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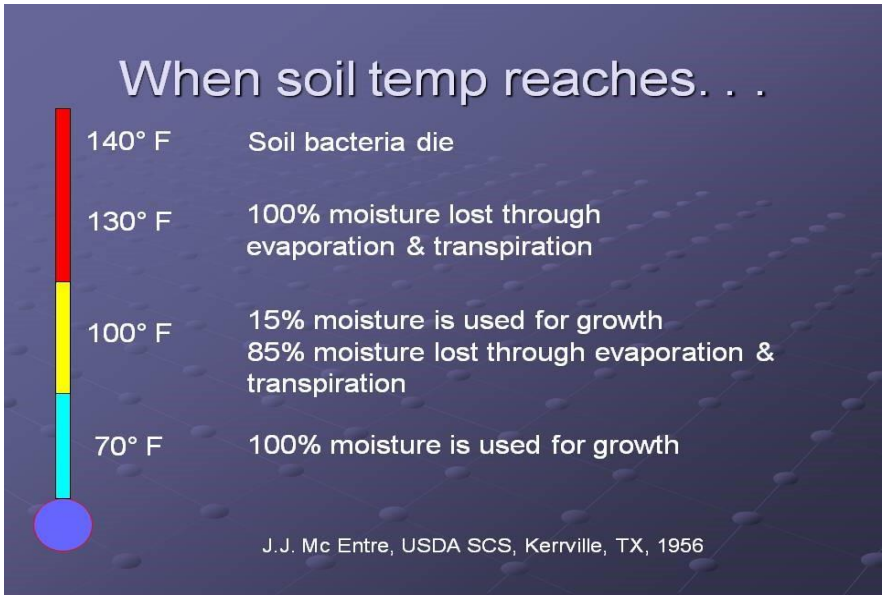
# NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

**W**e often talk about the importance of microbes in this column. The University of Massachusetts at Amherst has found that the ability of agricultural grasses to withstand drought is directly related to the health of their microbiology. This is the microbes living in the soil, mulch, roots, leaves, stems, etc. Applied and Environmental Microbiology 2021

Many gardeners I know have not had to water their lawns of flowerbeds since the drought of 2011. They all use the modern biological methods sometimes referred to as organic methods.

One of the ways to use less water in our lawn grasses is to top dress with a fine screened leaf mold compost. The compost not only provides beneficial microbes and nutrients, it also serves as a mulch. This mulch layer keeps the soil cooler. As one can see from the chart below this is an extremely important factor in using less water!

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When a gardener uses a good quality leaf mold compost, the microbes in it will break down clay and compaction creating soil structure, allowing air to go deeper into the soil. As air (oxygen) goes deeper into the soil, roots can go deeper (most roots require at least 6 ppm oxygen or they die). A study by the University of Florida several years ago found that St. Augustine grass has the biological (genetic) potential to grow over 12 feet deep. Hence, when it rains the water can soak deeper into the soil and be held in the pores and by the humus until plants need it (instead of running off).

The Agronomy Journal (June 2020) had an excellent article where they reviewed dozens of studies on the importance of organic matter and water holding capacity of soil. Increasing the OM (organic matter) from just 1% to 2% will store an additional 1.5 quarts of water per cubic foot of soil. They also found that a good compost can hold 20 times its weight in water (another benefit of top dressing with compost).

Note: Artificial fertilizers not only kill off beneficial microbes that prevent disease and cause plants to attract insect pests, they also destroy organic matter in the soil.

**R**esearchers at the Max Planck Institute for Plant Breeding Research have found that bacteria from the plant microbiota become adapted to their host species and preferentially colonize their native plant hosts. Nature Microbiology (2021)

This mechanism helps explain why when we dig up a plant in the wild, most tend to establish better when the soil they are growing it is included, and why their seeds germinate better.

Many years ago, when I was lecturing at the Catie Agricultural Research Institute in Costa Rica, I remember them sharing the efforts to establish a certain Pine Tree species from Honduras. Year after year they would plant seeds which would germinate but soon die.

Finally, they went to Honduras, and they dug up a small pine tree with soil and planted it near where the seeds were planted. The transplanted pine grew well and the seeds that germinated nearby also did well. However, the seeds planted farther away died. It was obvious that something in the soil was required for that specie of pine tree to grow, but they did not know what it was at the time.

Today we know that some of the microbes had become adapted to that species of pine and were required for the pine to grow as they had evolved together. This is similar to how the Monarch butterfly caterpillars evolved to eat only milkweeds.

For gardeners, if you have a plant that is struggling and see one of the same species in a neighbor's yard that is doing well, ask permission to take a small shovelful of soil from the rootzone and work it in around your struggling plant. Sometimes it solves the problem.

**R**esearchers at the Max Planck Institute for Human Development study found that spending time outdoors in the fresh air was good for your brain, over all well-being and health. Their finding adds to the neuroscientific support for the treatment of mental disorders. The World Journal of Biological Psychiatry (2021).

Many studies have shown both physical and mental benefit for being outdoors and the connection to beneficial microbes. Another rapidly growing field of study is the direct link between microbes in our gut and our mental health.

I recently finished reading a new book on this connection that I borrowed from my wife whom is a psychologist.

"This Is Your Brain on Food" by Uma Naidoo, MD, 2020, ISBN: 978-0-316-53682-0 who is with the Harvard Medical School. From the book over 40 million Americans are dealing with mental health concerns, and food is some of the most potent mental health medicine available (the book explains how and why).

The food we eat and how it is grown, directly affects our health and mental abilities. Most of the microbes in our guts that promote physical and mental health come from the soil!

As a society we can no longer separate gardening, health and environment as they are tightly linked in many ways. As we continue to learn, the old adage **"Healthy soil = healthy plants = healthy animals and humans = healthy environment"** becomes truer every day.