**General Characteristics**

The common characteristic of abiotic, i.e., noninfectious

diseases of plants, is that they are caused by the lack or

excess of something that supports life. Noninfectious

diseases occur in the absence of pathogens and cannot,

therefore, be transmitted from diseased to healthy

plants. Noninfectious diseases may affect plants in all

stages of their lives (e.g., seed, seedling, mature plant,

or fruit), and they may cause damage in the field, in

storage, or at the market. The symptoms caused by noninfectious

diseases vary in kind and severity with the

particular environmental factor involved and with the

degree of deviation of this factor from its normal. Symptoms

may range from slight to severe, and affected

plants may even die.

**Diagnosis**

The diagnosis of noninfectious diseases is sometimes

made easy by the presence of characteristic symptoms

known to be caused by the lack or excess of a particular

factor on the plant (Fig. 10-1). At other times, diagnosis

can be arrived at by carefully examining and

analyzing several factors: the weather conditions prevailing

before and during the appearance of the disease;

recent changes in the atmospheric and soil contaminants

at or near the area where the plants are growing; and

the cultural practices, or possible accidents in the course

of these practices, preceding the appearance of the

disease. Often, however, the symptoms of several noninfectious

diseases are too indistinct and closely resemble

those caused by several viruses, mollicutes, and

many root pathogens. The diagnosis of such noninfectious

diseases then becomes a great deal more complicated.

One must obtain proof of absence from the plant

of any of the pathogens that could cause the disease, and

one must reproduce the disease on healthy plants after

subjecting them to conditions similar to those thought

of as the cause of the disease. To distinguish further

among environmental factors causing similar symptoms,

the investigator must cure the diseased plants, if possible,

by growing them under conditions in which the

degree or the amount of the suspected environmental

factor involved has been adjusted to normal.

**Control**

Noninfectious plant diseases can be controlled by ensuring

that plants are not exposed to the extreme environmental

conditions responsible for such diseases or by

supplying the plants with protection or substances that

would bring these conditions to levels favorable for

plant growth.

TEMPERATURE EFFECTS

Plants normally grow at a temperature range from 1 to

40°C, with most kinds of plants growing best between

15 and 30°C. Perennial plants and dormant organs (e.g.,

seeds and corms) of annual plants may survive temperatures

considerably below or above the normal temperature

range of 1 to 40°C. The young, growing tissues of

most plants, however, and the entire growth of many

annual plants are usually quite sensitive to temperatures

near or beyond the extremes of this range.

The minimum and maximum temperatures at which

plants can still produce normal growth vary greatly with

the plant species and with the stage of growth the plant

is in during the low or high temperatures. Thus, tomato,

citrus, and other tropical plants grow best at high temperatures

and are injured severely when the temperature

drops to near or below freezing. However, plants such

as cabbage, winter wheat, alfalfa, and most perennials

of the temperate zone can withstand temperatures considerably

below freezing without any apparent ill effects.

Even the latter plants, however, are injured and finally

killed if the temperature drops too low.

A plant may also differ in its ability to withstand

extremes in temperature at different stages of its growth.

Thus, older, hardened plants are more resistant to low

temperatures than young seedlings. Also, different

tissues or organs on the same plant may vary greatly in

their sensitivity to the same low temperature. Buds are

more sensitive than twigs; flowers and newly formed

fruit are more sensitive than leaves; and so on.