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COLUMNS

Campbell Vaughn: If you want healthy plants at the end of summer, make them work for water

Campbell Vaughn Augusta Chronicle

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Key Points AI-assisted summary

- High temperatures and lack of rainfall stress plants by increasing transpiration rates.
- Transpiration, the process of plants releasing water vapor, is crucial for plant cooling but can lead to dehydration in extreme heat.
- Continuously high nighttime temperatures exacerbate plant stress by preventing them from recovering from daytime heat.
- Supplemental watering and establishing robust root systems are key to helping plants survive extreme summer heat.

I got back from an amazing trip to Montana just in time to celebrate Independence Day with friends and family in the neighborhood pool.

The difference in temperature and humidity from Montana to Augusta was slightly different. And when I say slightly different, I mean going from the 70s in the day and 40s at night out west to the surface of the sun plus humidity here.

I set my irrigation to run some while I was away and scheduled someone to supplemental water some potted plants and birdbaths for me while I was gone, but I could really tell a big difference in the stress on plants from the brutal heat here while I was traveling.

Campbell Vaughn: Learn how dust from the Sahara ends up in the Amazon River and Walmart

I am a huge proponent of deeper watering and less frequent irrigation in our landscapes because we cause a lot more damage overwatering than underwatering. But my watering philosophy gets out of sorts when we aren't having afternoon thundershowers and temperatures reach into the 90s and approach 100 degrees. When these high temperatures occur, our plants can struggle to manage their cooling system, which is called transpiration.

Transpiration is the process by which moisture is carried from the plant's roots, all the way to small pores on the underside of leaves. The water then changes to vapor and is released into the atmosphere. This process is essentially evaporation of water from plant leaves. Studies have revealed that about 10% of the moisture found in the atmosphere is released by plants through transpiration. The remaining 90% of the water in our atmosphere is supplied by evaporation from oceans, seas, and other bodies of water (lakes, rivers, streams).

Plant transpiration is pretty much an invisible process. Since the water is evaporating from the leaf surfaces, there are no visible signs of sweating. During the growing season, a leaf will transpire many times more water than its own weight. An acre of corn gives off up to 4,000 gallons of water each day, and a large oak tree can transpire 40,000 gallons per year. The amount of water that plants transpire varies greatly geographically and over time.

There are a number of factors that determine transpiration rates. For instance, transpiration rates go up as the temperature increases during the growing season. Higher temperatures cause plant cells to open where water is released into the atmosphere, whereas colder temperatures cause the openings to close. Dryer air causes more rapid evaporation as does increased air movement through wind.

There is not much we can do to adjust the temperature, humidity and wind in the landscape, but we can help with the amount of water the plant has to transpire. Deep watering and watering less often make for deeper, healthier and more plant

roots. The more roots the plant has, the more water the plant's vascular systems can intake. But when the heat gets as hot as it has been this past week, plants can't transpire enough to regulate themselves.

The biggest issue isn't as much daytime heat as it is nighttime heat. If the nights don't cool down enough for the plant to catch up, the next day's high heat puts the plant further in jeopardy.

Nighttime heat is a big reason we can't grow plants from cooler climates very well. They are adapted to shut down transpiration at lower temperatures, so they essentially sweat themselves to death in our extreme heat.

When the plant begins to wilt from lack of water, it encounters two problems. The first is that the surface of the leaves isn't open enough to trap sunlight to photosynthesize. The next is even if the plant leaves aren't too wilted, they may not have enough water to mix with the chlorophyll produced in photosynthesis to produce the sugars needed to provide the nutrients the plant needs to survive. And this can also cause damage to the plant's DNA, cell membranes, proteins, and sugars.

We are in the South, and it is going to be hot. Supplemental water is a good way to help, but growing good root systems is even better. More roots, more water for the plant. Water deep and less often.

Make your roots work for water. They will thank you in the middle of the night on the hot days of summer.