

The Importance of Mulch, Leaf Litter and Ground Cover

I know that every gardener and most other folks know the importance of mulch when growing anything from vegetables, to flowers, to shrubs. But you may not have stopped to think exactly why it is important. I have heard numerous people answer that question by saying it helps keep moisture in the ground. And indeed it does. But how?

Everyone certainly knows, even if they have not given it much thought, that water evaporates faster as the temperature increases—at least right up to the boiling point when the evaporation rate is very high. And, of course, we all know how much cooler it is in the shade.

I have heard and read numerous times about how much hotter bare ground is than ground under vegetation. But I thought it would be interesting to go out and make some measurements to see for myself. I have an accurate digital thermometer, and so one afternoon late in April when the sun was shining and the air temperature was 80 deg. I went out and made some measurements.

Here is a summary of what I found:

- In the shade under three different hardwoods (live oak, post oak and blackjack) I found the temperature of the soil (about ½-inch deep) under the leaf litter to be between 70 and 71 deg.
- In the shade under a large cedar (thin layer of cedar needles) I found the temperature to be between 73 and 78 deg.
- In bare ground measured in several places, all in the sun, I found from 99 to 114 deg., for an average of 106 deg.
- Under clumps of native bunch grasses in the sun, I found the temperature to be from 76 to 81 deg., with an average of 79.
- And under two different wildflowers in the sun, I found from 83 to 87 deg.

Based on the numbers I have seen reported by various speakers and writers, none of these results appear to be surprising.

To summarize the above, bare ground in the sun can be well over 100 deg. even when the air temperature is only 80 deg. And it was still April—what if it had been July! Under the leaves in the shade of a mature tree, the soil was over 30 deg. cooler than bare ground in the sun. Under clumps of native grasses, even in the sun, the soil is over 20 deg. cooler than bare ground, and under wildflowers it is only slightly warmer than under grass.

Why does all of this matter? Because the hotter the soil, the faster water in the soil will evaporate, and thus the less is available to the vegetation and the likelihood of any water staying in the soil to supply any local seeps or springs. Any vegetation, even dead vegetation, is better than no vegetation in terms of preserving the soil moisture, because at the very least, it helps shade the soil from the sun and lowers the

temperature of the soil. Not only that, but vegetation on or near the ground reduces the wind speed which also reduces the evaporation rate.

And soil moisture is essential to a healthy root system as well as the health and functioning of the microorganisms associated with plant roots. Furthermore, when the soil temperature begins to approach about 120 deg., some of the soil organisms begin to die, which in turn causes the above-ground vegetation to suffer.

Mulch obviously serves some of the same functions as natural leaf litter or living vegetation, which is why most all successful gardeners use mulch extensively. Obviously dark-colored mulch is not as good as light-colored in terms of keeping the soil temperature down, which is why black plastic sheeting is not as good as organic mulch. Organic mulch has the added benefit in that as it degrades into fine particles it can be incorporated into the soil where it becomes soil carbon which feeds microorganisms as well as help to hold moisture.

The very much cooler soil under mature trees with significant accumulated leaf litter explains the observation that after a stretch of dry months, the first areas to green up after a good rain are under the trees. The cooler temperature under the trees allowed for a higher moisture content before the rain and the grass was in better shape, so it could green up faster than grass in open areas with hotter soil temperatures.

Until next time...

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