

NEWS FROM THE WONDERFUL WORLD OF SOIL AND PLANTS

By John Ferguson

Do you ever think bananas do not taste as good as they used to many years ago?

Well, you are correct. Starting in the 1950's the main variety of banana was a member of the Cavendish group of cultivars called Gros Michel. As it was over planted it became susceptible to a fungal disease known as Panama disease (*Fusarium oxysporum*) which attacks a plant's roots.

This variety was replaced with another member of the Cavendish group called Grand Nain and some other varieties that were just not as tasty to most folks.

We were told that only GM (genetically modified) can save the banana. However, researchers at Cambridge university have found that like many other food crops, different varieties of banana can be grafted together to build in natural disease resistance and other traits to keep bananas healthy, without any need for genetic manipulation! Nature (2022)

If you are growing bananas several studies have found that most banana plantations have imbalanced soil nutrition, poor soil structure and quality and high salinity. These are conditions that favor the growth of the disease and prevent bio-control methods from working. These conditions also tend to favor the growth of nematodes that attack the banana plant weakening it and making the plant more susceptible to the disease.



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Numerous studies have found that soils rich in microbial species like *rhizobacteria* out compete fusarium for nutrients preventing the pathogen from growing. Other microbes produce chemicals (enzymes, phytoalexins, etc.) that increase resistance to the disease in bananas.

Many species of plants whom has their roots colonized by mycorrhizal fungi are extremely resistant to all forms of fusarium pathogens. When banana roots are inoculated by mycorrhizal spores of the *Glomulas sp.* they have greatly reduced symptoms of infection both inside and outside of the banana plant.

Note: If artificial fertilizers are used, mycorrhizal fungi will not colonize the roots of plants.

A good quality compost contains many of the microbes mentioned above and is generally effective against many species of the fusarium wilt pathogen. Also nutrients need to be supplied in an organic form for biological control to work.

I grew bananas for many years and never has a disease problem. They love a good compost which I applied regularly; they grew over 15' tall and were beautiful. About every three years if we had a mild winter, I would get stalks of bananas which were delicious.

Speaking about fungus pathogens, a new study by the Max Planck Institute for Chemical Ecology has found the plant defense hormones salicylic acid and jasmonic acid actually work together to increase a plants resistance to disease, contrary to what was previously believed. *New Phytologist* (2022)

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Organic soils rich in trace minerals and good organic matter (humus) create conditions where plants can produce more of these type defensive chemicals. This is one of the reasons organic gardens have less problems when compared to the obsolete toxic chemical rescue methods.

Researchers at Texas A&M have confirmed that organic methods produce more nutrient-rich fruit than the toxic chemical methods. They found that when a plants leaves are damaged by chewing insects, they produce more anti-oxidants.

Anti-oxidants are a part of a plant's defensive chemicals and for humans they are the anti-cancer chemicals.

I was asked the other day, "How can I increase the beneficial insects in my yard?"

One of the things I do is keep small brush piles out along the back corners of my lot which are hidden behind taller plants. When I am doing pruning, I just toss the branches and limbs on the pile. Periodically, I will toss some mulch or topsoil on the pile which helps it keep cool and moist.

This makes a great home for beneficial spiders, centipedes, earwigs, and many other predators that eat our pest insects. As the material decomposes it feeds the good microbes and provides nutrient to my plants.

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Speaking of beneficial control of insects, the other day I was out watering my flower pots and my cell phone rang. So, I set the garden hose down on the ground near the base of the house. After a few minutes while I was still talking, I noticed many small insects like roaches scurrying up the brick wall to get away from the water that was piling up against the foundation.

The insects had not climbed more than two feet up the wall when a half dozen lizards appeared out of nowhere and gobbled them down. I have to admit that I find that being gobbled up by a lizard a suitable fate for a roach.

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