

*It is important to remember that most insects are beneficial rather than destructive. They help with pollination or act as predators of more harmful species. Therefore, killing all insects without regard to their kind and function can actually be detrimental to tree health.*

Insects may be divided into three categories according to their method of feeding: chewing, sucking, and boring. Insects from each group have characteristic patterns of damage that will help you determine the culprit and the proper treatment. Always consult a tree care expert if you have any doubt about the nature of the insect problem or the proper treatment.

**Chewing insects** eat plant tissue such as leaves, flowers, buds, and twigs. Indications of damage by these insects is often seen by uneven or broken margins on the leaves, skeletonization of the leaves, and leaf mining. Chewing insects can be beetle adults or larvae, moth larvae (caterpillars), and many other groups of insects. The damage they cause (leaf notching, leaf mining, leaf skeletonizing, etc.) will help in identifying the pest insect.

**Sucking insects** insert their beak (proboscis) into the tissues of leaves, twigs, branches, flowers, or fruit and then feed on the plant's juices. Some examples of sucking insects are aphids, mealybugs, thrips, and leafhoppers. Damage caused by these pests is often indicated by discoloration, drooping, wilting, leaf spots (stippling), honeydew, or general lack of vigor in the affected plant.

**Boring insects.** All pests in this category spend time feeding somewhere beneath the bark of a tree as larvae. Some borers kill twigs and leaders when adults feed or when eggs hatch into larvae that bore into the stem and develop into adults. Other borers, known as bark beetles, mate at or near the bark surface, and adults lay eggs in tunnels beneath the bark.



## Treatment

The treatment method used for a particular insect or disease problem will depend on the species involved, the extent of the problem, and a variety of other factors specific to the situation and local regulations. Always consult a professional if you have any doubt about the nature of the problem or proper treatment.

This brochure is one in a series published by the International Society of Arboriculture as part of its Consumer Information Program. You may have additional interest in the following titles currently in the series:

- Avoiding Tree Damage During Construction
- Avoiding Tree and Utility Conflicts
- Benefits of Trees
- Buying High-Quality Trees
- Insect and Disease Problems
- Mature Tree Care
- New Tree Planting
- Plant Health Care
- Proper Mulching Techniques
- Pruning Young Trees
- Pruning Mature Trees
- Recognizing Tree Hazards
- Treatment of Trees Damaged by Construction
- Tree Selection
- Tree Values
- Trees and Turf
- Why Hire an Arborist?
- Why Topping Hurts Trees



Developed by the International Society of Arboriculture, a non-profit organization supporting tree care research around the world and dedicated to the care and preservation of shade and ornamental trees. For further information, contact: ISA, P.O. Box 3129, Champaign, IL 61826-3129, USA  
[www.isa-arbor.com](http://www.isa-arbor.com)

© 2001 International Society of Arboriculture

Printed in USA.

Recycled Paper  
Recyclable

# Insect & Disease Problems



**Insects and diseases can threaten tree health. As soon as you notice any abnormality in your tree's appearance, you should begin a careful examination of the problem. By identifying the specific symptoms of damage and understanding their causes, you may be able to diagnose the problem and select an appropriate treatment.**



## Stress

Basic elements that influence plant health include sufficient water, light, and a proper balance of nutrients. Too much or too little of any of these environmental conditions may cause plant stress.

**Environmental stress weakens plants and makes them more susceptible to insect and disease attack.**

Trees deal with environmental stresses, such as shading and competition for water and nutrients in their native environment, by adjusting their growth and development patterns to reflect the availability of the resources. Although trees are adapted to living in stressful conditions in nature, many times the stresses they experience in the landscape are more than they can handle and may make them more susceptible to insects and diseases.





## Diagnosis

Correct diagnosis of plant health problems requires a careful examination of the situation.

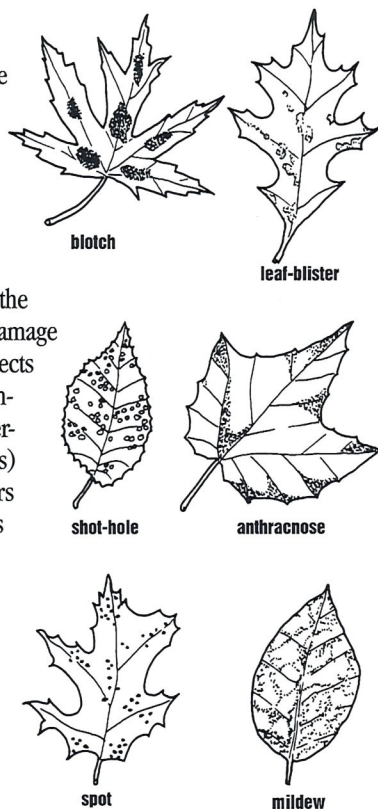
**1. Accurately identify the plant.** Because many insects and diseases are plant-specific, this information can quickly limit the number of suspected diseases and disorders.

**2. Look for a pattern of abnormality.** It may be helpful to compare the affected plant with other plants on the site, especially those of the same species. Differences in color or growth may present clues as to the source of the problem. Non-uniform damage patterns may indicate insects or diseases. Uniform damage over a large area (perhaps several plant species) usually indicates disorders caused by such factors as physical injury, poor drainage, or weather.

**3. Carefully examine the landscape.** The history of the property and adjacent land may reveal many problems. The number of species

affected may also help distinguish between infectious pathogens that are more plant-specific as compared to chemical or environmental factors that affect many different species. Most living pathogens take a relatively long time to spread throughout an area, so if a large percentage of plants become diseased virtually overnight, a pathogen is probably not involved.

**4. Examine the roots.** Note their color: brown or black roots may signal problems. Brown roots often indicate dry soil conditions or the presence of toxic chemicals. Black roots usually reflect overly wet soil or the presence of root-rotting organisms.



**5. Check the trunk and branches.** Examine the trunk thoroughly for wounds because they provide entrances for pathogens and wood-rotting organisms. Wounds can be caused by weather, fire, lawnmowers, and rodents, as well as a variety of other environmental and mechanical factors. Large defects may indicate a potential hazard.

**6. Note the position and appearance of affected leaves.** Dead leaves at the top of the tree are usually the result of environmental or mechanical root stress. Twisted or curled leaves may indicate viral infection, insect feeding, or exposure to herbicides. The size and color of the foliage may tell a great deal about the plant's condition. Make note of these and any other abnormalities.

## Diseases

Three things are required for a disease to develop:

- the presence of a pathogen (the disease-causing agent)
- plant susceptibility to that particular pathogen
- an environment suitable for disease development.

Plants vary in susceptibility to pathogens. Many disease-prevention programs focus on the use of pathogen-resistant plant varieties. Even if the pathogen is present and a susceptible plant host is available, the proper environmental conditions must be present over the correct period of time for the pathogen to infect the plant.

Diseases can be classified into two broad categories: those caused by infectious or living agents (diseases) and those caused by noninfectious or nonliving agents (disorders).

Examples of infectious agents include fungi, viruses, and bacteria. Noninfectious diseases, which account for 70 to 90 percent of all plant problems in urban areas, can be caused by such factors as nutrient deficiencies, temperature extremes, vandalism, pollutants, and fluctuations in moisture. Noninfectious disorders often produce symptoms similar to those caused by infectious diseases; therefore, it is essential to distinguish between the two in order to give proper treatment.

## Insects

Some insects can cause injury and damage to trees and shrubs. By defoliating trees or sucking their sap, insects can retard plant growth. By boring into the trunk and branches, they interfere with sap flow and weaken the tree structure. Insects may also carry some plant diseases. In many cases, however, the insect problem is secondary to problems brought on by a stress disorder or pathogen.

