The Plant Doctor's LANDSCAPE TIPS

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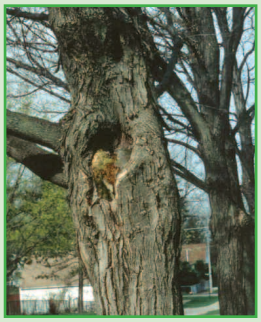

Photo 1: This large old tree developed a fungal canker and subsequent secondary heart rot from an old injury. It now represents a liability issue.

Photo 2: Several Nectria fungi (some introduced) are involved in Beech Bark Disease that results in cankers leading to unstable trees and "beech snap".

Photo 3: This is a classic target-patterned fungal canker. The disease is slow advancing with slight tree recovery year after year as evidenced by the callus growth rings. Eventually, the tree will be killed by the fungus.

Photo 4: In contrast to Photo 3, cankers caused by the fungus Phomopsis on spruce are rather inconspicuous (note small brown areas).

PLANT CANKERS

INTRODUCTION:

"Canker" is defined by Webster's Collegiate Dictionary as: a 1) an erosive spreading sore; 2) an area of necrosis in a plant; also, a plant disease characterized by cankers; b any of various disorders of animals marked by chronic inflammatory changes; 2 archaic: a caterpillar destructive to plants; 3 chiefly dial a: rust b: verdigris2 4: a source of corruption or debasement, etc. In the case of humans and animals, examples of cankers include cold sores caused by the herpes virus, cuts and bruises. With regards to cankers in plants, particularly in the classical sense, cankers are most often caused by plant pathogens. These plant pathogens include bacteria, fungi, phytoplasmas and viruses. Fungi cause the majority of the plant initiated cankers. Other cankers may be caused by human activity, weather, insects and animals.

Used loosely, canker may be defined as any plant abnormality that begins superficially as a wound or sore. Hence, for the purposes of this article, I will define canker loosely as any plant abnormality that resembles what appears to be an erosive spreading sore. These cankers, regardless of causal source, may be mistaken for one another. The importance of plant cankers to plant health may cover the entire gamut. Cankers may be temporary, superficial irregularities that may heal and cause no long term lasting effects. However, other cankers may spread and eventually kill plants, leading to structural failure and liability issues (Photos 1 & 2).

TYPES OF PLANT CANKERS:

Cankers Caused by Plant Pathogens: Plant pathogens are infectious agents that cause plant diseases. Plant disease pathogens are generally microscopic organisms. Fungi cause the greatest number of plant diseases, including cankers. Cankers caused by fungi tend to be slow growing, taking years to advance sufficiently to kill a tree. However, others may be quite aggressive. A classical canker disease fungus is the genus Nectria (Photo 3). Nectria, like many other fungi, may create a target pattern as the fungus advances slowly, followed by simultaneous plant healing. Other fungal cankers are not as obvious; for example, Cytospora canker of spruce and Phomopsis canker of spruce are far less visible (Photo 4); their initial manifestation may only be exhibited as resin secretions. On herbaceous plants, the canker may advance rather quickly (Photo 5). For most plant pathogenic cankers, infection often occurs through natural openings (lenticels, etc.) or through wounds created by other causal factors. One of the major causes of cankers is improper pruning. Pruning too close or leaving too much of a stub may predispose or allow plant pathogens get an introduction into plants (Photo 6). Pruning at the wrong time of year may increase the chances of canker formation; for example, the spore production for many fungi may reach their peak during the fall season and infection may be more likely to occur at this time. Pruning during conducive weather conditions, especially high moisture periods, may also result in a greater chance of infection by canker pathogens.

Bacteria may also cause cankers. In the example of fire blight, caused by an Erwinia bacterium, cankers frequently develop around lateral branch spurs (Photo 7). These cankers serve as overwintering areas for the bacterium.

Photo 5: The canker on the stem of this chrysanthemum was caused by the soilborne fungus Rhizoctonia.

Photo 6: Too close pruning resulted in invasion of the pruning wounds by a fungus, which is now inducing cankers over this entire tree. Note the orange-red reproductive structures of the fungus.

Photo 7: These cankers around branch spurs on apple were caused by the fire blight bacterium, Erwinia amylovora. These cankers enable the bacterium to survive overwinter.

An example of a virus induced canker is Impatiens Necrotic Spot Virus (INSV) (Photo 8). INSV is an unusual virus because it causes a very diverse group of symptoms on a very broad host range of herbaceous plants. Most viruses cause the classical mosaic and mottling symptoms in foliage and stems. INSV may cause stem cankers and even kill plants outright.

Cankers caused by Physical Injuries: Cankers may be caused by physical injuries; these injuries may be caused by human activity (Photo 9) such as improper pruning or transplant injury. In other situation, weather issues may cause cankers on plants; examples include cold temperature injury (Photo 10), lightning injury or hail injury (Photo 11).
In some cases, these physical injuries may heal naturally on their own or be invaded by opportunistic pathogens (Photo 6).

Cankers caused by Insects and Animals: Other types of physical injuries are those caused by living creatures other than pathogens. Examples of insect injures that may result in cankers include any of the borers such as Emerald Ash Borer (Photo 12) or Two-Lined Chestnut Borer and Black Vine Weevil injury to roots. If the insect population is low, plants may recover from these types of injuries. With the exotic, introduced EAB, the rapid rise in insect populations and subsequent attacks almost always overwhelm the plant's defenses and recovery capability.

Deer browsing and rodent injury (Photo 13) are typical examples of animal induced-cankers. Depending on the extent of feeding, plants may recover or be completely girdled by the animal. Often, symptoms of animal injury are not manifested until the following spring or summer.

MANAGEMENT OF PLANT CANKERS:

Diagnosis is the very first step to managing canker problems. Obviously, there is very little utility to apply an insecticide or fungicide to a canker caused by human physical activity or animal feeding, unless there is a significant chance of invasion by secondary organisms. As with many other landscape problems, diagnosis may be difficult. Collecting all of the available information may increase the accuracy of the diagnosis.

In general, plant disease cankers do not respond well to pesticide inputs. For example, cankers caused by Cytospora, Hypoxylon and Nectria do not appear to be affected significantly by fungicide treatments, largely because the fungus body is well protected within the plant tissues. There are exceptions; bacterial-induced infections (fire blight) and certain fungal induced infections (Phomopsis canker of spruce-Photo 4) may respond to antibiotics and fungicides, respectively. There is some promise that systemic injection of fungicides may help remediate fungal cankers, but in the opinion of the author, this area has not been well researched. Probably the most important procedure to help correct most infectious (pathogen caused) cankers is pruning out the affected plant tissues, being sure to adopt sterile pruning techniques to prevent further spread of the disease organism to new wounds created by pruning injury.

For weather-induced cankers, most will heal naturally just fine. With rodents and large animal, allowing the injuries to heal naturally is probably the best advice. Preventing additional damage in succeeding season with repellents or barriers should minimize recurrence of the damage.

Many cankers caused by insects will usually respond to insecticide inputs. Such examples, as introduced above, include the EAB and Black Vine Weevil. For the greatest impact in reducing cankers by insects, insecticides must be administered properly to exhibit the most efficacy against certain susceptible life cycle stages of the insect.

For most canker problems, regardless of the causal factor, maintaining proper plant health care and vigor with sufficient water and nutrition (not excessive) should help plants to fight off and recover from canker issues.

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 13: This Rhododendron is being attacked by rodents (probably squirrels) year after year. Note new light colored cankers and older dark colored cankers that have tried to heal. This plant will probably succumb to death by girdling.

Photo 8: Impatiens Necrotic Spot Virus (INSV) causes a wide variety of symptoms on plants. On these New Guinea impatiens, the virus is causing leaf spots and stem cankers, ultimately resulting in death of the plants.

Photo 9: This small oak tree has the unfortunate luck of growing in the path of a Frisbee course on a University campus. These cankers were caused by impact of Frisbees being thrown toward the base target (background).

Photo 10: Very low temperatures for many days during the winter resulted in explosive-sounding cracks of these sycamore trunks more than a decade ago. The resulting cankers healed quite nice naturally.

Photo 11: Hail impact on these branches created open wounds. If this tree was an apple, pear, crabapple or mountain ash, severe infections from the bacterium that causes fire blight might have resulted.

Photo12: This is a canker caused by the Emerald Ash Borer (EAB); note serpentine tunneling. The wound is healing nicely but is probably short-lived as repeated attacks by overwhelming swarms of the EAB will eventually kill the tree