

PLANT DISEASE CONTROL

Almost all control methods aim to prevent plant diseases rather than cure them after they have become diseased. The five basic principles of plant disease control are exclusion, avoidance, eradication, protection, and resistance.

Exclusion

As long as pathogens and host plants can be kept apart, disease will not develop. Many potentially-susceptible plants are grown in areas of the world still free of certain diseases. When plant pathogens are introduced into a new area, they can cause much more catastrophic epidemics than do the native pathogens. Host plants that evolve in the absence of a pathogen have no opportunity to develop resistance to the pathogen and are extremely vulnerable to attack.

The Dutch Elm fungus evolved in Europe where it causes little damage to European elms. However, this fungus devastated American elms when it was imported to the United States. Other devastating diseases that resulted from introduction of a pathogen from abroad include downy mildew of grapes in Europe and bacterial canker of citrus, chestnut blight, and soybean cyst nematode in the United States.

Quarantines, inspections, and disease-free certifications help to prevent the spread of pathogens into a particular country, state or geographic area.

Avoidance

If a disease does occur routinely in an area, there may be ways to avoid disease development. Choice of planting site, time of planting, storage conditions, and wound avoidance are a few of these techniques. Phytophthora root rots can be avoided by not planting susceptible plants in heavy, poorly drained soils. Planting later in the year, when soils are drier and warmer, will prevent damping-off diseases that are common to many vegetables.

Wounding can provide entrances for pathogens or weaken plants so that they are less able to defend themselves. For example, the crown gall bacterium must enter raspberry, cherry, and many other host plants through wounds.

Eradication

When a plant or area is infected with a pathogen, eradication can eliminate or reduce the disease threat. Rotation, sanitation, eliminating the alternate host, heat treatment, and use of certain chemicals can reduce or eliminate diseases.

Removing plant debris (sanitation) is important in areas where pathogens may over winter. Once collected, dispose of the debris by burning, burying, or composting.

Protection

Protection involves treating a healthy plant before it becomes diseased. There are both chemical and biological means of protection.

Chemical protection is one of the most widely used means of control. Some fungicides (such as copper and sulfur products) are allowed for use under several "organic" growing guidelines. Knowledge of the disease cycle and host susceptibility is needed to obtain good control using fungicides. Proper timing, coverage, and selection of fungicides also are needed.

Interest in using biological organisms to control diseases has increased in recent years. With biological control, one organism is used to attack or inhibit the activity of another organism.

Resistance

Plants may be susceptible, tolerant, or resistant to various pathogens. The term **susceptible** indicates that the plant readily becomes diseased if the factors of environment, time and pathogen are favorable. The term **tolerant** implies that the plant may become diseased but little damage occurs.

Resistant plants do not become diseased readily unless environmental conditions are extremely favorable to the pathogen.