



Healthy Soil-Heat Island Effect

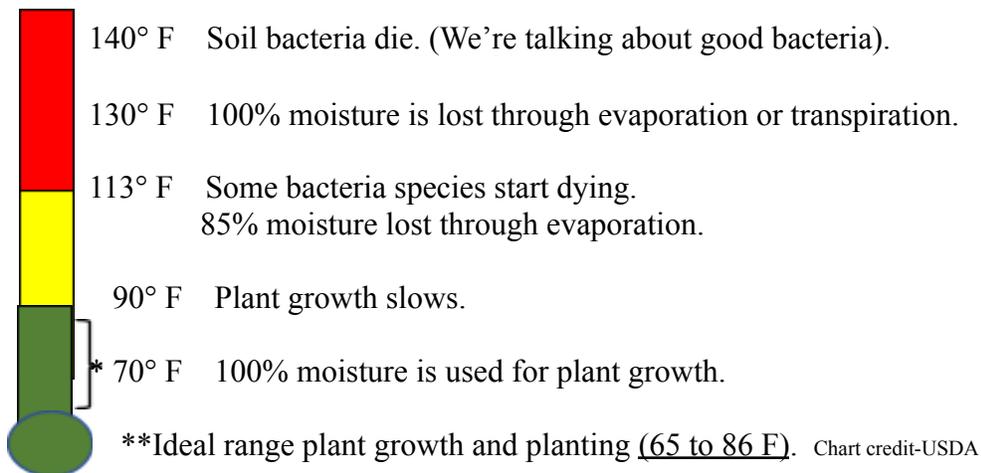
Heat Island Effect is a man-made phenomenon in which air temperatures and surface temperatures are higher in urban areas than in the surrounding rural settings.

A team from the Master Gardener’s Climate Change and Soils committee recently recorded temperatures of different surfaces in one neighborhood in Napa (see Surface Temperature Chart). Readings were taken on two different days, March 4th and June 21st. On June 21st, two recordings were done, one at 10:30am and the other at 3:30 pm. Of course, you remember that 104° day!

SURFACE TEMPERATURES			
	3/4/22	6/21/22	
AIR TEMPERATURE	10:30am	10:30am	3:30pm
	52°	84°	104°
1. Concrete (sidewalk)	■ 58°- 61.5°	▲ 110°	◆ 142°
2. Asphalt (street)	■ 62°- 64°	▲ 125°	◆ 155°
3. Plants	■ 65°	▲ 89°- 91°	◆ 105- 115°
4. Turf (grass)	■ 69°- 71°	▲ 93.5°	◆ 99.5°
5. Bare Dirt	■ 78°	▲ 119°	◆ 159°
6. Mulch	■ 81°	▲ 120°	◆ 154°
6a. Soil under mulch	→	▲ 96°	◆ 110°
7. Gravel (stones)	■ 82° large	▲ 122° lg.	◆ 140°
	■ 90° small	▲ 129° sm.	◆ 149°
8. Artificial Turf	■ 90.5°- 93°	▲ 143.5°	◆ 165°

Chart credit: UCMG Napa County Soils team

What happens to Soil Organic Matter (SOM)? Soil organic matter is what keeps soil alive and healthy, in other words, the living world below. A teaspoon of healthy soil contains millions of living organisms. This graphic from the USDA displays the crucial temperatures that expose your soil to potential “death”, in other words turning your soil into plain dirt. Read the chart from the bottom up!



What Can You Do?

1. Plant more trees that will protect against high winds, erosion, flooding, as well as keeping carbon in the ground and keeping groundwater clean. The big plus is the shade for our homes thereby reducing energy consumption.
2. Cover the ground with living plants to absorb CO₂ rather than reflect the sunlight. Given, turf (grass) is green and it is cool, and in many circumstances needed for pets and children. But an expanse of green lawn requires heavy watering to maintain it and contributes little to soil health because the roots are shallow. On the other hand, plants and shrubs provide abundant roots, creating healthy soil and sequestering carbon in the earth.
3. Where plants are not growing, try to cover the ground with organic mulch. In the readings, notice that the soil under the mulch is significantly cooler than the mulch itself. But be aware that all mulch is not created equal! Some dyed mulches may leach toxins into the soil and dark/black mulch heats up and can be detrimental to tender plants. Rock may seem like a good choice and in some cases may be appropriate, perhaps around cactus. But large areas covered with rocks/stones, in the sun will absorb and retain heat, later releasing it back into the atmosphere. Keep rocks/stones in shady areas under plants, trees or next to the house.
4. Use permeable hardscapes (including permeable pavers) instead of concrete and other solid surfaces. Rain is absorbed into the soil rather than running off into the gutters and streets and will not retain the heat like non-porous and darker surfaces.
5. Resist the urge to put down artificial turf. Not only is it hot to the touch, but it kills anything living in the soil underneath of it. There is truly nothing beneficial about it.
Notice it is the hottest reading on the Surface Temperature chart!

Author: Maureen Jett UCMG Napa County

If you want to learn more about Heat Islands, what can be done, and what's been implemented or being proposed in some cities to mitigate the horrible affects, check out these US government's websites:

Heat.gov (*National Integrated Heat Health Information System/ NIHHS*)

<https://www.heat.gov/pages/urban-heat-islands>

EPA <https://www.epa.gov/heatislands>

And for children: **NASA** has a website, *Climate Kids*, chockfull of great information and age-related activities:

<https://climatekids.nasa.gov/heat-islands/>

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