

JOHN'S CORNER:

NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

by John Ferguson

I recently read a couple articles in the Journals Pest Management Science (2020), and Weed Science (2020), on weed resistance to herbicides. Weeds are evolving new ways to be resistant to certain types of herbicide damage by ramping up enzyme production. These enzymes neutralize the herbicides before they can cause cellular damage. Water hemp is an example of this process. Super weeds are increasing daily that are resistant to all herbicides.

Oregon State University researchers released a new study in the journal PLOS ONE (2020) on the effects of pesticides on bees. They found the active ingredients “sulfoxaflor” and “flupyradifurone”, when applied at sub-lethal doses, did not kill the bees immediately, however it severely shortened their lifespans. In some cases, they only had 6 hours of life.

A paper published in the journal Scientific Reports (2020) by Goethe University (Frankfurt) using a new video technique, has found that exposure to certain pesticides like the neonicotinoids changed the behavior of the nurse bees.

They found that the larval development took up to 10 hours longer which makes it easier for parasites like the Varroa mite to infect the bees.

They also found that exposure to these pesticides changed the bees learning behavior, and altered their navigational ability.



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It makes me wonder how these toxic chemicals are affecting our children as they are used on many food crops.

The “Detox Project” is now offering a certification for products tested free of glyphosate (Round-Up). Many products from baby food to protein powders are full of the toxic chemical glyphosate. One can learn more about which ones are safe at detoxproject.org

Look for the seal below when buying common products to protect one’s family.



The journal Forest Ecology and Management (2020) had a recent article on tree growth and bedrock type such as shale or sandstone. They found that trees grow faster on soils that were derived from shales (had shale underneath the soil) as compared to soils above sandstones.

They found that trees grew 25% faster and sequestered more carbon (55%) than those trees growing over sandstone. They also found that the diversity of trees was higher on shale sites.

They hypothesized that it was because there was more water stored and available in shale derived soils.

I believe there is another factor in play, as geologically shale is formed in aqueous environments, primarily oceans. Seawater has all 84 naturally occurring elements in it, hence a lot of these elements are deposited with the shale as it is forming. Shale has a much finer particle size, hence after uplifting to form continents, there would be less leaching of nutrients



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(elements) as compared to sandstone derived soils. Thus, mineralization may also be a factor as we have seen with hundreds of species of plants.

A study in the Indian Journal of Entomology found that organically grown rice had less problems with the insect pest called the rice yellow stem borer than conventionally grown rice. The organic rice had a lot more borer egg parasitizing beneficial insects, hence less damage.

The journal International Society for Microbial Ecology (2020) had an article on spittle bugs. These bugs produce clusters of spit that keep them from drying out and protects them from predators.

These insects live on the sap from the xylem layer of plants, a very nutrient poor food. They found two types of special bacteria living in the spittle bugs. These bacteria work together. The first has the ability to convert the sap into the sugar glucose and the second bacteria takes the glucose produced and uses it to produce all 7 essential amino acids required by the bugs.

The Rodale Institute has released a paper summarizing three more research studies that confirm "*Healthy soil = Healthy People.*" The summary explains that plants from healthy soils have much higher levels of molecules like ergothioneine a natural occurring anti-oxidant or vitamin B₃ and beta glucans. The full papers can be found at: www.rodaleinstitute.org

More reasons to grow and buy organic food.



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A colleague of mine Jeff Lowenfels (author of the books “Teaming With Microbes and Teaming With Fungi”) sent me a paper from Cornell University titled “Secrets of the Soil: A newly discovered microbe builds understanding of soil ecosystems”.

They discovered a new species of bacteria (*P. madseniana*) that responds to aromatic chemicals that tree roots produce (exudates). These signaling chemicals stimulate the bacteria to produce more nutrients for the tree.

Along the same lines, a paper in the Journal of Comparative Psychology (2020) by researchers at the University of Padua in Italy, found that plants can sense, feel, think, and communicate among themselves.

For example, the Venus Fly Trap conserves energy by *counting* time and *remembering* triggers.

Another experiment with *Mimosa pudica* commonly known as the sensitive plant demonstrated that it can learn and remember. By dropping the plant from a six-inch height. The first few times it closed its leaves, but after a few drops the plant learned that there was no harm being done to it and quit closing its leaves. This learned response lasted up to a month.

I recently read a paper on the health benefits of Garlic (*Allium sativum*) as it has been used for thousands of years to treat everything from wound healing to diseases and parasites.

Scientists are studying 17 different compounds found in garlic in relation to Covid-19. They found two organosulfur compounds (allyl disulfide and allyl trisulfide) which compose over 50% of garlic’s essential oils were a natural anti-virus source which helps prevent the invasion of the coronavirus into the human body.

Other studies have found that garlic was active against a number of other viruses like the common flu, common cold, HIV, herpes types 1 and 2, and rhinoviruses.



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A study from the University of Louisville found that garlic helped reduce age related declines in our gut microbiota which are linked to cognitive decline.

Other studies have shown garlic is good for our hearts and has a strong anti-inflammatory effect.

As you might suspect, home grown garlic using organic methods are higher in these beneficial compounds.

Evidence continues to grow that the microbes in our guts actively communicate with our brains, or as some have called it, "The Lovebug Effect". A paper in the Journal of The Total Environment has found that our thirst for nature is driven by the microbes in our guts.

It appears that microbes in our digestive system when NOT exposed to new microbes from nature, hijack neural pathways between the brain and gut to drive our nature seeking behavior. "The microbes in our guts are yearning for their outdoor counter parts and our telling our brains to go find them".

There is a far greater diversity of microbes in nature and instinctively we know that this is good for us. As in numerous other studies of nature, the greater the diversity of all life, the healthier the ecosystem.

It seems that the microbes are using scents to drive our reactions. Whom does not love the smell of fresh rain or the rich fragrance of healthy organic rich soil? It does make us feel good.

Many gardeners love the feel of a good compost or rich fertile soil on their hands. This hands-on experience may boost our immune system, our mental health, and overall well-being.

The reasons to be an organic gardener continue to increase. Note: When one uses the obsolete toxic rescue chemical methods, most of these benefits are destroyed and lost.