

## Soil health nuggets—food for thought

**By Janet Lagler**

*Natural Resources Conservation Service*

Did you know that more than 200 years ago, Thomas Jefferson, a farmer and conservationist, used vetch, turnips, peas, and clover as cover crops and in rotation? He used these crops on his Virginia plantation to build soil that he knew was being depleted with his tobacco cash crop. Here are some things you may not know:

There are more soil microorganisms in a teaspoon of healthy soil than there are people on the earth! Millions of species and billions of organisms—bacteria, algae, microscopic insects, earthworms, beetles, ants, mites, fungi and more—represent the greatest concentration of biomass anywhere on the one percent of the total soil mass, are the yeasts.

The best soil on most farms is found in the fence row. These undisturbed remnants of what soil properties were once like is not surprise to farmers who have dug into the soil. It's crumbly, dark, and loose, and it's a model of soil structure and organic matter for farmers who are trying to make their soil healthier.

Tillage (or plowing) destroys the soil's structure! Tillage destroys "aggregation" or the soil's structure—the habitat soil microorganisms depend upon to ensure critical soil functions like nutrient cycling.

Tillage also reduces organic matter content and increases erosion, which reduces the sustainability of our food production system.

Tilling the soil up does NOT allow more water to soak into it. Don't believe it? Fill two containers with untilled and tilled soil and simulate rainfall on them. Watch the water stand on top of the till sample, but soak down through the untilled sample. Or, give them the slake test (placing clods of untilled and tilled soils on wire mesh at the top of water filled jars).

You'll find if you submerge tilled soil just below the surface it will soon collapse in a heap at the bottom of the jar, but the untilled soil will still be intact for the most part even 24 hours later.

Tilling soils causes pores to collapse and seal over, causing more rain to runoff than soak in.

OMG! Organic Matter (half) Gone! The Morrow Plots on the campus of the University of Illinois indicate soil organic matter content in prairie grass borders was 5.5 to 6.5 percent in 1876.

Less than half of that is left. That's the case with most prairie soils - oxidation of organic matter from tillage for row crops has reduced organic matter levels to between 2–3 percent today.

A farmer's favorite cocktail may not be what you think. Innovative farmers are breathing new life into their soil by seeding a "cocktail mix" of 6-12 plants to get diversity above-ground, which create much-needed diversity below the ground.

Through that diversity, farmers are mimicking the soil-building and microbial-friendly conditions of the diverse native prairies.

If you want your soil to be healthy, you shouldn't see it very often. That's because you want that soil to be covered all the time, preferably with living plants.

Keeping the soil covered all the time makes perfect sense when you realize that healthy soils are full of life. The microorganisms living in the soil need food and cover to survive—just like other living creatures.

Roots of some plants can grow three-feet deep in 60 days! Roots of Daikon type radishes are a biological alternative to deep ripping to alleviate soil compaction.

After radishes winter kill, the channels created by the roots tend to remain open at the surface, improving infiltration, surface drainage and soil warming. The popular cover crop also is an excellent nitrogen scavenger.

What did President Thomas Jefferson know that we don't? More than 200 years ago, Thomas Jefferson, a farmer and conservationist, used vetch, turnips, peas, and clover as cover crops and in rotation. He used these crops on his Virginia plantation to build soil that he knew was being depleted with his tobacco cash crop.

Multiple “bennies” through multiple species.

The below-ground synergy created by crop rotations and multi-species cover crops can actually accelerate biological time by increasing organic matter, allowing crops to flourish in dry times while monocultures struggle. And as an added bonus, diverse cover crop mixtures work together to crowd out weeds, improve nutrient cycling and reduce plant diseases.

Want more soil secrets check out [www.NRCS.USDA.gov](http://www.NRCS.USDA.gov) or call your local NRCS office at 352-4776, Ext. 3.