PLANT DISEASES

AN OVERVIEW

When your plants or lawn start to decline, either suddenly or over a period of time, it usually indicates that something is hampering their growth. For example, yellowing leaves are often an indication of nitrogen deficiency while high salts in the soil may cause leaf edges to turn brown. These are environmental or nutritional disorders. Improper watering (too much or too little water) may also hamper growth or cause foliage to yellow. Other causes of plant injury that fit in these categories are air pollution, wind, cold, heat, too much light or shade, and improperly used pesticides. Insects may also cause these problems. However, sometimes disease-causing micro-organisms are responsible for these problems. Some forms of fungi, bacteria, viruses, and nematodes (tiny worm-like creatures usually found in the soil) cause plant diseases. These are called "pathogens." Depending on the type, pathogens can spread by wind, in water, in soil, by contacting another plant, by insects, on seeds or cuttings, or on contaminated equipment. Three factors must be present for a disease to occur: 1) the pathogen; 2) a susceptible plant; 3) the proper environment for the pathogen to infect the plant. Disease will develop when all three factors are present (see Fig. 1). Disease will not occur when any of the three factors is absent.

Fig. 1. The Disease Triangle.

DISEASE

PATHOGEN

SUSCEPTIBLE PLANT

PROPER ENVIRONMENT

DISEASE SYMPTOMS

Disease symptoms can include wilting, rotting, and dead spots. When looking at a sick plant closely, you may actually see the pathogen. Examples are rust (raised reddish or brown spots on leaves or stems), spots (often black and powdery), or mycelium (fine whitish threads). The following are some common diseases you may encounter:

- **Powdery mildew.** A fungus causes this disease. While powdery mildew will rarely kill landscape plants, it can kill some vegetable crops.
  - Signs and symptoms: Leaves and sometimes stems and flowers of plants are covered with what looks like a gray or white powder. Sometimes tiny black dots can be seen if you look at the infected parts through a magnifying glass. Roses, sycamore trees, and some vegetable plants are particularly susceptible to powdery mildew. Control: Avoid overly wet soil or potting mix; use resistant varieties (for example, use tomato seeds or plants with "VEN" designations); use only clean potting mix; and avoid wounding the roots and bases of stems.

- **Fungi.** Fungi cause this disease. Wind and splashing water from rain or sprinklers spread rust. Rusts usually do not kill established landscape plants.
  - Signs and symptoms: Numerous dry, small bumps occur on the undersides of leaves. The bumps or pustules are usually red, bright orange, or yellow-brown. The tops of the leaves usually have brown spots. Rusts are common on roses, hawthorn, pine, and fescue grass.
  - Control: Rusts grow best in moist conditions, so avoid overhead watering that keeps leaves wet for a longer period of time. Some fungicides applied in the spring can be helpful. Pruning out infected parts will also reduce spread.

- **Cankers.** Cankers deter growth or germination. For example, yellowing leaves are often an indication that something is hampering the plant's ability to take up water and nutrients.
  - Signs and symptoms: Usually, bacteria or fungi plug the water-conducting tissue in the plant, or fungi or nematodes destroy the roots. Initially, you may think that the plant is not being watered enough because the leaves or stems droop. If the plant does not recover after a good soaking, you probably have a wilt disease. Many pathogens that cause wilt disease are in the soil.

- **Sooty mold.** This disease is not particularly harmful to plants but does make the plant look unappealing. In rare instances, sooty mold can be so extensive and thick that it blocks sunlight from reaching the leaves. Then, leaves may drop and the plant slowly declines.
  - Signs and symptoms: Leaves are covered with a dark gray or black fungus, giving them a "sooty" appearance.
  - Control: Wash leaves with a strong stream of water. Control insects with insecticidal soap.

- **Wilts.** Wilts are caused by bacteria or fungi. Control: Avoid overly wet soil. Wilts diseases often kill the plant, and there are often no effective treatments after the disease has set in.
  - Signs and symptoms: Usually, bacteria or fungi plug the water-conducting tissue in the plant, or fungi or nematodes destroy the roots. Initially, you may think that the plant is not being watered enough because the leaves or stems droop. If the plant does not recover after a good soaking, you probably have a wilt disease. Many pathogens that cause wilt disease are in the soil.
  - Control: Avoid overly wet soil or potting mix; use resistant varieties (for example, use tomato seeds or plants with "VEN" designations); use only clean potting mix; and avoid wounding the roots and bases of stems.

- **Rusts.** A number of pathogens cause wilts. Wilt diseases often kill the plant, and there are many different fungal species that cause rust damage if they are fertilized as soon as the disease is noticed.
  - Signs and symptoms: A fungus usually causes wilts. Wilt diseases often kill the plant, and there are often no effective treatments after the disease has set in.
  - Control: Rusts grow best in moist conditions, so avoid overhead watering that keeps leaves wet for a longer period of time. Some fungicides applied in the spring can be helpful. Pruning out infected parts will also reduce spread.

- **Damping off.** Damping off is often caused by fungi or bacteria. Control: Avoid overly wet soil. Damping off is often mistaken for insect damage.
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The author is Cheryl Wilen, Area IPM Advisor, University of California, Cooperative Extension, San Diego. Remember that the best strategy is to prevent diseases. It is easier to prevent than to correct or treat diseases. To prevent diseases, eliminate one or more of the three factors to break the disease triangle described earlier. Select plants that are environmentally well adapted for the intended planting site. Consider soil, light, temperature, wind, water, fertilizer, and insect and disease susceptibility. Use disease-resistant varieties wherever possible. Follow the recommended cultural practices for the selected plants to keep them growing in a healthy manner. It is also important that the problem is correctly diagnosed so that you can apply the best corrective treatment. For example, insects or a disease may cause brown patches in the lawn. Knowing whether it is an insect or disease is essential before considering treatment. Ask your nursery or garden center professional for additional information and assistance about controlling diseases.