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NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

By John Ferguson

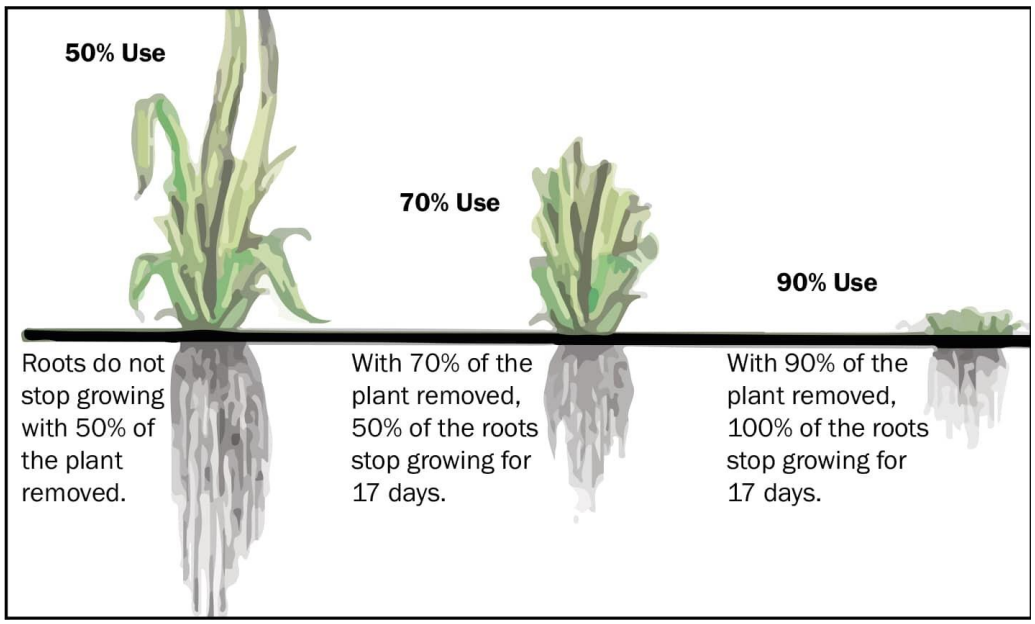
Subject: lawns and grass

With this prolonged heat wave and drought, many of our lawns are suffering. A paper by researchers at Rutgers and several other groups was on grass and the effects of mowing height.

They compared mowing at 3 inches tall versus 1.5 inches. They found that when grass was cut at the shorter length, the soil and grass became a carbon emitter but was carbon neutral at 3 inches. This means when grass is cut short the lawns add carbon dioxide to the air contributing to climate change. This did not include emissions by the lawn mower. Journal of the American Horticultural Society

This means for the grass to help build carbon (organic matter) in the soil, and reduce greenhouse gasses, it needs to be cut higher than 3 inches.

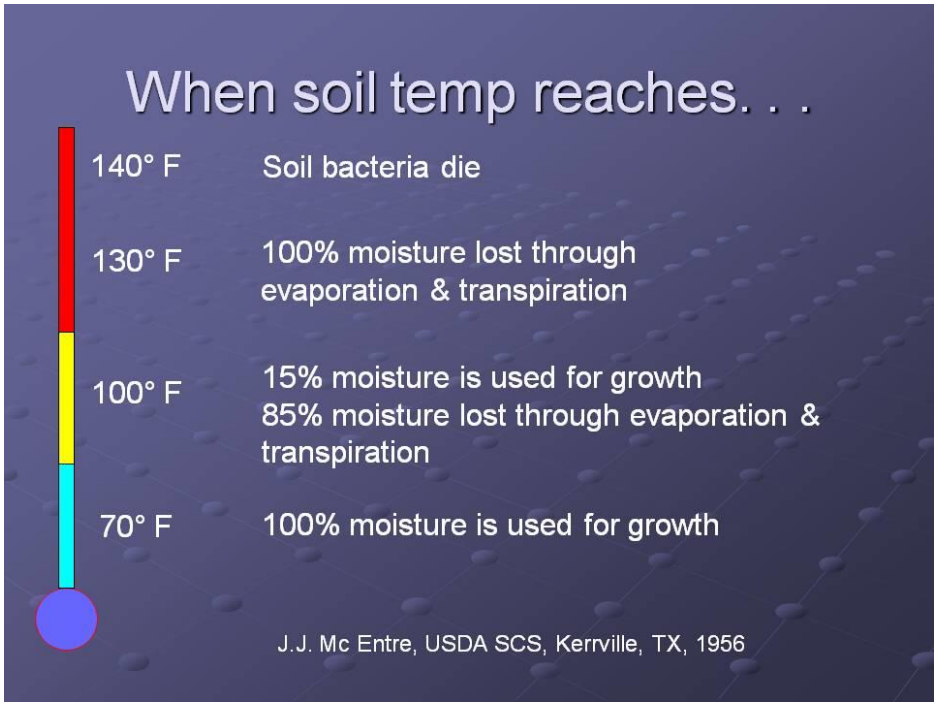
Lets look at some other effects of cutting grass short. From the chart below - The grass stops growing and is not capturing carbon and not producing root exudates that helps the soil microbial community be healthier. This means your chance of getting a lawn disease like brown patch or take all is much higher when fall rolls around.



When the grass is cut short and the soil dries out, the roots cannot grow deeper to follow or obtain moisture. A study at the University of Florida found that St. Augustine grass has the genetic potential to grow roots 12 feet deep.

If the grass is cut short (less than 4 inches), it does not shade the soil. This increases the soil temperature and evaporation rates. The chart below from the USDA illustrates this issue.

In Texas it is easy for the soil temperatures to exceed 130 degrees if not shaded by vegetation. Cutting short allows the soil to get hot, which kills the bacteria that prevents fungal diseases in the fall.



When grass is cut short it is not building organic matter in the soil. This is done from root exudates directly, feeding the microbes that pull carbon out of the air to build their bodies which adds organic matter when they die, and roots when they die (root turn over) adds organic matter as they decompose.

The chart below illustrates how important organic matter is to helping the soil capture and hold water from rain or irrigation. Healthy soil will have around 8% organic matter by weight (25% by volume).

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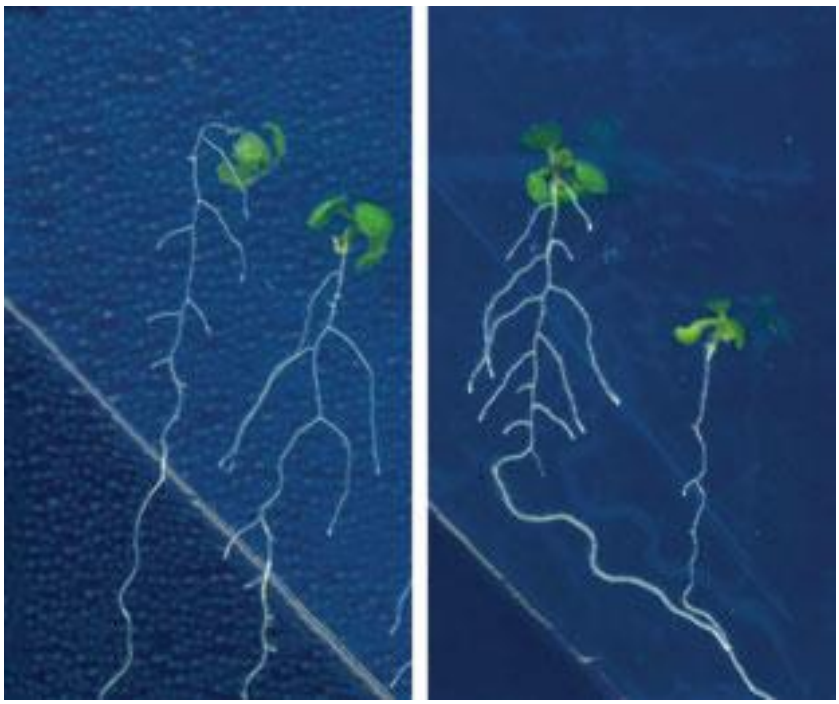
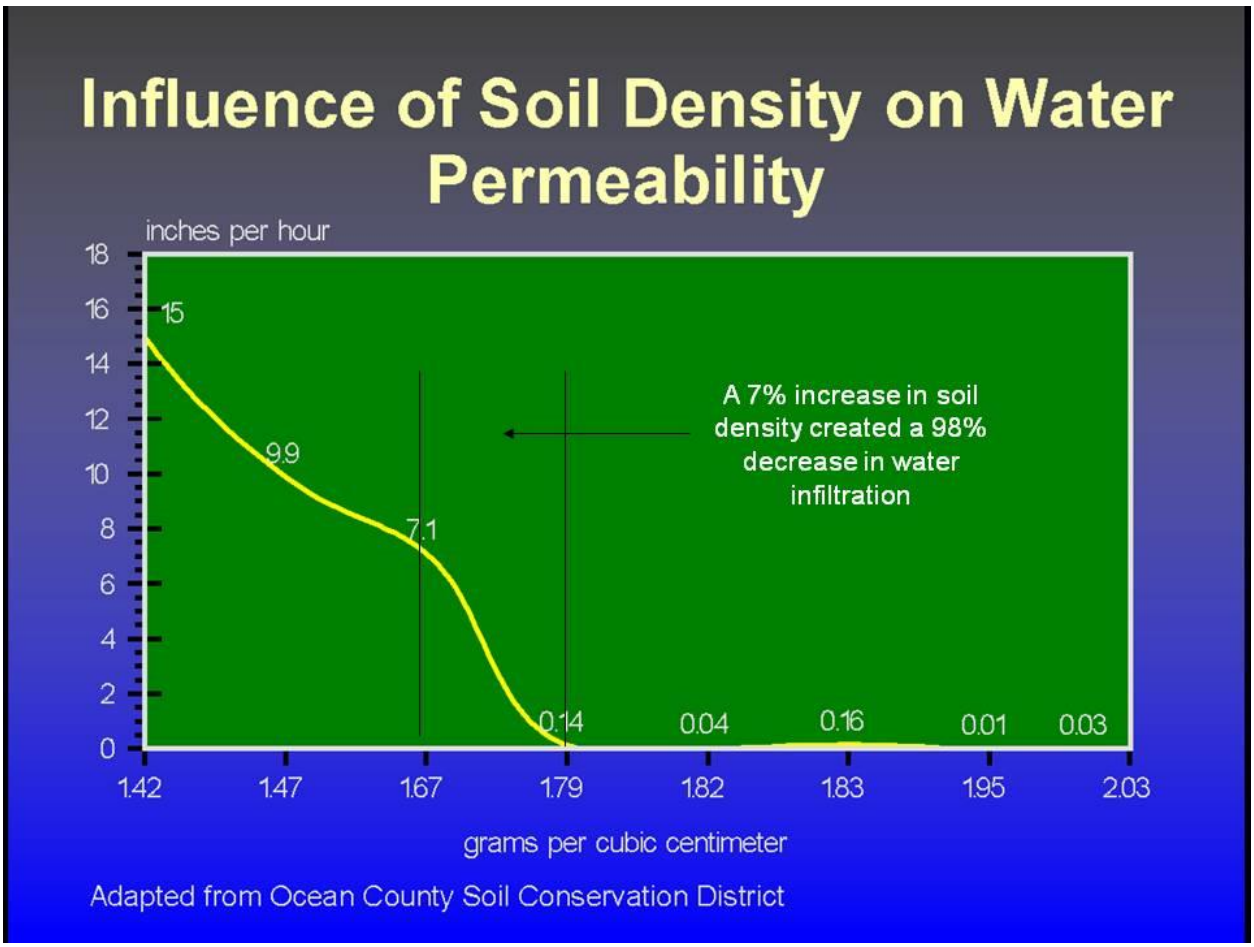
The next effect is the use of artificial fertilizers which are composed of chemical salts. Plants (roots) do not like salt. The picture below shows on the left when no salts are present the roots grow through the barrier and go deep. If salts are present, the roots can sense the salt and turn away and do not grow deep.
Another reason to only use a good organic fertilizer.



The salts glue the soil particles together creating hardpan which reduces the soil's ability to allow water to enter, a property called permeability.

As the permeability of the soil goes down, both rain water or irrigation water cannot be absorbed into the soil and stored.



Another issue we often encounter when we water using municipal water with fluoride in it, is that this chemical, effects permeability.

Minerals are formed from the chemicals in our municipal water supply that cement our soils and create hardpan. Two common ones are Fluorapatite $Ca_5(PO_4)_3Fl$ and Chlorapatite $Ca_5(PO_4)_3Cl$, (from Principles of Soil Chemistry, 4th Edition, Kim H. Tan).

If you notice in the chemical formulas above, we first notice our friend the phosphate ion (PO_4) that is required for healthy soils and plants. We next notice calcium (Ca) that all gardeners know is essential to having healthy plants. However, when these good guys are exposed to fluorine (Fl) as in the fluoride and chlorine (Cl) that are found in our water systems it turns them into minerals that cement our soil particles together creating hardpan. So, the more one waters, the more often one will need to aerate and in general the more problems one will have.

This is why using a good organic fertilizer and top dressing with leaf mold compost is so important and effective. When you add some Re-mineralizer every few years it helps even more.

Many of the soils south of Buffalo bayou are the heavy expansive black clay known as the Beaumont/Lake Charles clay. By cutting the grass short the soil dried out much quicker, and the clay shrunk, creating the crack shown that was over 6 inches wide.

These cracks besides being a danger of getting a foot injured by stepping into it, also breaks many things from tree roots to water pipes and sewage pipes.

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Mowing the grass short kills off the many beneficial microbes and insects that control insect pests. The hot soil with reduced soil life activity, becomes a good home for chinch bugs and sod webworms.

Just for the record, I watered my St. Augustine lawn this past weekend, for the first time since the drought of 2011!

Note: Many lawnmowers are made for Northern grasses that can be cut shorter hence they do not offer a higher cutting option. On my lawn mower I had to drill holes above each height adjustment peg and insert a large screw to make a higher stop, so I could cut the lawn at 4 inches.

Another benefit is that the lawn looks better, is thicker and more fun to walk on or play on.