

IMPORTANT TREE AND SHRUB DISEASES

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INTRODUCTION

The following list is by no means complete. Its intent is to help you become familiar with the types of disease and pest problems you may encounter when caring for trees and shrubs in the urban landscape. Some ideas concerning control of these important diseases are also given. An understanding of these generalities may aid you in avoiding plant problems.

This article will only discuss infectious diseases. Infectious plant diseases result from the fact that a pathogen is on or in the plant (the "host" plant). Pathogens are usually microorganisms. Many may be present almost constantly in the air or the soil around the host plants. They will not infect or cause plant disease unless the environment is favorable for the interaction to take place.

Understanding the basic concepts and make-up of infectious plant diseases will aid in understanding how the various disease control practices work. Mistakes will be made by merely memorizing the procedures given in crop-by-crop guides you may have read in the past.

RECOGNIZING INFECTIOUS DISEASES ON ORNAMENTALS

Recognizing infectious diseases on flower, leaf and stem parts of trees and shrubs is sometimes more difficult than recognizing insect or mite pests because the pathogens cannot be viewed directly. In many cases, infectious diseases cause non-specific symptoms similar to those caused by environmental problems. Even when specific symptoms are produced, you may be unfamiliar with what the pathogens and the damage they cause are supposed to look like!

Most often, the pathogens you are looking for will be fungi. A fungus often grows on a leaf or a stem similar to the way mold grows on bread or a rotted spot develops on a fruit or vegetable. Look for a circular spot of growth. Sometimes one circular spot overlaps another, giving more of a blotchy appearance. Look for concentric rings in the spot, which gives a bullseye appearance. Sometimes you can see evidence of the production of spores of these fungal pathogens on leaves of stems or plants. Inspect for fluffy, moldy growth on the surface of the plant, such as you see in powdery mildews. Also, look for black pinpoint-like pustules within the damaged tissue. These pustules are actually fungal formations in which many spores are produced and pushed to the outside. There are many different

fungal pathogens found on trees and shrubs. They produce different sizes, shapes and colors of lesions, spots, blights, or blemishes.

BACTERIAL DISEASES

Bacteria comprise a diverse group of single-celled microbes, which cause many diseases of ornamental crops. Common diseases of trees and shrubs include fireblight of crabapples, pears, and other Rosaceous plants; soft rot of cuttings, corms, bulbs, etc.; bacterial leaf spots of English ivy; or crown gall. A bacterial stem blockage disease has recently been diagnosed on many shade trees. The result of these infections is a scorch condition of the leaves. Not much is known about the spread or control of these bacterial scorch diseases.

Control of bacterial diseases is preventive, centered around cultural control measures. Always begin with clean plant material from a reliable source. If bacterial diseases have begun to cause trouble in the crop, be very careful to avoid spread. Do not splash water about during watering, space the plants and harden them by keeping them cool, dry and with reduced nitrogen fertilization. Resistant cultivars can be grown in many cases. For fireblight, promptly prune out diseased plant parts. Be sure to sterilize your pruner in alcohol (70%) between cuts. Avoid mechanical damage to plants to reduce crown gall infection. Fixed copper pesticides often are effective in slowing the spread and development of some bacterial diseases. Phyton 27, a new systemic copper pesticide is labeled for many bacterial diseases of trees and shrubs.

VIRUS DISEASES

Viruses are systemic plant disease-causing agents that live and multiply only within living cells of the host. They are most often spread by plant contact or by sucking insects such as aphids or leafhoppers. The symptoms they cause are diverse, depending on the virus. Generally, vein banding mosaic (a mixture of irregularly shaped dark and light green areas on the leaf), flecking, or ring spotting will show up on leaves. Sometimes, growth abnormalities will appear. This is often similar to damage caused by weed killers. Finally, viruses can cause stunting of plants. Rose mosaic is the most common virus disease you will see on trees and shrubs.

Control of virus diseases begins with the use of non-infested plants when available. If virus symptoms are noted in a crop you are growing, try to prevent spread by controlling insects and avoiding unnecessary handling of the plants. Discard any plants showing symptoms.

YELLOW S DISEASES

Several diseases of trees and shrubs are caused by an unusual type of microbe called a mycoplasma. Mycoplasmas are very tiny and are in between viruses and bacteria in structure and functions. Ash yellows is a typical mycoplasma caused plant disease. Another is the lethal yellowing disease of some palms. In these diseases, the plant develops growth abnormalities and a general yellowing. "Witches' brooms," a proliferation of buds and shoots coming from an older stem, often develop.

Mycoplasma diseases were once thought to be caused by viruses. Like some viruses, the causal agents are transmitted by leafhoppers or in infected cuttings. Therefore, control involves controlling insect vectors and using only non-infected material for planting. Also, weed control is important to eliminate reservoirs of insects and the pathogen. In palms, injection of older trees with antibiotics has been proven to be effective. Fortunately, mycoplasma diseases of trees and shrubs are relatively rare.

POWDERY MILDEWS

The powdery mildew-causing fungi are very host specific. Generally, each type of plant is unique in that the powdery mildew that infects it will not infect any other type of plant. Common hosts include roses, buckeye, lilac and evergreen euonymus. The white growth appearing on leaves and stems is the fungus growing on the surface of the tissue. Small structures, called haustoria, grow within the host cells, injuring them as they obtain food. Powdery mildew will not usually kill a plant. The unsightly fungus lesions, however, greatly reduce the quality of the plant.

Powdery mildews can be treated effectively with chemicals. They can be eradicated, thus "curing" the plants. The white lesions will remain, however, even though the fungus may be dead. For highly susceptible plants such as roses, a regular preventive spray program should be planned and carried out. Many fungicides are effective against powdery mildews, such as Cleary's 3336, Banner, Bayleton, Triforine, Duosan or Karathane. Environmental control of powdery mildews can also be quite successful. Reduce the high humidity that often occurs at night by spacing out plant or pruning away crowded, competing branches. Never water trees and shrubs late in the day or at night.

RUSTS

Like powdery mildews, rusts are also host specific. Rusts usually sporulate abundantly on leaf tissue. The masses of orange to dark red spores are what show on plants when they become diseased. Rusts are seen on many trees and shrubs, notably Washington or Lavalley hawthorns, junipers, crabapples and roses.

Rusts are, for the most part, cool weather diseases. Rust spores spread in air currents and in splashing water. They must have water to germinate and infect the leaf. Therefore, control involves keeping temperatures up, watering early in the day, spacing plants to allow more rapid drying and using protective fungicide sprays. Effective fungicides include Banner, Bayleton, Manzate, Dithane or Duosan.

LEAF SPOTTING AND BLIGHTING FUNGI

These fungi are spread either long distances by air or shorter distances by splashing water. There are many different ones on trees and shrubs. Most notable among this group are Entomosporium leaf spot on hawthorn, scab on crabapple and pyracantha, black spot of rose, and anthracnose on shade trees.

To control leaf spotting fungi, maintain plant vigor. Grow resistant cultivars. Space plants out or prune away crowded branches, especially when susceptible plants are growing in damp, dimly lighted places. Also, chemicals can be sprayed on the plants to prevent infections. Cleary's 3336, Banner, Bayleton, Triforine, Chipco 26019, Duosan, Manzate, Dithane or Daconil 2787 are effective. Check labels for legal uses.

STEM AND TWIG CANKERING FUNGI

Many fungal organisms such as *Phomopsis*, *Diplodia* and *Fusicoccum* cause stem or twig cankers. Most notable examples include twig blight on juniper, branch blight on Shumard oak and tip blight on red or Austrian pine. These pathogens sporulate primarily in the spring. The spores are spread by splashing water, insects and wind.

Fungicides currently available often do not effectively control these diseases. Cultural control involves maintaining plant vigor, protecting the plants from winter injury, pruning out diseased plant parts and growing resistant cultivars whenever possible. Try not to water overhead at night.

PLANT WILTING FUNGI

Verticillium is a fungus that causes wilting of a large number of woody ornamentals such as hard maples, redbud and Russian olive. The fungus invades injured roots, grows into the stem and plugs the vascular system of the plant. Along with wilting, it often causes a browning of the vascular system. It also has a resting structure to help it persist in soil.

Ceratocystis ulmi is the plant wilting fungus that causes Dutch elm disease. It is spread from plant to plant by root grafts or by being carried by elm bark beetles. Control programs involve preventive fungicide injections and insecticide sprays. For infected plants, prompt removal of the plant or the infected portion is the only solution.

Plant wilting fungi cannot be controlled effectively with chemicals. Control plant wilting fungi via sanitation, growing resistant plant types and maintenance of vigor.

PLANT DISEASE CONTROL

Effective disease control measures are aimed at "breaking" the environment-pathogen-host plant triangle. For example, the plant can be made less susceptible by breeding a resistant variety. The environment can be changed to favor growth of the host plant and less favorable for development, reproduction and spread of the disease-causing agent or pathogen. These basic methods of control can be divided into numerous practices to keep diseases in check.

The most important point in controlling a plant disease is choosing the best method for a given situation. The best method of control for one type of disease on a certain host may not be the best method for another disease on the same or a different plant. Also, the use of several control measures (integrated control) is often needed. For example, several cultural practices are often combined with a protective fungicide spray or dust program. The best disease control program is integrated disease prevention.

Infectious diseases are controlled by one of four basic methods outlined below;

1. Exclusion - Disease-causing organisms and agents can be excluded from certain areas or countries by quarantines and embargoes; inspecting and certification of seed and other plant materials; disinfection of plants, seeds and other propagative parts using heat or chemicals; and other methods used to prevent movement of pathogens into areas where the pathogen is absent or rare.

Plant diseases can be excluded by selecting planting sites unsuited to disease development. Examples of such exclusion practices include controlling storage and moisture conditions for vegetables, fruits, and nursery stock; crop rotation with unrelated planting only disease-free material. Sanitation in and around plant beds is an excellent disease exclusion measure as well. Disinfecting tools and equipment is most valuable if they have been used in pruning disease plants or around general plant debris.

2. Protection - Plants can be protected by uniform and timely applications of recommended, disease-control chemicals (fungicides, bactericides); by suggested cultural practices (e.g., proper spacing, time of planting, careful handling during planting, proper pruning, watering and fertilization); and by altering the air and soil environment to make it unfavorable for the pathogen to infect, develop, reproduce, or spread. When applying fungicides it is important to treat before infection takes place. Most fungicides are protectants and not eradicants (curatives).

3. Resistance - The ideal disease-control measure is the growing of resistant or immune varieties, cultivars or species. Unfortunately, there are no plants resistant to all diseases. The development of resistant or immune varieties is an ever-continuing process. The development of resistant varieties and cultivars is greatly complicated by pathogens having several to hundreds of physiological races. Most "resistant" cultivars or varieties ward off only one pathogen or race of pathogens.

4. Eradication - Plant pathogens can be eliminated (eradicated) by pesticides--such as soil fumigants--by heat treatment, or by removal and destruction of diseased plants or plant parts (pruning). These plants may be weeds or alternate host plants. Fungicides are often used as eradicants, but rarely work in this manner.