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JOHN'S CORNER:

NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

by John Ferguson

A term we will be hearing more of is "Earth Overshoot Day". This is the day when the Earth's capacity to regenerate itself has been exceeded by consumption of its natural resources. Some folks think it has already occurred while others believe it will occur in the next couple years.

As gardeners we can do our part to help out by using modern methods based on biology often referred to as organic methods. Thousands of papers and studies now exist that show these modern methods work far better than the old obsolete toxic chemical rescue methodologies. Not only do they give better results at far lower cost, they help protect the Earths natural resources and help be part of the solution instead of part of the problem.

I was told the other day that the National Federation of Garden Clubs has a new organic program called: "I took the Pledge – The Great Healthy Yard Project".

So, a question I often get asked is "why do so many people continue to recommend toxic chemicals?" There are several reasons from ignorance to being too lazy to learn new things. However, the main reason is money.

It starts with artificial fertilizers that pollute our waterways and kill off the beneficial life in the soil. Using turf grass as an example, without the beneficial microbes one then gets a disease problem like brown patch and then they are told to purchase a fungicide (with even higher profit margins). This kills off most all fungi, good and bad. Without the good fungus we get a thatch buildup in our lawns that makes a good home for webworms or chinch bugs. Now we

are told to purchase very toxic pesticides like diazinon, dursban or anyone of several other choices (these all have very high profit margins).

These chemicals kill earthworms, micro-arthropods and other soil life that recycle nutrients and help create soil structure. This leads to compaction and weeds, now we are told to aerate our lawns and use weed and feeds with even higher profit margins….. Get the picture!

The other reason is that many of our agricultural universities are funded by multi-million-dollar grants from Monsanto, Dow, Scott's, etc. Hence, they dance to the tune of their corporate masters.

As gardeners we are always concerned with improving ad protecting our soil. Another study published in the Soil Science Society of America Journal (June 2019) looked at soil enzymes which are indicators of soil health. Enzymes are used to cycle nutrients, make nutrients available to plants, create soil structure, etc. The study found that the highest level of enzymes was found when cover crops were used with good compost. Conversely the lowest levels were found when compost was not used. As gardeners we can expect similar effects (healthy soil) when we have plantings with lots of species diversity and we use lots of good compost.

Have you ever had a tree stump in your yard that would not decompose as it stayed alive even without foliage? Researchers have discovered the reason as a paper published in the Journal Science (July 2019) explains. They found that trees with foliage transferred energy and carbon compounds to the stump to feed it and keep it alive. In return the stump with its huge root system collected minerals and water and gave them to the other trees. It is well known that

roots from different trees can merge as well as transfer nutrients over the fungal "wood wide web".

As we grow older, we often worry about mental decline. The Dr. Mercola newsletter had an article about Ashwagandha (Withania somnifera) an herb that is a member of the nightshade family, has been used in natural medicine for centuries. This herb improves memory, improves cognitive function, improves attention, and improves our information processing speed.

We often hear about toxic algal blooms and masses of seaweed contaminating the water and washing up on our beaches. A paper published in The Scientist on a study from the gulf Coast of Mexico has found the cause was nutrient discharge (fertilizer runoff) from the rivers in the Amazon Basin that currents carried to the Mexican shores. I suspect that the toxic algal and seaweed problems from Texas to Florida are coming from the Mississippi which is known to be the primary source of the Dead Zone in the Gulf of Mexico. I am tired of having my tax dollars used to clean up the mess caused by the artificial fertilizers. Maybe it is time that we impose a tax on artificial fertilizers to cover the cleanup costs so homeowners do not have to.

One of the wonders of natures is photosynthesis which scientists have studied for decades but have not fully explained. A new model has emerged that provides a better description of the reactions to convert sunlight into stored energy as carbon compounds. The new explanation uses a property of matter called quantum tunneling. Sunlight (photon) excites an electron in the chlorophyll molecule to create a structure called an exciton. This exciton travels as a wave

instead of a particle hence it can explore all possible paths simultaneously and take the most efficient route to complete a chemical reaction. Nature (God) is amazing!

Last week I asked and discussed the question "are plants intelligent". This week let's ask "are fungi intelligent"?

We know that fungi communicate (ex. Wood wide web, chemical signals, etc.)

Fungi hoard nutrients (savings and investment accounts)

Fungi reward plants that provide ample carbon foods (exudates) and punish those plants that do not (a judicial system)

We know that fungi barter for nutrients and energy to get the best deal for themselves (they evaluate)

Fungi are sophisticated information processors (Quantum Magazine August 2019) and pass on information about pests, water, and other resources (for a fee of course).

Do you ever wonder why bananas do not taste as good as when we were kids? The famous, large, slippery, and delicious banana called "Gros Michael" developed Panama disease in the early 1960's, which destroyed this banana and eliminated it from cultivation.

The growers of bananas then switched to a variety called "Cavendish" that is smaller and not as flavorful, that we have today. Now this variety of bananas is becoming infected with this disease (Fusarium oxysporum f. sp. Cubense) or Tropical Race 4 (TR4) as Gros Michael did.

A few year ago, I did a study on this issue. It was caused by chemical abuse of our soils, artificial fertilizer's (salts) killing natural biocontrol agents, and mono cropping. Unless large plantations learn and switch to ecological methods, we as a society will soon loose the Cavendish banana also.

A study from the University of Melbourne published in the journal PLOS Pathogens (2019) has found that the disease Pneumonia caused by bacteria, has a strong nutritional link. This disease kills over one million people each year. They found that animals with low levels of Zinc (Zn) succumbed t the disease 3 times faster than those with normal levels. Zinc is required by the immune system of mammals to kill this bacterium.

Over two billion people around the world are deficient in this nutrient. Zinc is a common element and added to most fertilizers, hence why are people deficient?

I suspect the toxic chemical glyphosate, used in the Round-Up herbicide as a major cause. Zinc has a +2 electrical or valence state. In our study on the dangers of glyphosate a few years ago we found out that glyphosate binds strongly to elements with a +2 electrical state like calcium and magnesium. It binds so tightly that it was used to clean mineral scale out of pipes (US Patent # 3,160,632).

Unless one buys certified organic food, common items like corn, wheat, oats, etc. are contaminated with glyphosate. GMO foods have even higher and more dangerous levels of this carcinogen. Bottom line is that when we eat foods with glyphosate in and on them, our bodies cannot absorb the zinc in the food making us more susceptible to this disease.

As gardeners we know to keep our beds and gardens mulched to prevent erosion. This short video clip shows what happens to soil without mulch. The raindrop is like a tiny bomb exploding, throwing soil fragments everywhere as it hits the ground. This effect quickly leaches the clay and silt particles along with many nutrients destroying the health of our soil.