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JOHN'S CORNER:

NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

by John Ferguson

Remember the old saying by Hippocrates, "Let food be thy medicine"? A new study from the University of East Anglia in cooperation with Harvard University reinforces this. They found that eating a cup a day of blueberries improved heart health and reduced the risk of cardiovascular disease by 15%. American Journal of Clinical Nutrition (2019) . Many varieties of blueberries grow well in the Houston area and there are several pick your own blueberry farms in the region. A mature rabbit-eye blueberry plant can produce as much as 15 pounds of berries. Many pollinators love the flowers and many species of birds relish the ripe berries. When blueberries are grown next to woodlands the plants get better pollination and produce more fruits (USDA). The USDA also found that growing native grasses next to blueberry plants corrected signs of iron (Fe) deficiency.

The journal Environmental International (2019) had a recent article that demonstrated that restoring environments to a wide range of plant species promoted good bacteria over bad bacteria. They found a direct connection between a healthy ecosystem and human health. In particular they found it increased bacteria that boost our immune systems. This is a good reason to increase the diversity of plants in our landscape. The greater the diversity of

grasses, flowers, herbs, shrubs and trees the more health benefits one's garden provides from microbes and earthworms, to butterflies and birds.

A problem that gardeners often face in Houston is the disease Phytophthora. Research at Cornell University has found that it can be controlled using certain plants like Brassicaceae family as cover crops. These include mustards, cabbages, broccoli, etc. as they have sulfur compounds in them called "gluconsinolates" which give some members of this family their spicy taste. When these plants are turned under, they act as a natural fungicide for this disease. They also have deep fast-growing taproots that helps break up hardpan and loosen the soil. Additionally, they return a lot of nitrogen to the soil and return 3.5 time more carbon than other species. A bonus is that many pollinators love to feed on the pollen and nectar of the flowers.

Researchers at the University of Sheffield's physics lab have found that photosynthetic bacteria that directly use sunlight for energy, use a mechanism of nature called quantum entanglement to communicate with each other. Similar work at the University of Oxford stated it would explain the remarkable speed of enzyme-catalyzed reactions we find in nature.

The June issue of Science News had a summary of a research paper published in the journal Functional Ecology. They discovered that some species of plants can grow directly from rock (no soil required). Species of plants that have this ability to secrete malic and citric acid from their root tips that dissolve nutrients (elements) directly from the minerals composing the rock.

A study published in the journal Environmental Sciences Europe (2019) has found another problem caused by use of the herbicide glyphosate (think Round-Up). One of the breakdown products of glyphosate is a toxic chemical called AMPA (α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid) where it is slow to degrade further. In the soil it harms earthworms preventing them from growing properly and performing their normal ecosystem services from aerating soil to eating weed seeds. It also causes reproductive damage in earthworms. Bacteria and fungi are also sensitive to this chemical preventing them from cycling nutrients and storing carbon in the soil. This chemical has also been found to cause changes in the reproductive cycle, metabolism, growth and behavior of fish, insects and mollusks. We now have companies marketing meatless burgers made from genetically engineered soy that requires very high levels of the cancer-causing chemical glyphosate.