

JOHN'S CORNER:

NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

by John Ferguson

A paper in the journal *Molecular Ecology* (2020) was on how fungal communities in the soil change after burning. They found that there were changes in some ecosystems after the forest was burned but not others.

Evergreen forests had the most changes in the soil biology, while there was little change in oak woodland communities. Oak woodlands depend on fire to survive as fire clears leaf litter and dead limbs, releases nutrients and creates better conditions for some seeds to germinate, helps control insects and pathogens. It also helps prevent other tree species from invading.

We know that many species of fungi have symbiotic relationships with many plants. Fungi also store carbon in the soil and they are food for many other organisms. Fungi are very beneficial and if we want healthy gardens, we need to take care of our fungi. This means we need to feed and protect them.

This means no fungicides (as they kill fungi) and feed them with items like an aged native mulch, liquid humates, and fish emulsion. Remember "Healthier fungi = healthier plants".

The relationship between fungi and plants is so important that Leiden University has created a database of fungal interactions and is available via the Global Biodiversity Information Facility (GBIF). "The goal is to combine all our knowledge on fungi into one database and allow scientists to acquire a new understanding of the importance or the relationship between plants and soil fungi". *New Phytologist* (2021)



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Another benefit of gardening is exercise. Numerous studies have shown moderate exercise to stretching makes us healthier. Applying mulch is a good example, as the twisting turning shoveling and raking are all moderate exercises.

Reaching to pull a weed or reaching to prune a limb are a natural form of stretching. Being out in the sun increases our vitamin-D production, and many of the microbes in healthy soil produce chemicals that stimulate our immune systems as well as the feel-good chemicals for our minds.

Studies have shown those with moderate exercise have lower all cause mortality than those whom do not. Maybe this is one of the reasons gardening has exploded in popularity over the last few years.

A paper from the University of Nottingham published in the journal Science (2020) was on a sealing mechanism in plants supported by microbes.

The study found that the coordination between root diffusion barriers and the microbes colonizing the root, combine to control the mineral uptake by the plant which is crucial for proper growth and reproduction. This mechanism allows for the plant to absorb what they need but not get too much of a given element.

When we use things or products that harm microbes, we harm our plants. A few examples are fungicides, herbicides and pesticides, high salt products like artificial fertilizers and poultry manure, chemicals in public water supplies (the more we water the more harm we do), to even some types of mulch like cedar, cypress and pine that do not rot due to the chemicals in them that kill microbes.



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Artificial fertilizers often force too much of a given nutrient into the plant defeating this regulatory system. This may result in fast growth that is weak and actually attracts disease and insect pests.

I was reading in a new book on minerals or elements this morning and our how they relate to our health. It stated that the fluoride in our water systems prevents plants from absorbing iodine from the soil! This leads to thyroid problems for many people.

One of the hottest trends in horticulture is landscaping in such a way that it provides ecosystem services. This type of landscaping design also increases the value of one's home, especially when compared to just plain grass lawns.

So, what is ecosystem landscaping? Over the years research has established that the health of an ecosystem is tied to the number of interacting species both in ecosystem stability and ecosystem function. Note: Nature does not like mono cultures.

"We can define ecosystem function in several ways: the ability to hold energy captured from the sun within biological systems before it escapes back into space; the ability to produce products or perform services useful to humans or other species; the ability to create living and dead biomass; and so on." Dr. Doug Tallamy

I would add to that list the ability to capture and hold water until needed by plants and animals. Numerous folks with beautiful landscapes have stated they have not needed to water their lawns or flowerbeds since the drought of 2011 thus saving them thousands of dollars since then on water bills!

A statement that I once heard from a very experienced landscaper was, "If a person would spend one-half the cost of an irrigation system on soil improvement, they would never need the irrigation system in Houston".



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Another question we might ask is; What type of landscape is capable of producing insects in the numbers required to support food webs? If we want birds then we better have insects. When birds are laying eggs over 80% of their diet is caterpillars (insects), without insects we do not have birds, or toads and frogs, spiders, lizards, bats, small mammals from rodents to racoons, and even large animals like foxes and bears.

So, do we plant a tree from China or maybe a popular species that supports zero or 21 species of caterpillars respectively, or an oak tree that may support 557 species!

There are many places to get started. These range from joining a local Native Plant society or Master Naturalist group or visit several websites.

The agency [Woodlands Water](#) has a lot of information on their website and are even rebating homeowners \$300 per home to plant [drought tolerant native plants and trees](#).

[The Ladybird Johnson Wildflower Center](#) also has a lot of good information on plants.

[The National Wildlife Federation](#) under the Native Plant Finder tab lists plants by zip code.

A couple great books on the subject for gardeners are:

"Bringing Nature Home - How You Can Sustain Wildlife with Native Plants"

by Douglass W. Tallamy, Timber Press, 2014, Edith Printing,

ISBN-13: 978-0-88192-992-8

"Nature's Best Hope- A New Approach to Conservation That Starts In your Yard" by Douglass W. Tallamy, Timber Press, 2019, ISBN-13: 978-1-60469-900-5