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JOHN'S CORNER:

NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

by John Ferguson

A recent study from the ARS (Agricultural Research Service) a division of the USDA, has found that a harmless airborne fungus, *Cladosporium sphaerospermum* (strain TC09) can dramatically accelerate plant growth, if a germinating plant is near the fungus as it emits gases. The researchers used tobacco and peppers in the study.

Following a relatively short time, the plants at the seedling stage were able to sense the fungi's gasses. This stimulated very rapid growth, earlier flowering and increased fruit yield.

"With longer exposure times for 10 days the plants exhibited substantially more vigorous growth, thicker stems, larger leaves, and a more robust root system. The plants also flowered 20 days sooner and yielded twice the amount of fruit".

The University of British Columbia released a study on a plant known as Breadfruit. I first remember reading about this fruit when I was a young boy and reading the Mutiny on the Bounty trilogy.

This fruit is a staple fruit for many South Pacific countries and islands. This fruit can be dried and ground into a gluten free flour. They found that the breadfruit protein was easier to digest than wheat protein. Animals fed the breadfruit diet had a significantly higher growth rate and body weight compared to those on a standard diet.

Breadfruit in addition to being a good source of protein also contains vitamin-C, potassium, iron, calcium and phosphorous (journal PLOS ONE, 2020).



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The University of Gottingen had a paper in the Journal of Ecology (2020) on Australian Fairy Circles. They were able to confirm Alan Turing's theory for the origin of these circles. Turing's theory stated that random disturbances can allow for strongly patterned structures to emerge like the patterns on Zebra fish or Leopards.

They discovered that the grasses that make up these patterns act as eco-engineers to modify their own hostile and arid environment to keep the ecosystem working.

These patterns emerge from the ecohydrological biomass-water feedback from the grasses and soil crusts that form. These circles up to 12 feet in diameter are a critical source of extra water for the vegetation. They found the soil temperature under the circles are 25 degrees cooler. The grasses work together as ecosystem engineers to modify their environment and redistribute water. A form of plant intelligence?

We continue to learn that nature is amazing in God's creation.

On a side note for you bird lovers, the same mathematical patterns developed by Alan Turing also help researchers understand bird behavior. Journal of Animal Ecology 2020. Their study showed that some flocks of birds live in separate areas despite there being plenty of food to sustain multiple flocks in a given area. The same mathematics accurately predicts this behavior.

A three-year study out of Poland has found that farming in an organic system increased the soil organic matter content (carbon storage) and increased the nitrogen storage in the soil. They also found that the enzymes systems for healthy soil and plants were significantly higher in the organic system regardless of the crops that were grown. Journal of Agriculture 2020.



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The virus Covid-19 is on everyone's mind these days. For the human immune system to fight viruses it needs the elements zinc (Zn) and magnesium (Mg) along with a couple others. The herbicide known as glyphosate that contaminates most of our food supply, prevents the absorption of these essential elements. See issue #116,

Glyphosate was originally patented as a demineralizer to clean pipes (US Patent # 3,160,632) as it strongly binds to these elements. As a result, it ties up the nutrients we need for good health and prevents them from being absorbed by our bodies. Conventionally grown food especially GMO foods are very high in this toxic chemical. If you remember the MIT study a few months ago that found a very strong correlation of having COVID-19 and exposure to glyphosate.

Junk food from our grocery stores and fast-food restaurants have the largest amount of this dangerous chemical.

The Health Research Institute published in the journal Environmental Research (August 2020) has found that switching to a completely organic diet for just six days could cut the levels of this pesticide in our bodies by 70%!

The reasons to buy organic or grow our own chemical free food organically continue to increase.

Researchers at the University of Maryland have discovered a new role for a plant molecule called ACC. They found that this molecule in addition to being a trigger for pollen and seed



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production, it also acts like a plant hormone activating proteins that are similar to those found in animals and human's nervous systems.

Previously we thought ACC was only a precursor to ethylene (a plant hormone) that is used in many plant processes. They also found that ACC affects the nervous system in humans so they looked for similar responses in plants and found it.

These were GLR's (glutamate-like receptors) in plants and they are involved with long distance electrical signaling through the plant vascular system. For example, a single injury to one leaf informs the whole plant to turn on its immune system and create chemicals to deter insects. Journal Nature Communications (2020).

Another study published in the Journal Renewable Agriculture and Food Systems (2020) by researchers at Penn State has shown the importance of diversity. They evaluated several species of plants growing in mono-culture and measured root growth, etc. They the planted all five species together and they found total root mass increased.

A corn crop following the multi-species cover crop was more productive than a corn crop following the mono-species cover crop.

Nature requires diversity to be the most productive, whether an agricultural crop or the flower beds in our yards. This also applies to our lawns, as lawns with multiple species of grasses are healthier than mono-species.

Note: Some states are now giving grants to folks to remove their lawns and grow urban meadows as they are so beneficial to our health and the environment.