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The Myth of Hot-Weather Watering

"Watering plants on a hot sunny day will scorch their leaves"

The Myth

As we enter the hottest months of the year, another bit of well-meaning advice rears its annual head. Magazine articles, books and web sites all warn against watering plants during the heat of the day. Those water drops that accumulate on the leaf surfaces act as tiny magnifying glasses, focusing the sun's energy into intense beams that burn leaves. Furthermore, we're told that since water efficiently conducts heat, wet leaf surfaces are more likely to burn than dry ones. This all sounds very plausible (it has the patina of physics, after all) and there is anecdotal evidence that seems to support a cause-and-effect relationship between midday watering and leaf dieback.

The Reality

This is one of those myths that refuses to die. Although most (but not all!) of the .edu web sites I checked dispel this myth, hundreds of other domains on the web keep the misinformation alive. If your plants are showing signs of water stress in the middle of the day, by all means you should water them! Postponing irrigation until the evening (not a good time to water anyway, as this can encourage fungal pathogens) or the following morning could damage your plants and open them up to opportunistic diseases.

There are many causes of leaf scorch, but irrigation with fresh water is certainly not one of them. Hundreds of scientific publications on crop plants, turf, woody shrubs and trees have examined foliar scorch, and not one of them has implicated midday irrigation as a causal agent. What does cause damage, however, is suboptimal plant-water relations, which can result in tip and marginal leaf scorch, shoot dieback, stunted growth, and leaf abscission. After drought, the most common source of these problems is salt, in particular salts containing sodium (Na) and/or chlorine (Cl).

Salt can enter a plant's microhabitat by spray from the ocean or other salt water bodies, or by runoff from road deicing salts. These are relatively localized occurrences and far more damage occurs with salts in soils or irrigation water. Some of these salts come from over-application of fertilizers, herbicides, and insecticides. Others are naturally found in irrigation water as it runs through particularly saline soils. This tends to be a more significant problem in arid climates. In urban areas, irrigation with recycled or gray water can add toxic levels of salt to the plant's environment.

Plants that are not adapted to dry or saline environments have a difficult time maintaining optimal water balance when that water contains salt. We all know the dangers of shipwreck survivors drinking seawater, and we know what happens when we put salt onto slugs in the garden. The dehydration and death you expect from these examples also occurs in plant tissues, and in particular those tissues that transpire the most water – the leaves. Salts can either reduce root function, and thus reduce water transport to the leaves, or they can accumulate in the leaves themselves. In either case, water loss occurs first at the tips and margins of the leaves and will lead to tip and marginal necrosis if not treated promptly.

Besides drought and salt, other causes of leaf scorch include wind stress, high temperatures, reflected light, and cold stress. All of these environmental stressors are directly linked to decreasing water availability in leaves. Poor root health, imperiled by soil compaction, flooding, or restricted space, will also induce leaf scorch. Lack of foliar potassium (the "K" in fertilizers) prevents leaves from regulating stomatal openings and leads to higher water loss. Urea, contained in some fertilizers and in urine, can

burn foliage and is a common cause of turf damage. Regardless of the cause, leaves deficient in water have been shown to be more susceptible to opportunistic pests and pathogens including mites and fungal leaf scorch.

To prevent leaf scorch, it's important to have environmental conditions conducive to optimal root health – adequate moisture, oxygen, space, temperature, and nutrients are part of a healthy root zone. Some studies have found additional nitrogen helps prevent leaf scorch (perhaps by increasing root growth and uptake capabilities). Secondly, it's crucial to watch foliage for signs of wilt. Once leaf tissues have passed the terminal wilt stage, no amount of water will save them. People that don't recognize the signs of terminal wilt and add water anyway might then associate their midday watering with the marginal and tip leaf burn that follows. Again, consider the plant's needs in terms of sun/shade requirements; a shade-loving plant in an area with high light exposure, reflected heat, wind, or temperature extremes is going to show leaf burn on a continuing basis.

The Bottom Line

- Wet foliage is not susceptible to sunburn
- Analyze site conditions to ensure optimal root and shoot health and prevent drought problems
- Any time plants exhibit drought stress symptoms is the time to water them
- Optimal watering time is in the early morning; watering during the day increases evaporative losses, and evening watering regimes can encourage establishment of some fungal pathogens
- Do not overuse fertilizers and pesticides, especially those containing sodium or chloride salts
- If using recycled or gray water, consider running the water through a filtering system before applying it to plants

For more information, please visit Dr. Chalker-Scott's web page at http://www.theinformedgardener.com.