



PLANT DISEASES

AN INTRODUCTION

A plant disease is broadly defined as any condition in which a plant is in some way different from a normal plant in either structure or function. The plant may be shorter, have more branches, or fewer leaves than normal. It differs in structure. Or it may wilt and die prematurely, or not produce flowers or fruit. It differs in function.

Plant diseases have had an important role in history. The holy fire of the Bible is believed to have been due to the ergot fungus growing in the heads of grain which made bread poisonous. The great famine in Ireland in the mid-1800's was caused by the destruction of the potato crop by late blight. The American chestnut has been virtually eliminated as a commercial tree in the United States by chestnut blight and the American elm is now similarly threatened by the Dutch elm disease.

What causes plant disease?

Plant diseases are generally divided into two groups based on their cause.

1. Non-parasitic diseases are induced by some genetic or environmental factor such as nutrient deficiencies, extreme cold or heat, toxic chemicals (air pollutants, weed killers, or too much fertilizer), mechanical injury, or lack of water. These diseases cannot be transmitted to healthy plants and their control depends solely on correcting the condition causing the disease.

2. Parasitic diseases are caused by living organisms which derive their food by growing as parasites upon other plants. The most common causes of parasitic diseases are fungi, bacteria, viruses, and nematodes. A few seed-producing plants such as the mistletoes can also cause plant diseases.

Fungi are plants that lack the green coloring (chlorophyll) found in seed-producing plants and therefore cannot manufacture their own food. There are between 50,000 and 100,000 different species of fungi of many types and sizes, but not all are harmful. Most are microscopic in size, but some, such as the mushrooms, are quite large. Fungi reproduce by spores.

Bacteria are very small, one-celled plants that reproduce by simple fission. They divide into two equal halves, each of which becomes a fully developed bacterium.

Viruses are so small that they cannot be seen with the ordinary microscope. Many of the viruses that cause plant diseases are transmitted from one plant to another by insects, usually aphids or leafhoppers. Viruses are also very serious problems in plants that are propagated by bulbs, roots, and cuttings because the virus is easily carried along in the propagating material.

Nematodes are small eel-shaped worms that reproduce by eggs. The number of eggs produced by one female nematode and the number of generations in a season depends largely on soil temperature. Therefore nematodes are usually more of a problem in warmer areas of the country. Most nematodes feed on the roots and lower stem of plants but a few attack the leaves and flowers.

The life cycles of all disease organisms are greatly influenced by environmental conditions. Temperature and moisture are probably the most important factors that affect the severity of plant diseases. They not only influence the activities of the disease organism but also affect the ease with which a plant becomes diseased and the way the disease develops.

How do we recognize plant diseases?

The fact that diseased plants are in some way different from normal plants indicates that there are ways of recognizing plant diseases. Symptoms are outward expressions of plant diseases and include three general types: overdevelopment of tissue, such as galls; underdevelopment of tissue, such as yellowing or dwarfing; and death of tissue, such as blights and cankers.

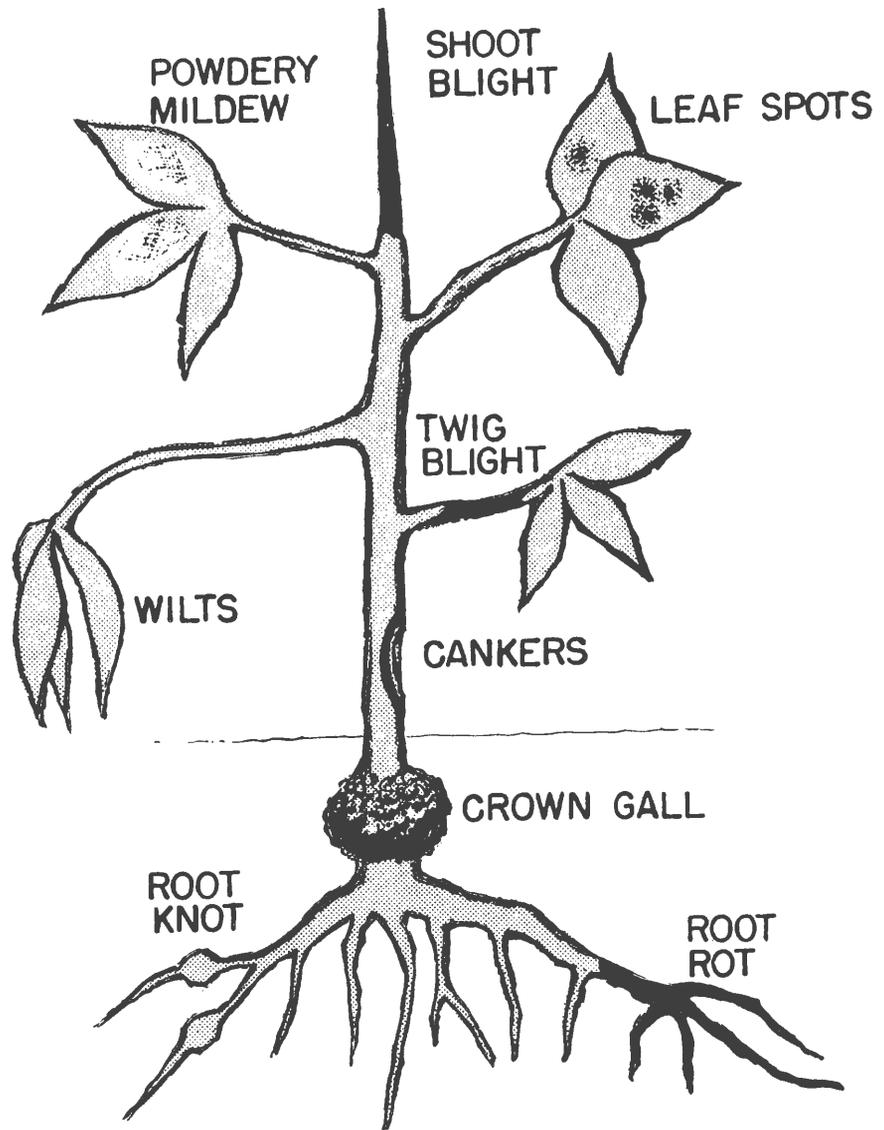
How are plant diseases identified?

The extremely large number of plant diseases (about 50,000 in the United States) makes it impossible for any one person to be familiar with very many of them. However, there are certain facts that help in the identification of plant diseases. The most important fact is to know the name of the plant that is affected. This can be used to go through lists of known plant diseases to see if a similar condition has ever been reported on that plant.

How the disease developed is also important. If it occurred in a very short time (overnight) it is probably not a parasitic disease but is more likely due to some unfavorable environmental condition or chemical. How is the condition distributed in the planting? Is it general over the area or only in one or two spots? Parasitic diseases usually do not affect a large percentage of the plants in the early stages but start in one area and gradually spread to the other plants. And parasitic diseases usually do not affect several different kinds of plants in one area at one time, even though some disease organisms can attack many different plants. Knowing the past history of the planting and what chemicals have been applied may help identify a problem.

A knowledge of the growing requirements and habits of the affected plant also helps to understand certain conditions. There is often a tendency for gardeners to immediately suspect a disease when a leaf turns yellow or brown. But it may just be a normal response. Even evergreens lose their leaves eventually.

Plant diseases are frequently given their common names based on the plant part affected; by the way the plant is affected, or by the cause of the disease.



How are plant diseases controlled?

The key to controlling parasitic diseases is to introduce an obstacle into the life cycle of the disease organism. This obstacle may be the use of disease resistant plants on which the disease organism cannot grow. It may be to create environmental conditions that are unfavorable for disease development, or it may involve placing a protective chemical over the surface of the plant.

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