts and decline. With other insects, the larval or adult forms may feed on the roots, thereby inhibiting the uptake of moisture that may ultimately lead to wilt, decline and death of the plant.

CHEMICAL WILTS:

Various chemicals including herbicides can induce wilt symptoms in plants (Photo 6). Herbicides are designed to kill plants by a variety of modes of actions. Some herbicides cause physiological disorders that result in wilted appearances. Other herbicides induce growth regulator responses that may cause foliage to appear wilted. Herbicide injury in plants may be difficult to discern and may involve some intricate investigative work.

CANKER WILTS:

Cankers are typically caused by plant pathogens but may also be caused by other entities. Cankers usually occur on twigs, branches and stems/trunks of plants. The most common plant pathogens that cause cankers are fungi. Some examples of fungal cankers include those caused by species of fungi in the genera Cytospora, Phomopsis and Nectria. These canker fungi cause wilt symptoms in plants because the vascular area where the canker forms is compromised; consequently, the transfer of vital water to the extremities of the plant beyond the canker does not occur (Photo 7). Many cankers are often visible to the eye; others may have to be exposed through tissue sectioning.

Photo 5: In this example, so many euonymus scales have infested this shrub that wilt and decline symptoms are likely to follow. The piercing-sucking mouth-parts of abundant scale insects are literally "sapping" the health of the plant.

Photo 6: Herbicide drift has caused the apparent wilt symptoms on this shrub in the landscape.

Photo 7: The brown areas of the cambium in this photo were caused by Phomopsis occulta, the cause of Phomopsis canker of spruce. As the cankers expand to girdle the branch, the shoots and foliage will wilt and die.

ROOT ROT WILTS:

Root rots of various plants may be caused by pathogens. Phytophtora is one pathogen that causes root rot that results in wilt of plants, for example, rhododendron (Photo 8). Because roots are rotted, the plant is incapable of taking up moisture and elemental nutrients. Root rots may be diagnosed by examining the roots (Photo 9). Gentle pulling on rotted roots will often result in a loose cortex and visible stele if root rots are the culprit.

URBAN SALT WILTS:

Perhaps more appropriately included in the chemical wilts, the urban salt issue is a very serious problem for plants and trees in landscapes. Deicing salt usually accumulates in the soil and water runoff during the winter and spring. Often, deicing salts end up in ponds and lakes, which are subsequently used for irrigation. The excess accumulation of deicing salts in the vicinity of plant roots may cause them to rot. In addition, salts in the root vicinity may cause osmotic imbalances between the root and surrounding soil and make it more difficult for the plant to take up vital moisture. Wilt may result. With suspicious cases of "salt wilt," the soil and/or irrigation water should be tested as soon as possible with a solubridge.

MOISTURE WILTS:

Obviously, one of the most common forms of wilt is caused by the lack of water. Drought induced by insufficient precipitation is perhaps the most usual form of wilt. Many people may not understand that too much soil moisture may also induce wilt (Photo 10). Too much soil moisture drives out the oxygen that is necessary for moisture uptake by roots. Too much soil moisture may also eventually lead to root rots, further complicating the issue of plant health and wilt.

SUMMARY:

Plant wilts may be caused by a variety of factors. It is inaccurate to assume all wilts are caused by infectious diseases. Differentiating among the various causes of plant wilts can be challenging. A variety of tools, observations and the gathering of information may assist with diagnosis of the causal factor(s). ■

For more information, please feel free to email me 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.

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Photo 8: This Rhododendron has wilted and died due to Phytophthora root and stem rot.

Photo 9: Root rots can be determined to some extent in the field by gently pulling on roots. The separation of the cortex from the stele often indicates root rot.

Photo 10: These Rhododendrons have no diseases that may have induced these wilt symptoms . . . yet. However, the plants are wilting from too much irrigation water, resulting in "wet wilt."