AIR POLLUTION

The air at the earth’s surface consists primarily of nitrogen

and oxygen (78 and 21%, respectively). Much of

the remaining 1% is water vapor and carbon dioxide.

The activities of humans in generating energy, manufacturing

goods, and disposing of wastes result in the

release of a number of pollutants into the atmosphere

that may alter plant metabolism and induce disease. Air

pollution damage to plants, especially around certain

types of factories, has been recognized for about a

century. Its extent and importance, however, have

increased with continued industrialization and will,

apparently, increase further with the world’s increasing

population and urbanization.

**Air Pollutants and Kinds of Injury to Plants**

Almost all air pollutants causing plant injury are gases,

but some particulate matter or dusts may also affect

vegetation. Some gas contaminants, such as ethylene,

ammonia, and chlorine, exert their injurious effects over

limited areas. Most frequently they affect plants or plant

products stored in poorly ventilated warehouses in

which the pollutants are produced by the plants themselves

(ethylene) or result from leaks in the cooling

system (ammonia).

More serious and widespread damage is caused to

plants in the field by chemicals such as ozone (Fig. 10-

8), sulfur dioxide, hydrogen fluoride, nitrogen dioxide,

peroxyacyl nitrates, and particulates. In many localities,

e.g., the Los Angeles basin, air pollutants spread into the

area surrounding the source(s) of pollution, become

trapped, and cause serious plant damage. More frequently,

most air pollutants are transported downwind

from the urban or industrial centers in which they are

produced and may be carried by wind to areas that are

several miles, often hundreds of miles and sometimes

thousands of miles, from the source. High concentrations

of or long exposure to these chemicals cause visible

and sometimes characteristic symptoms (such as necrosis)

on the affected plants. More important economically,

however, is the fact that even when plants are

exposed to dosages less than those that cause acute

damage, their growth and productivity may still be suppressed

by 5 to 10% because of interference by the pollutants

with the metabolism of the plant. Moreover,

prolonged exposure to air pollutants seems to weaken

plants and to predispose them to attack by insects, by

some pathogens, and by other environmental factors

such as low winter temperatures. The main pollutants,

their sources, and their effects on plants are given in

Table 10-1.