



NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

By John Ferguson

Today I am going to lead off with a question from a reader: “Should one put coffee grounds in one’s garden?”

This is a complex question due to the variation of coffee species, growing conditions, etc. Caffeinated versus decaffeinated (more residual chemicals) left in the grounds is another factor. Even the type of brewing will drive off more volatiles and change the left-over chemistry.

Originally, coffee was an understory tree (shade grown) found in Ethiopia growing in mineral rich soils. However, most coffee has been hybridized to grow in the sun to produce higher yields, and most of the health benefits are lost as well as the flavor. The growing fields are generally lower in soil quality with less elements in them, which changes the chemistry of the coffee bean.

The complication is that coffee (Arabica) when grown in the sun, is subject to a parasitic fungal pathogen we know as coffee leaf rust. This requires that more toxic chemicals be sprayed on the coffee plants which ends up in the coffee.

Some of these chemicals are removed during the processing of the beans in preparation for roasting. The heat of the roasting will destroy some more of the toxic chemicals, and finally brewing the grounds will leach most of the remaining chemicals into the coffee. If the coffee was shade grown then this is unlikely to be an issue.

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Hence, in general, the left-over coffee grounds are pH neutral as the acids in coffee are water soluble and leach out when brewed. The grounds do contain some nitrogen, and are a source of organic matter. Thus, they provide benefits.

When applied to the soil the primary decomposers are fungi which produce weak short lived organic acids.

I enjoy a good cup of coffee every morning and prefer organic shade grown coffee for many reasons, from more flavonoids to higher levels of phytochemicals that support our health and it just tastes better. Most coffee of this type also has higher nutrient levels (minerals) that are in the coffee and the grounds which provide additional benefits.

At home my spent grounds go into the compost bin, and at our retirement place I just scatter over the ground as the native soil is low in organic matter.

Earthworms are sometimes called a gardener's best friend. Studies at University College of Dublin have discovered another amazing fact about our wiggly friends.

As earthworms consume soil and organic matter, they digest the microbes living on this material especially bacteria. Bacteria are the most nitrogen (N) rich life form on earth.

They then release this nitrogen in a form that plants can rapidly use exactly when they need it, as plant growth and earthworm activity are synchronized by environmental factors. Soil Biology and Biochemistry (2022)

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We often talk about the importance of re-mineralization. For decades we have focused on N-P-K (nitrogen, phosphorous, potassium) and ignored the minor and trace elements. As a result, many of our soils have become depleted in microelements.

The Chinese herb *Pseudostellaria heterophylla* has been used for its medical properties for centuries.

In this study the scientist added boron (B), molybdenum (Mo), and copper (Cu) to their regular fertilization. They found the addition of these elements promoted the absorption, capture, and conversion of light energy and efficiency of electron transfer in the plant.

This significantly improved the quality of the single root tuber and the yield per unit area. HortScience (2021)

Another area of research showing good results is in the use of biostimulants. Researchers at Ohio State University found that using biostimulants increased the growth, leaf chlorophyll content, and shoot biomass on several species. The products tested contained both bacterial and fungal species. The species tested were Zinnias and Petunias.

“Many biostimulants are incomplete, the products contain nutrients and other components that are not included on the label. Biostimulants often include various plant extracts, vitamins or amino acids, which may stimulate plant growth by various mechanisms including providing additional macro or micro nutrients for the plant.” HortScience (2021)

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This is one of the reasons a good compost works so well as it has hundreds of billions of good bacteria and fungi in it and is loaded with humus, macro and micro nutrients for the plant.

There has been a lot of hype over the last few years on biochar as a miraculous soil amendment. A recent study published in the Soil Science Society of America journal (2021) found that is not always true with woody plants.

The study tested two types of slow pyrolysis biochar made from pine wood. They found the biochar negatively impact tree growth and survival, but impacts varied between tree species and biochar type.

One of the many benefits of using a native mulch is that it feeds many beneficial fungi that help to build soil structure (break up compaction), bioremediate salts and to correct pH.

Another study in the Soil Science Society of America journal (2021) explains this process. The researchers looked at *Trichoderma sp.* Which are free living fungi commonly used as biofertilizers.

This study was done in saline-alkaline soils in China with the crop maize. They found that long term exposure to these fungi can alleviate saline-alkaline stress by decreasing soil pH and salt ion content.

As these beneficial fungi increased, plant pathogens such as *Fusarium* and *Neonectria* were also significantly reduced.

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An extra benefit they found was a 40% reduction of the amount of fertilizer required without loss of yield.

Evidence on the benefits of nutrient dense food grown on mineral rich soils continues to increase.

The Alliance for Natural Health (**ANH-USA**) newsletter summarizes a new study published in the journal *Pharmaceuticals* (2022), that found that a mixture of zinc (Zn), copper (Cu), and plant flavonoids inhibited viral replication in lab tests by as much as 50 percent.

The researchers tested the compounds on human lung cells in the lab against RNA viruses, including those that cause the flu and the common cold.

The scientists write, "Such an inexpensive combination of dietary supplements would be highly advantageous to have, alongside vaccines, as a safe prevention method affecting various RNA respiratory viruses."

Most of us are familiar with Dr. Doug Tallamy and his great books:

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

by Douglass W. Tallamy, Timber Press, 2014, Eighth Printing,
ISBN-13: 978-0-88192-992-8

The Nature of Oaks – The Rich Ecology of Our Most Essential Native Trees by Douglas Tallamy, 2021, Timber Press, ISBN: 978-1-64326-044-0

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"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

Doug's newest project is Homegrown National Park for those whom are part of the solution rather than part of the problem in gardening and agriculture.

His idea is that all the properties and land owned by gardeners is larger than all out national parks put together. By managing these properties using modern biological methods and using native plants, it would make a large contribution to solving many of the environmental issues facing society today.

WHAT'S THE RUSH?

PLANT NATIVE!

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to Regenerate Biodiversity!**

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**Listen to Doug Tallamy's talk on
What's The Rush?**



**THANK YOU
If YOU *are* ON THE MAP
we THANK YOU for taking the lead
and ask that you pass this on**

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