**Main Sources of Air Pollutants**

Some air pollutants, such as sulfur dioxide and hydrogen

fluoride, are produced as such directly from a

source, such as refineries, combustion of fuel, and ore

and fertilizer processing. Others, such as ozone and peroxyacyl

nitrates, are produced in the atmosphere as secondary

products of photochemical reactions involving

NO2, O2, hydrocarbons, and sunlight.

Automobile exhaust in the streets and highways and

exhausts of other internal combustion engines in factories

and in homes are probably the most important

sources of ozone and other phytotoxic pollutants. Thousands

of tons of incompletely burned hydrocarbons and

NO2 are released into the atmosphere daily by automobile

exhausts. In the presence of ultraviolet light from

the sun, this nitrogen dioxide reacts with air oxygen and

forms ozone and nitric oxide. The ozone may react with

nitric oxide to form the original compounds:

NO O O NO sunlight

2 + 2¨æææÆ 3 +

In the presence of unburned hydrocarbon radicals,

however, the nitric oxide reacts with these instead of

ozone, and therefore the ozone concentration builds up:

O

NO

O

3

3

+

[ + ]

Æ +

unburned hydrocarbons from automobiles, etc.

peroxyacyl nitrates

Ozone can also react with vapors of certain unsaturated

hydrocarbons, but the products of such reactions

(various organic peroxides) are also toxic to plants.

Normally, the noxious fumes produced by automobiles

and other engines are swept up by the warm air currents

from the earth’s surface rising into the cooler air above,

where the fumes are dissipated. During periods of calm,

stagnant weather, however, an inversion layer of warm

air is formed above the cooler air, which prevents the

upward dispersion of atmospheric pollutants. The pollutants

are then trapped near the ground, where, after

sufficient buildup, they may seriously damage living

organisms.

Peroxyacyl nitrate (PAN) injury has been observed

primarily around metropolitan areas where large

amounts of hydrocarbons are released into the air from

automobiles. The problem is especially serious in areas

such as Los Angeles and New Jersey, where the atmospheric

conditions are conducive to the formation of

inversion layers. Many different kinds of plants are

affected by PAN compounds over large geographical

areas surrounding the locus of PAN formation due to

diffusion or to dispersal of the pollutant by light air

currents.