ALABAMA COOPERATIVE Extension SYSTEM
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ALABAMA A&M AND AUBURN UNIVERSITIES

Plant Disease Notes

Ozone Damage to Plants

Ozone is probably the most important, plant-toxic air pollutant in the United States. Much of the ozone in the lower atmosphere is produced when sunlight reacts with exhaust gases from internal combustion engines.

Symptoms. Ozone is a very active form of oxygen that causes a variety of symptoms. Symptoms include tissue collapse, interveinal necrosis, and markings on the upper surface of leaves known as stipple (numerous tiny spots of yellow, light tan, red-brown, dark brown, red, black, or purple pigment), flecking (silver or bleached straw white spots), mottling (irregular blotches of green, light green, and yellow), yellowing, bronzing, or bleaching. Plant growth is often stunted. Flowering and bud formation can be depressed. Affected leaves of certain plants, such as citrus, grape, and tobacco, commonly wither and drop early.

Conifers frequently show a yellow to brown mottling and tipburn or a yellow to brown or orange-red flecking and banding of the needles. Susceptible white pines are stunted and yellowed.

The injury pattern in small grains and forage grasses generally occurs as a scattering of small, yellowish or white to tan flecks on one or both leaf surfaces. The flecks may later merge to form larger, bleached white to yellowish dead areas.

Ozone usually attacks nearly mature leaves first, progressing to younger and older leaves. Young plants are generally the most sensitive to ozone; mature plants are relatively resistant. Ozone-killed tissues are readily infected by certain fungi.

Persistence and Transmission. Ozone is brought down from the stratosphere by vertical winds produced during electrical storms. More importantly, it is produced when sunlight reacts with nitrogen oxides and hydrocarbons formed by refuse burning and the combustion of coal or petroleum fuels, especially the exhaust gases from internal-combustion engines. When oxidant levels in the air are high, more than 90 percent of the air is ozone. These levels are usually at their highest point in the afternoon and are relatively low at night.

Varieties of the same plant can differ greatly in their susceptibility to ozone damage. Some examples include bean, grape, oat, onion, petunia, pines, potato, spinach, squash, sweet corn, and tobacco. The extent of the injury depends on the plant species and the environmental conditions before and during

exposure. Ozone and sulfur dioxide can combine to cause plant injury. This mixture causes damage to plants before either of these pollutants alone would begin to cause damage.

Control. To control ozone damage, avoid planting highly sensitive plant species in an area prone to damage from the pollutant. A partial list of plants and their relative sensitivity to ozone is given:

Very Sensitive Plants. Abutilon, alder, alfalfa, apricot, ash (green and white), aspen, aster, avocado, barley, bean (green and Pinto), beet (table and sugar), begonia, bentgrass, birch, bluegrass (annual), box elder, bridal wreath, broccoli, bromegrass, Brussels sprout, carnation, carrot, catalpa, celery, chicory, chickweed, Chinese cabbage, chrysanthemum, citrus, clover (red), corn (sweet), crabapple, crabgrass, dahlia, dill, duckweed, eggplant, endive, fuchsia, gourds, grape, hemlock, honeylocust, hypericum, larch (European), lilac, linden, locust (black), maple (silver and sugar), marigold, mint, mimosa, muskmelon, oak (gambel and white), oat, onion, orchardgrass, parsley, parsnip, pea, peach, peanut, petunia, pine (ponderosa, scotch, and white), potato, privet, pumpkin, radish, rye, salvia, scallion, smartweed, snowberry, spinach, squash, strawberry, sweet potato, Swiss chard, sycamore, tobacco, tomato, tulip tree, turnip, verbena, walnut, wheat, and willow (weeping).

Somewhat Resistant Plants. Coleus, cotton, cucumber, dogwood, euonymus, geranium, gladiolus, impatiens, juniper (Pfitzer), kalanchoe, most maples, most oaks, pepper, poinsettia, tolmiea, and yew.

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For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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