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JOHN'S CORNER:

NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

by John Ferguson

I recently talked about a 4th phase of water called the Exclusion Zone (EZ) and how it might affect roots and fungi and allow them to do amazing things. This same effect has been found and explains why many homeopathic treatments made with herbs and minerals works so well. The Dr. Mercola's newsletter has a [recent article on the subject](#).

We all know that negatively charged ions boost our moods and help clean the air. How often when one sits near a waterfall we just feel good. Waterfalls produce lots of negatively charged ions that produce the mood-boosting biochemical reactions in our brains. Similarly the clean air scent after a thunder storm improves our mood. This effect is a good reason to add a waterfall to ones water garden.

I heard the question the other day, "Why Should I garden?". The reasons are many fold. We can start with the pleasure one gets from just being in a garden whether sitting or walking. For children and students gardening has helped develop a positive attitude about health, nutrition, and the consumption of fruits and vegetables. The children then score better on tests, have better attitudes about school and interact better socially, and it improves their self esteem. Many studies have shown that Horticultural therapy improves our mood, reduces our stress levels, and decreases our risk of heart attacks and other stress related issues. Other studies have shown that gardening increases our quality of life and decrease anxiety and depression which then tends to promote a longer life span.

The Dr. Mercola's e-newsletter recently had a good summary of the health problems caused by exposure to a class of pesticides called organophosphates (OPs) that has been shown to put children at increased risk of behavioral and cognitive deficits and neurodevelopmental disorders. Based on data from 71 countries and hundreds of studies, a team of environmental and public health researchers is calling for a [global phase-out](#).



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Weeds are a major problem for gardeners to farmers alike. A new study from the University of Illinois College of Agricultural has found that we are losing the war on weeds. They (weeds) are adapting (evolving) to be resistant to all herbicides. Herbicide resistant GMO plants have accelerated the evolution to super weeds that can no longer be killed. However, they have also found that using the newer weed management methods based on soil biology and physical methods, plant physiology, etc. they have been able to show effective weed management with a 90% reduction in herbicides required for the same control. As a bonus the new methods have the same profit, same productivity, two orders of magnitude reduction in environmental pollution, and a 90% reduction in fertilizer usage.

We hear a lot about the human biome or the soil biome and how functioning biome is critical to our or soil health. Researchers at Duke University are now looking at a plant's biome. They have found that there can be thousands of species of bacteria in a single leaf. By using DNA mapping techniques on 440 plants they have found over 4,000 species of bacterial living inside of plants. They found that roots have 2X-10X more bacteria than leaves. "Host Genotype and Age Shape the Leaf and Root Microbiomes of A Wild Perennial Plant", in the Journal Nature Communications, 2016. I suspect just as a good Leaf Mold Compost helps a plants roots be healthier since it increases the density and diversity of beneficial microbes, a good quality compost tea also helps a plants leaves be healthier as it also increases the density and diversity of good microbes.

The magazine Acres, USA had a nice article summarizing the loss of quality and nutrition in the modern food supply. From 1940-1991 averaging data from 27 kinds of vegetables, they found that copper (Cu) declined by 76%, calcium (Ca) by 46%, iron (Fe) by 27%, magnesium (Mg) by 24%, and potassium (K) by 16%. Looking at the same time span and averaging 10 kinds of meat they found that copper (Cu) declined by 24%, calcium (Ca) by 41%, iron (Fe) by 54%, magnesium (Mg) by 10%, and potassium (K) by 10% and phosphorus (P) by 28%. Since 1991 nutrient levels have continue to decline leading to many or most of the health problems we experience today. "An individual today would have to consume twice as much meat, three time more fruit, and 5 time more vegetables to obtain the same amount of minerals and trace elements available in the same foods in 1940. Unless one buy's organic, the food is also contaminated with toxic chemicals that cause cancer, hormone disruption to chemicals like glyphosate that prevents one from absorbing what few nutrients are in the food. "And we wonder



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why we have so many health problems in today's society". This is the reason that more and more gardeners are growing their own food organically from vegetables to fruits and nuts.

Organic product sales in the U.S. show few signs of slowing down. Total U.S. organic sales grew by more than \$20 billion between 2007 and 2016, according to the [Organic Trade Association \(OTA\)](#). Notably, the size of the organic sector in the U.S. has grown to approximately \$47 billion in 2016, which is \$3.7 billion higher than the previous year (and 135% more than sales in 2007). A study published in the journal *Lancet Diabetes & Endocrinology* has revealed that exposure to hormone disrupting chemicals is costing the US \$340 Billion each year in additional health care costs.

I frequently get asked what is GMO foods? [Here is a link](#) to a short 3 minute video that answers that question.

We often hear that we should not cut our grass too short and there are multiple reasons. I read about another one this week. If only 50% of a plant is removed the roots do not stop growing. If one removes 70% of the plants top growth 50% of the roots stop growing for 17 days. If one removes 90% of the top growth then 100% of the roots stop growing for 17 days. When roots are not growing, they are unable to collect nutrients (requires more fertilizer be applied), the roots cannot reach sources of water stored in the soil (frequent irrigation required), the roots cannot produce root exudates to feed the microbes that protect the plant from diseases like "brown patch" (treatment required), etc. Several studies have found that St. Augustine grass should never be cut shorter than 4 inches tall. Note: Most lawn mowers sold cannot cut this tall as they were designed for short grass varieties found in northern states. Also many lawn services cut the grass too short on purpose, as it triggers many problems and they can then sell you additional services to solve problems that they created.

Another benefit to cutting our grass high is the formation of organic carbon in the soil. This may be from fine root turnover, root exudates, clippings decomposing, microbial action, etc. Organic carbon can hold up to 20 times its own weight in water, hence the water holding capacity is greatly increased. When artificial fertilizers are used they destroy organic carbon in the soil, hence the water holding capacity of the soil is significantly reduced. Over the last few months I have spoken with folks all over our area using modern biological methods (organic), and none of them have needed to water their lawns or flowerbeds since the drought of 2011 (myself included)!