Question on building better soil

With compacted soil you simply cannot have healthy roots, good plant nutrition, or good water penetration and storage. The condition of compacted soil causes a multitude of problems in excess to list here. Here are two factors that can improve that situation.

There's no doubt that the journey to better soil health requires better oxygenation of the soil allowing for better water penetration, oxygen for the soil microbes to utilize, better root growth and potentially the ability of the terrestrial biosphere to create enough calories to sustain the proliferation of microbiology. Of course that requires plants conducting photosynthesis which ultimately allows for the production of Rubisco, a protein.

The trick is, how do we get there from here?

1. Is is just Organic nutrition contained in mulch (in the case of no till)? Important yes, but most of the nutrition the mulch contributes is minerals that originated from the same site, so you don't have a net gain in remineralization. Therefore minerals may still need to be fortified from an outside source. The mulch will of course also contribute calories which the microbes need, but most of those calories are in the form of carbohydrates while fatty acids and proteins are equally if not more important.

2. Reducing Compaction of the soil. Microbes always play a huge role in soil health as they do in our own health. However to best understand the physics and chemistry of soil compaction you must also appreciate the primary factors involved. Here's a brief description of factors.

A. Glomalin: a glycoprotein that glues soil particles together assisting in the formation of macro-aggregate structure of the soil. The protein will eventually contribute calories to soil microbiology, but in the meantime is helping to open up the structure of the soil allowing for oxygenation. The Glomalin also serves as a huge carbon banking system that will eventually turn into the more permanent 'Recalcitrant Carbon' molecular structures we call Humic Acids. More on Humic Acids further down. What's important to understand is where does the Glomalin come from? Not from the decomposition of mulch, not from compost, and not from the dead decomposing soil organic matter. It comes from the cellular tissues of the Glomus genus of mycorrhizae that hopefully are living in the soil in orchestration with

the plants. However the problem is that under typical agricultural settings the plants don't have a mycorrhizal relationship that's abundant and sometimes or even often have none at all! Thus an important reason for inoculating crops with EndoMaxima, an agriculturally applicable form of mycorrhizal spores. It's not the only reason for using mycorrhizae in agriculture or
urban horticulture as this amazing fungus does many more important things that the entire ecology of the site benefits from. For example we could think in a one dimensional way and say that mycorrhizal plants get more water out of the ground with the help of the fungus than they could without. Or we could say that plants with this relationship get more mineral uptake from the soil than they could without the help of the fungus. Or we could say the mycorrhizal fungus will protect plant roots from the ravaging nematodes that can damage roots. Or we could just say that mycorrhizal inoculation often (not always) improves the crop yield for the farmer. However
what's the big picture that we really need to be looking at? Many authorities
on the subject will agree with me that we need to focus on the big picture and not the individual benefits and that big picture is that when we have an abundant mycorrhizal relationship on the site we also have abundant carbon sequestering that essential for us to move in a positive direction towards better soil health.

B. Supramolecular soil chemistry via the biologic chemicals we generically call humic acids: These are Recalcitrant Carbon structures and when many have accumulated in a soil you can see the soil change color and improve structure. When the so called humic acids are truly biologic, they are also
'supramolecular' and under those conditions they play a huge role in improving the macro-aggregate structure of a soil as they have characteristics
of Quantum Mechanics/Polarity that change how soil particles behave. They are truly essential to a healthy and productive soil, however under many conditions of agriculture and urban horticulture they are not being developed and therefore are not accumulating. This is why we fortify them into a
soil along with inoculate with mycorrhizal products, to instigate a process that's needed to keep us on the journey to better soil health?

While EndoMaxima and TerraPro Humic's are not the only two tools needed in the tool box, they play a very important role in the building of a better soil.

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