

NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

By John Ferguson

Phytoremediation is the process of using plants to remove and store contaminants in their tissue that was taken from soil. Researchers at Nanyang Technological University in Singapore has been studying tropical plants that are native and available locally.

They have identified 46 species of plants that have shown promise for use in phytoremediation. Of these 12 species were identified as most promising.

For example, Cow Grass (*Axonopus compressus*), Brake Fern (*Pteris vittate*), and Indian Pennywort (*Centella asiatica*) were found to be very effective in removing several types of heavy metals and metalloids.

Heavy metals and other contaminants, accumulate in soils in urban areas from air pollution, vehicle emissions, pesticides, paints, batteries, industrial waste and sewage sludge (biosolids). Environmental Pollution (2022)

Note: In parts of Houston and along the Gulf coast the soil is contaminated. If it is contaminated then it is best to place an impermeable liner down on the ground and build a raised garden bed on top of it. The liner prevents the roots from reaching the topsoil and absorbing these toxins.



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An article in Science daily talked about a chemical called geosin which has an unmistakable pleasurable fragrance, the scent of wet soil or the air after a summer rainstorm or the scent that fills our nose while gardening in rich healthy soil.

We all know that a caterpillar's bright colors, a pufferfish's spines, a Monarch butterflies' coloration, all warn predators that "I am not good to eat".

This chemical (geosin) is produced by bacteria for a particular purpose, to warn predators that they are poisonous to them. A soil worm called nematodes is the most abundant animal on earth and help cycle nutrients by eating bacteria.

However, some bacteria like *Streptomyces coelicolor* are toxic to nematodes. They produce this chemical that the nematodes can smell to warn them away. Humans can easily detect this chemical even at 5 ppm. Environmental Microbiology (2022).

I have noticed at my retirement property outside of LaGrange I have lots of lightning bugs. I have a St. Augustine lawn that I provide minimal care to and rarely water. I do not have diseases, sod webworms or chinch bugs.

I was reading a paper this morning that over the last century the amount of available (reactive) nitrogen (N) has doubled through industrial and agricultural activities. "This excess nitrogen has become concentrated in streams, lakes, and coastal bodies of water often resulting in eutrophication, low oxygen dead zones and harmful algae blooms".

At the same time many ecosystems have declining nitrogen availability. There are many causes from increased carbon dioxide in the air allowing plants to grow faster (which uses up nitrogen quicker) to a loss of insects that help cycle nitrogen back into the soil, to the loss of nitrogen fixing algae in our soils.

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This got me thinking that there may be a connection. One of the problems when we use nitrogen rich artificial chemical fertilizers, is that the nitrogen ends up in our storm sewers before it gets to our bayous and streams. There it causes a loss of dissolved oxygen which kills aquatic life from crayfish to minnows that eat mosquito larva. As a result, our mosquito problems get much worse.

I remember reading a paper years ago on lightning bugs (fireflies) that described how in their larval form, while living in the soil they are voracious predators of many soil insects. I would suspect this includes the eggs of lawn pests like webworms and chinch bugs.

I also suspect from the text above; we now spray poisons to kill mosquitos which also kill lightning bugs. No lightning bugs, hence no larva, thus more lawn pests like sod webworms and chinch bugs, and now we apply more toxic cancer-causing chemicals to treat them.

It is time we started studying nature and use the methods God gave us to grow plants and manage insects.

Just more reasons to use modern biological methods and organic fertilizers. Not only do they give better results, they do not have the tremendous environmental and health costs to society, and they cost less.

I finished reading a book this week titled, "REWILDING - The Radical New Science of Ecological Recovery" (Illustrated Edition) by Paul Jepson and Cain Blythe, MIT Press, 2022, ISBN 978-0-262-04676-3.

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I know many of our readers are trying to restore habitats for animals and pollinators at their homes as well as their country places. This book ties ecology, habitat, animals, etc. altogether and is a good introduction to how they relate to the larger ecosystem.

This book is easy to understand and has lots of illustrations to help the reader become familiar with how all we do, ties together.

From the cover: "How rewilding has transformed the conservation movement, combining radical scientific insights with practical innovations."

Progressive scientists and conservation professionals are pursuing a radical new approach to restoring ecosystems: rewilding. By recovering the ripple effect generated by the interactions among plant and animal species and natural disturbances, rewilding seeks to repair ecosystems by removing them from human engineering and reassembling guilds of megafauna from a mix of surviving wild and feral species and domesticated breeds, including elk, bison, and feral horses. Written by two leaders in the field, this book offers an abundantly illustrated guide to the science of rewilding. It shows in fascinating detail the ways in which ecologists are reassembling ecosystems that allow natural interactions rather than human interventions to steer their environmental trajectories.

Rewilding looks into a past in which industrialization and globalization downgraded grasslands, describes current projects designed to recover self-willed ecosystems, and envisions the future with ten predictions for a rewilded planet. It shows how rewilding is shaking up conservation science and policy, bringing new hope and renewed purpose to efforts to revive essential ecological processes. Color illustrations capture moments of beauty in nature and offer enlightening infographics and visualizations.

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