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## GARDEN BAD GUYS – ABIOTIC DISORDERS

By Nanette Londeree, Marin Master Gardener

Plants, whether cultivated or wild, generally grow best when the soil provides them with adequate nutrients and moisture, sufficient light reaches their leaves, and the temperature stays within a "normal" range. However, like people, plants can get sick. Agents similar to those that cause disease in people can do the same to plants. A broad definition of plant disease is anything that damages plant health. Infectious disease requires a causal agent or pathogen, most commonly bacteria, fungi, nematodes, viruses, protozoa, and parasitic plants, resulting in a **biotic disease** – one that is produced by living organisms. **Abiotic diseases or disorders** are maladies that result from non-living factors. Some common abiotic disorders include:

**NUTRIENT DEFICIENCIES AND EXCESSES:** the absence or unavailability of an essential nutrient to a plant (chlorosis due to lack of adequate iron) or too much of a particular nutrient or mineral (leaf tip dieback from over fertilizing) is the most frequent cause of nutrient excess, but it can also result from animals urinating around or on a plant.

**TEMPERATURE EXTREMES:** Air temperatures that are either too high or low can damage plant tissue. High temperatures increase the plants rate of transpiration; if there is inadequate water to maintain the elevated rate, the plant will voluntarily let some of the leaf surfaces die. Injured plant tissues may appear as light to dark brown papery areas on leaf surfaces or wilting. Freezing temperatures cause the moisture in plant tissue to freeze then burst as it warms. Buds, flowers and shoots can curl, turn brown or black and die. On woody plants, freezing temperatures produces splits and cracks in trunks, branches and twigs providing entry sites for opportunistic pests and diseases.

**WATER EXTREMES:** Visible signs of too little water are wilting, discoloration of leaves and premature leaf drop. Available water may be marginally sufficient to keep the plant alive though it won't produce new growth, flowers or fruit. Too much water deprives roots of oxygen; as they die, the plant may show signs of chlorosis or have small, thin or dying foliage. Ultimately, the lack of air can kill the plant and produce anaerobic conditions in the soil detectable by an unpleasant, sour odor.

**LIGHT EXTREMES:** Bark, foliage, fruit and other parts of the plant can get sunburned from heat generated by too much sunlight during warm temperatures. In cooler conditions, excess light can produce chlorotic or faded foliage. Too little light can slow down the rate of seed germination and plant growth. As plants "stretch" for available light, the space between the nodes is elongated. Foliage can become pale or dark, larger and thinner, depending on the type of plant, or drop prematurely.

**HERBICIDE DAMAGE:** Exposure to herbicides produces cupped, curled, or chlorotic leaves, small leaves, or necrosis of the entire plant. The herbicide type and the dosage to the plant determine which symptoms appear and their severity. Injury from glyphosate (*Roundup*) is relatively common, and may not appear until after the season of application. If the dosage of the herbicide was not too high, the plant may outgrow the injury.

**MECHANICAL DAMAGE:** Plants can be torn, cut, crushed, chewed, sliced or punctured from wind, animals, lawn mowers and weed whackers, the errant gardener or a myriad of other possibilities. The nature and magnitude of the damage is relative to both the type of plant and the cause of the damage.

Prevention is the key for most abiotic disorders. While you can't control temperatures or rainy weather, you can make sure your plants have good drainage, appropriate levels of light, nutrients and water, are protected from pets or other destructive animals, herbicides and mechanical damage.