



Hot Spells and the Sun's Effect on Plants

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Are we in a hot spell, or what? Even some of our toughest landscape plants are showing signs of heat stress. Here are a few disorders that affect plants during hot summer months.

Water Deficit (water stress, drought, dehydration) - Deficits occur when water loss exceeds supply, that is when transpiration is greater than water uptake. Almost every aspect of plant growth and development can be affected by a water deficit. Symptoms range from slow growth (typical of a chronic deficit) to death of the whole plant (acute deficit).

Wilt is an early symptom of water deficit; leaves and shoots lose turgidity due to warm air temperatures and dry soil conditions. Some species may wilt during the hottest part of the day even when soil moisture is plentiful, then rehydrate in the evening. This is called **incipient wilt**.

If a water deficit continues, tissues may dehydrate to the point of becoming necrotic. **Leaf necrosis** may be expressed as a marginal burn, tip burn, or as irregular areas of dehydration in the leaf blade. Often rapid dehydration causes the leaves to turn reddish brown with distinct borders between hydrated and dehydrated tissue. In some species extensive leaf drop may occur. If an acute water deficit is severe, the whole plant may die.

Chronic water deficit causes slow growth or stops growth altogether. This symptom is frequently difficult to identify, however since the long-term observation of the species and the individual plant is needed. Comparing plants of similar ages in similar growing conditions is usually required to assess a growth rate decline.

Moderately severe prolonged water stress causes shoot and branch dieback and, in some cases, bark cracking and trunk bleeding. Chronically water stressed plants often have low pest resistance, and secondary injury from insects or pathogens is common in some species.

Aeration Deficit (Poor aeration, anoxia, oxygen deprivation, oxygen stress, wet feet) - Plant roots require an adequate supply of oxygen for growth and development. Root respiration is usually the first plant process to be restricted, followed by disruptions in metabolism, nutrient uptake, water absorption, and photosynthesis. Healthy roots appear white and turgid and the



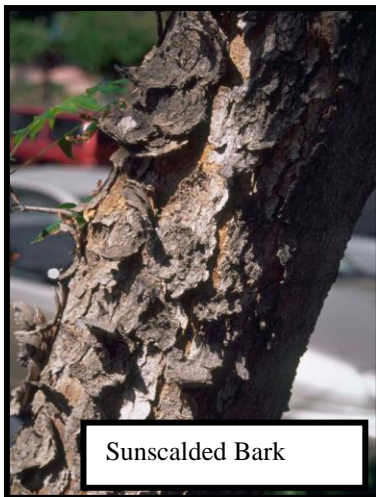
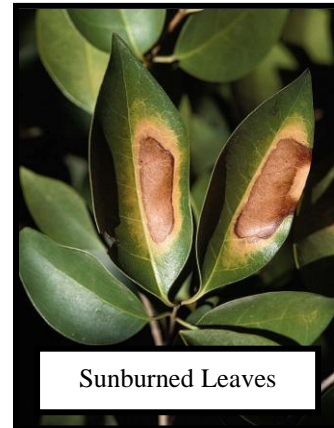
bark is firm and intact. Roots injured by an aeration deficit can appear discolored and water-soaked and bark can lift off easily.

An aeration deficit that persists over an extended period of weeks or months is considered chronic. Leaves become chlorotic and cankers or bleeding may occur. Typically older leaves are affected first, then younger leaves. Plants begin to look anemic, or “sick”. Leaf drop and canopy thinning is common.

Under anaerobic (no oxygen) conditions, soil and roots smell like rotten eggs because gas containing sulfur is produced. When the condition persists, the soil color may change to bluish gray or black.

Sunburn – Sunburn is injury to aboveground plant parts (leaves, bark, flowers, and fruit) caused by excessive exposure to solar radiation. Injury results when tissues become dehydrated after being heated beyond a critical limit. Injury from heat sources other than the sun is considered to be thermal injury.

Sunburn may cause leaf discoloration and necrosis. The epidermis may appear glazed, turning a silvery or reddish brown color. In advanced cases, distinctive necrotic areas develop on the leaf blade. Marginal necrosis may develop, usually starting at the leaf tip, where transpiration is highest, and progressing along the entire margin. The onset of symptoms is usually rapid.



Sunburned bark initially appears discolored (often reddish brown) and then becomes dry. Cracking and peeling is typical and damage is usually most severe on the south or southwest sides of branches and trunks.

Sunscald – Technically speaking, sunscald is damage to bark caused by rapid temperature fluctuations during the winter (believe it or not). Bark exposed to freezing temperatures at night can be injured when warmed by the sun to a critical level during the day. Sunburn and sunscald symptoms are similar.

These definitions were taken from “Abiotic Disorders of Landscape Plants: A Diagnostic Guide” published by University of California Ag and Natural Resources, Publication #3420.

July 12, 2012