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JOHN'S CORNER:

NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

by John Ferguson

Most gardeners feel better after digging in the dirt. One not only feels satisfaction from creating a beautiful garden but a general improvement their mood. New research that started at the Royal Marsden Hospital in London has found that a bacterium *Mycobacterim vaccae* found in the soil triggers the release of serotonin, which elevates mood and reduces anxiety. It also improves our cognitive function and they found reduced cancer symptoms. Gardeners inhale these bacteria while digging in the soil. Other research building on the initial findings have found that children that grow up on farms are 30-50% less likely to develop asthma (New England Journal of Medicine). In other words, it is good for children's health for them to play in the dirt and get dirty. For more information see the Cosmos Magazine article, "How gardening could cure depression." Other research is studying this microbe as a treatment for cancer, Crohn's disease, and rheumatoid arthritis. See a readable summary of this research in the Economist, "Bad is Good."

We have known for years that plants (flowers) produce electrical signals to communicate with pollinators. Most insects have antennas that help receive these signals. A study published in the international journal Proceedings of the National Academy of Sciences (PNAS, 2016) has found the hairs on a bee also respond to these signals. They found that these hairs dance in response to electric fields. God's creation is amazing!

In past issues, I have talked about the dangers of glyphosate and the health problems it causes. I mentioned this report last week. Testing at the University of California (sponsored by the Organic Consumers Association) has found that 93% of Americans tested had glyphosate in their urine with children having the highest levels (The full study will be released later in 2016). This is over **3 times higher** than has been found in Europe. It is believed that at these levels it acts as a hormone disruptor. This is another reason to avoid GMO foods, which have much higher levels of glyphosate on them.



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Speaking of hormone disruptors, a study by the U.S. Geological survey published in the Journal of the American Society of Agronomy, 2016; 45 (3) has found the anti bacterial chemical triclosan in 58% of America's freshwater streams. Triclosan kills both good and bad bacteria and contributes to antibiotics becoming less effective. It is also toxic to algae, which are the base of many ecological food systems. Research at Texas A&M (Journal of Environmental Quality, 2016; 45 (3)) has found it in all edible portions of tomato and onion plants. Soils with diverse bacteria populations are healthier and better for plants. Triclosan disrupts these systems.

An article in Acres, USA mentioned research where a dye was put into a tree and by the end of the day, it showed up at the other end of the forest. Scientist has also found a single fungi as big as the state of Rhode Island. Everything in nature is connected!

A new book for gardeners by Jeff Lowenfels whom authored the books "Teaming With Microbes" and "Teaming With Nutrients" is scheduled for release. His third book "Teaming with Fungi: the Organic Growers Guide to Mycorrhizae" will be available in January 2017.

A paper in the journal AOB Plants (Oxford, May 2015) has found that fungi mycorrhizal networks between plants of the same or different species influence the survival, growth, physiology, health, competitive ability and behavior of the plants and fungi linked in the network. These fungal networks help plant collect nutrients from areas where they are plentiful and transfer them to plants in areas where nutrients are not plentiful. These networks will tell neighboring plans if an insect or microbial pathogen is attacking one member so the other plants can ramp up their immune systems. In drought, these networks can also transfer water from areas where moisture is plentiful to areas where it is scarce. They also found that plants can transfer defense chemicals through the network to other plants. It was also found that plants growing in areas deficient in sunlight will receive photosynthate chemicals from plants with good sunlight. This research supports the concept of "Guild Systems" where multiple plants that are linked together by the fungal network for mutual aid. When one uses a fungicide or artificial fertilizer, these networks are destroyed and the plants loose all these benefits.