

## Heat Stress Effects on Plants

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Release: Week of July 11

June was hotter and windier than average and plants are showing stress. Why have garden plants been growing so slow? Why are the edges of leaves on trees or shrubs turning brown? Why do the leaves of tomatoes roll up? Why did the new growth on spruce trees turn brown and droop?

These and other complaints have been common this year. After asking questions to exclude other causes, the answer is that its most likely due to stress caused by above average heat and high winds.

Hot, windy conditions at any time stress plants because of their effect on critical plant processes of photosynthesis, respiration and transpiration. Such conditions in June can be even harder on plants as growth is still tender and not hardened off.

We also had a cool May which further delayed hardening off. And there have been many days of above average temperatures and high winds for sustained stress. All of this on top of very dry soil conditions.

Plants are the only living thing that make their own food, such as sugars, through photosynthesis. The products of photosynthesis are converted into energy used for growth through respiration.

Transpiration is the movement of water into, through and out of plants. It cools plants, allows for water and nutrient uptake and distribution, allows carbon dioxide intake for photosynthesis, and much more.

Hot temperatures, especially above 90F, slows or stops photosynthesis. At the same time, respiration rapidly increases and surpasses photosynthesis.

When photosynthesis exceeds respiration, plants grow and store food. When respiration exceeds photosynthesis, growth slows and stored food is used. If plants have also been stressed by drought, incorrect care practices, or pest issues and are already low on stored food, the effects are amplified.

Transpiration is most efficient when there is a uniform and continuous supply of moisture. Hot, windy conditions increases the rate of transpiration leading to increased water loss from plants. The rate can be so high that roots, even in moist soil, are unable to replace it fast enough.

Now that we have a general sense of how hot, windy weather negatively affects plants, what can be done since we can't change the weather? The main thing is to avoid further stress.

I know I repeat myself in these articles but once again, provide adequate moisture without overwatering. Water to moisten the soil 4 to 6 inches deep for lawns, 6 to 8 inches deep for flowers and vegetables and 8 to 10 inches deep for trees and shrubs. Stick a screwdriver into the soil to determine depth. Don't assume your automatic irrigation system is doing the job of deep watering.

Next, shut off the irrigation system and do not water again until the upper two to three inches of soil are dry. This helps prevent overwatering which leads to low functioning roots. Plants will not readily take up water or nutrients if the soil is too wet as roots may be rotting or not have enough oxygen to function.

Correctly mulch plants to conserve soil moisture and maintain a cooler soil. Correct mulching is the use of organic mulch, not weed mats and rocks. The mulch should only be 2 to 4 inches deep and not piled against the plant stems.

Remember that fertilizer is not plant food. Only plants can produce their food. When plants are under stress, do not apply nitrogen which can burn roots in dry soil and force stressed plants to grow which will likely stress them further.