NUTRITIONAL DEFICIENCIES IN PLANTS

Plants require several mineral elements for normal

growth. Some elements, such as nitrogen, phosphorus,

potassium, calcium, magnesium, and sulfur, needed in

relatively large amounts, are called major elements,

whereas others, such as iron, boron, manganese, zinc,

copper, molybdenum, and chlorine, needed in very small

amounts, are called trace or minor elements or micronutrients.

Both major and trace elements are essential to

the plant. When they are present in the plant in amounts

smaller than the minimum levels required for normal

plant growth, the plant becomes diseased and exhibits

various external and internal symptoms. The symptoms

may appear on any or all organs of the plant, including

leaves, stems, roots, flowers, fruits, and seeds.

The kinds of symptoms produced by deficiency of a

certain nutrient depend primarily on the functions of

that particular element in the plant. These functions

presumably are inhibited or interfered with when the

element is limiting. Certain symptoms are the same

when any of several elements are deficient, but other

diagnostic features usually accompany a deficiency of

a particular element. Numerous plant diseases occur

annually in most agricultural crops in many locations as

a result of reduced amounts or reduced availability of

one or more of the essential elements in the soils where

the plants are grown. The presence of lower than normal

amounts of most essential elements usually results in

merely a reduction in growth and yield. When the deficiency

is greater than a certain critical level, however,

the plants develop acute or chronic symptoms and may

even die. Some of the general deficiency symptoms

caused by each essential element, the possible functions

affected, and some examples of common deficiency disorders

are listed in Table 10-2 and are shown in Figs.

10-7 and 10-8.