Ornamental plant diseases and their control

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An ornamental plant may be defined as diseased when its normal life processes are disrupted. These disruptions are caused by both parasitic (living) and non-parasitic agents.

Parasitic agents of ornamentals are principally fungi but also include bacteria, mycoplasms and viruses.

Many parasitic plant diseases can be discussed according to the major part of the plant infected.

Leaf Diseases

Leaf Spot Diseases

Most deciduous ornamentals are subject to leaf diseases to some degree.

One of the most common types of disease is that caused by the leaf spot fungi. These fungi overwinter in the old leaves on the ground in the form of spores which become windborne during cool, wet spring weather. They produce diseased areas on the leaves which are more or less charateristic in size, shape and color for each species of fungus. Such descriptive common names as leaf blotch, tar spot and frog-eye leaf spot indicate the distinctive character of the injuries produced by many of these fungi. Some of the disease organisms are specific to a particular plant species; others may attack several species of trees or shrubs.

Leaf spot diseases are particularly noticeable when they cause premature leaf drop. However, partial defoliation is seldom serious unless it occurs two or more years in succession. These diseases do not directly kill trees but rather predispose them to other diseases or stresses which may lead to decline and death.

Most leaf diseases can be suppressed or prevented with fungicidal sprays applied at budbreak and repeated twice at 7-to-10-day intervals. In wet years, additional applications may be necessary. Raking and disposing of leaves to reduce the sources of inoculum is effective only if practiced on a wide area basis. The amount removed at a single site would not significantly reduce the potential infection since the fungal spores are windblow over great distances. Proper fertilization, pruning and watering during droughts will not decrease fungal infection but will help the plant recover more quickly and remain vigorous.

Rust Diseases

That class of diseases known as rusts should be included in a discussion of leaf diseases since many of the rust fungi cause serious leaf problems.

The characteristics of rust diseases which sets them apart from the others is that most of the fungi that causes them require two hosts to complete the life cycles. In other words, the spores produced by a rust fungus on one kind of tree cannot reinfect the same kind of tree. Instead they must infect a second kind of tree or some other plant which is usually from an entirely different genus. The fungus then prduces spores on the second host. These in turn cannot infect the second host but must return to the first kind of tree or plant to grow to complete the cycle. In some cases both hosts may be trees or other woody plants. In other cases one host is a tree and the other some herbaceous weed or crop plant. Both hosts of some rusts are herbaceous plants. Some of the serious diseases of branches as well as leaves of trees are caused by rust fungi. The cedar-apple rust, which is a common disease of apple trees and related ornamental species, may be considered as typical of the rust disease.

The most effective preventative measure for rust diseases would be to destroy the less desirable hosts within carrying distance of the spores. Unfortunately, this is seldom practical because of the long distance spores may travel. Properly timed fungicidal applications have successfully controlled most rust diseases on ornamentals.

Stem Disease

Canker Diseases

Canker diseases are common on many ornamental trees and shrubs. Some of the fungi which cause leaf

Photographic guide to ornamental tree diseases

Beginning with the top row and proceeding from left to right, the photographs illustrate Apple scab on crabapple; Cedar apple rust on hawthorn; and Cytospora canker on mountain-ash.

Proceeding from left to right on the bottom row: Verticillium wilt, showing streaking of sapwood; Wood rot and a shelf fungus associated with the wound; and Shoestring root rot showing rhizomorph fungus strands and whitish mycelial fan.

diseases also cause a killing-back of the twigs for some distance from the end. For example, the fungus which causes a typical leaf disease known as anthracnose of sycamore also causes a twig blight and canker stage on branches up to an inch in diameter. Other fungi causing similar twig symptoms may not directly affect the leaf tissue. Fungous injury on a trunk or branch becomes a canker when destruction of bark is complete and a wound results. In most cases, the cankered area is sunken and/or discolored and may be covered with the fruiting bodies of the fungus.

An individual canker may continue to grow until it girdles a large branch or a fair sized tree. Numerous small cankers on a branch or trunk may result in the same girdling effect in less time. The damage is caused by the fungus destroying the cambium and conducting tissues of the phloem and outer xylem or as a result of infection in the outdoor bark. This shuts off the supply of water and minerals to the top of the tree and prevents the downward flow of prepared food materials to the roots and other parts below the cankered area.

Cankers often go unnoticed until the infected stem dies and the foliage

turns brown. By this time, considerable damage may have occurred and corrective pruning will drastically alter the appearance of the plant.

Vigorous plants usually are not affected by cankers. Proper planting procedures and cultural practices should minimize or eliminate many problems caused by canker diseases.

Since many of the casual fungi invade plant tissues through breaks in the bark, care should be taken to avoid unnecessary injuries. In general, chemical control measures have been unsuccessful in the treatment of cankers, while bark tracing and excising small trunk or branch cankers has produced satisfactory results.

Wilt Disease

Wilting is due to a deficiency of water in the leaves and stems and can be caused by excess or insufficient water in the soil, injury to the root system or parasitic invasion of the vascular xylem which conducts water throughout the plant system.

The wilting caused by disease organisms is the result of phytotoxic substances produced by these pathogens and by the clogging of water-conducting vessels with bacterial or fungal growth. In some cases cells surrounding the vessels are stimulated to form tyloses, extensions of the neighboring cells that grow into the vessels or tracheids, blocking active water transport. The wilt-diseased branch, in cross section, shows a discolored area in the sapwood. This may be confined to one annual ring or may be found in several rings. Frequently the discoloration takes the form of a closed or broken ring in one annual layer. When the stem is split lengthwise or the bark peeled back, the diseased layers show as lengthwise streaks in the sapwood.

Because wilt diseases are systemic, they are usually more important, and harder to control than localized spots or cankers. Often the fungus is present near the base of a tree while the first symptom of flagging, wilting or yellowing of a branch occurs near the top.

Several vascular diseases caused by fungi seriously menace some of our important shade and ornamental trees. Verticillium wilt and Dutch elm disease are two of our most important diseases and both are caused by vascular wilt fungi. Some of the casual organisms of wilt are limited to one species or genus. Others may infect a number of species. Verticillium has been reported to infect over 50 different species of trees and shrubs.

Vascular wilt diseases are difficult to control after serious infection has occurred and preventative control has not been entirely successful. Removing and destroying infected trees will reduce the sources of inoculum. Where a disease organism such as verticillium can spread from plant debris remaining in the soil after an infected host is removed, susceptible trees and shrubs should not be replanted within the root zone of the diseased plant removed.

Many cases have been reported where maples infected with verticillium have "walled-off" the disease by laying down new layers of tissue after being properly fertilized.

Plants should be maintained in a vigorous condition through pruning, watering and fertilizing and sprayed, where applicable, to control disease-carrying vectors.

Wood Rot Diseases

The wood rots may be divided into those which infect the heartwood and those which infect sapwood. The distinction between the two is not always clear. Some of the fungi which cause decay of sapwood are limited to the older, non-living layers. Others may attack the living outer layers which are actively engaged in water conduction.

Infection takes place by the germination of a spore, this spore having been produced in a fruiting body which protruded from the surface of another diseased area. These fruiting bodies are usually of the bracket type, commonly called conks, and are among the most prominent of fungous growths. The under sides of these fruiting bodies are divided into a great many pores or have other types of openings on the inner walls from which the spores are produced.

After the spore germinates, the growing mycelium branches again and again. As it advances into the wood, the walls of the cells that lie in its path are dissolved or broken down and their substances used as food by the fungus. The wood changes in color and weight and becomes "punky" or "rotten". In addition to killing the living cells, wood rots greatly weaken the structural strength of trees and so make them more subject to being broken during storms.

The rot fungi enter through unprotected wounds — either pruning cuts or breaks due to mechanical or wind injury. Although there is some question concerning the value of wound dressings as a deterrent to fungal invasion, the addition of a fungicide which inhibits rot fungi would be useful in preventing wood rot diseases. Protecting ornamentals from mower damage and other unnecessary wounds would also prevent rot diseases.

Root Diseases

Although the casual fungi of root rots are usually present in the soil, most become aggressive on living plants only when unfavorable growing conditions exist.

The main factors contributing to such stress conditions are drought, altered drainage patterns, soil compaction, waterlogging of soil, landfill over roots, wounding of roots, nutrient deficiencies and insect defoliation.

To prevent root rot diseases, both soil disinfection and removal of diseased roots or portions of roots have been tried, but with indifferent success. The most effective prevention would be to maintain favorable growing conditions. One cannot overstress the importance of fertilization and proper watering.