



Did you know??? **Your soil is alive!!!**  
I bet you think it's "just the dirt beneath your feet" ☺

It is SO much more than that...  
**It's the skin of the earth and the digestive tract for all of the plants.**

It tells the story of earth's history as well as  
today's reality and tomorrow's potential.

It's a composite: of minerals – all types and sizes,  
animals (large and small – and smaller still),  
plants, fungi, debris and residue of all kinds (good and bad).

### **So....What IS in your soil???**

1. The minerals: these are inorganic (non carbon sourced) pieces of the soil. These are the classic combination of sand, silt, clay found in all soils– and in/on those pieces are the elemental ions that all of the living members of the soil use to sustain life.

2. And those pesky ions... a word remembered from high school chemistry! This is the electrical component of any healthy soil system. And just like a car battery – your soil can be fully charged or it can be totally "dead" and in desperate need of a recharge.

The word ion sounds hard but it's actually just the active forms of the minerals and substances that you're already familiar with – minerals like Calcium (Ca), Carbon (C), Magnesium (Mg), Phosphorus (P), Potassium (K), Nitrogen (N), Iron (Fe), Sulfur (S), Boron (B), Manganese (Mn), Silicon (Si), Molybdenum (Mo), Cobalt (Co) and so forth. These are the most important but there are others...

3. Then there's all of the life – and there's more life (both in numbers and in volume) under the soil per healthy square inch than there is on top of the soil. There's an entire complex community that lives down where the sun don't shine.

Community members range from the size of chipmunks, gophers and wood chucks; through earthworms, insects, arachnids (spider group) and mollusks (slugs) all the way down to amoeba, paramecium and finally down to bacteria- and that's just the "animal" side of the community. Fungi are an entirely different (and essential) group of organisms that are closely associated with almost all plant roots.

The plant community is split with its roots in the ground and its green growth in the air. It's that green growth and its ability to gather and sequester carbon (all those sugars from photosynthesis) that makes the underground system possible. Plants shed anywhere from 25-60% of their food production into the immediate area around their roots called the rhizosphere and that's where they feed the fungi and the bacteria that help to gather those earlier mentioned ions and funnel them into the plant (and on into us!)

**Practical Tips for Fertilizers and Amendments That Can Aid in Carbon Stabilization, Sequestration and Growing Great Plants Anywhere**

This first list of products to experiment with is directed at the base problems of soil – getting it to come to life.

#### **Available Anywhere**

- **Molasses**  
Basic sugar easily added to water and used as a drench for any weakened plant system. Plants produce sugars (photosynthesis) to shed into their rhizosphere – this can give those microbes the sugars they are starved for and kick the whole system upwards.
- **Liquid Soap**  
Any liquid soap, even the cheapest stuff from the dollar store, can be mixed with water (one cup to three to five gallons water – more concentrated if the soil is totally compacted) and drenched into compacted or drought stressed soil. If you have the money and the access, yucca (Sledgehammer) is superb. Raw yucca is cheaper but trickier to work with – read the label!
- **Mix molasses and liquid soap for even better results.** I've rototilled water, soap and molasses into an awful compacted and hyper droughted space and then followed up with soap and molasses drenches for superb results. The planting stabilized in record time and has never faltered (15 years)
- **Wood Pellets**  
Either bedding or for pellet stoves – found anywhere. Soaked in water with soap and molasses in it or just water and mixed thoroughly with alfalfa meal – really work it together. Rough and ready but can work in some circumstances. Direct carbon added to a system. Straight wood pellet is very high in carbon (900pts +) adding the alfalfa meal adds the needed nitrogen to get the system cooking correctly. Soap and molasses act as wetting agents as well as food for microbes. The sawdust (which is what the pellets are made from) last quite a while in the soil system. Keep an eye of the nitrogen if the whole system is weak – the wood pellets can pull more nitrogen out of the system than help at the beginning (the microbes need the nitrogen for their lifecycle. Add more alfalfa meal or even use a chemical nitrogen source if needed (I know heretical but it works!))

#### **Available with a little research -and here at the store**

- **Alfalfa meal -**  
Meal not pellets!! In a pinch, you can use alfalfa cubes soaked overnight. Fifty pounds of cubes per 32 gallons water makes a nice slurry to use as an underlay in a mulch situation (don't let it sit for more than 24 hours – phew!!!!). Both organic and conventional meals are available. Per usual, the organic meals are brutally expensive, but better. I use the organic in my general planting mix but use conventional alfalfa meal for broad landscape application. There are GMO alfalfa fields now, but they are not yet as ubiquitous as soy and corn GMO fields.
- **Rock dusts**  
Look local – almost anything you find that isn't treated with pesticides to repel weeds etc. is worth looking at and is the least expensive major product you can add. Soil is a combination of raw mineral, organic detritus and micro and macro-organisms so adding back in that raw mineral component can be very effective.
- **Azomite, Dynamine, Flora-stim, and Mt. Tom basalt (local stone dust).** Raw minerals with known analysis feed the soil system better than concentrates if you're trying to build a diverse microbiology, and that diversity is key to carbon stabilization/sequestration. I've used Azomite for years and am experimenting this year with a load of Mt. Tom stone dust.
- **Compost teas/Inoculants**

There has been an explosion of information in this category over the last 15 years. A true, well-brewed compost tea with protozoa and amoeba is the gold standard, and like all gold standards, not always achievable. There's been a huge influx of inoculant options due to the marijuana industry's need for the highest quality plants. Drugs are secondary plant metabolites that take A LOT of quality plant to produce. Find out which sources are easy for you to get and experiment with. Look for Glomus sp on the label; these fungi are the best at holding onto carbon.

- **Leonardite and its derivatives (fulvic and humic acids):**  
This is the core of immediate carbon supplementation at the moment. The liquid forms are as close to a “magic potion” that you're ever going to get. They raise the energy of the soil and allow the roots to work much easier – you'll often see the plants change and green within ½ an hour especially in containers
- **Biochar:**  
The new carbon kid on the block with a very ancient pedigree (the Terra Pretta soils of the Amazon). Use it if you can find it...
- **Non-medicated Chicken Layer Mash (not pellets):**  
Not organic (way too cost prohibitive!!) but outrageously effective at waking up a totally damaged soil system if you have 6-8 weeks (min) between using the mash and planting. Causes a complete explosion of bacteria and rapid integration of all other minerals added to the space. I try and get this down in November for spring planting on sites that I know are a real challenge. Weird but it works... This is what I used to convert 4” of painted wood chip “mulch” and sand into a decent garden over one winter (October – layer mash, lime, alfalfa meal tilled in and watered – planted to a mixed palette the following May).

**Favorite Soil Amendments Used Throughout the Growing Season:** I use all of these depending on soil tests, budgets and site situations

#### **Straight products**

- Alfalfa meal
- Greensand
- Azomite
- Calcite lime
- Rock phosphorus
- Gypsum
- Liquid kelp

#### **Blended products**

- North Country Organic's (NCO) Pro-Gro, Pro-Start, Pro-Holly
- Neptune's Harvest Fish hydrolysate (not emulsion!) and liquid kelp- especially good on begonias and all vegetables if they need a pick me up.

**Favorite Soil Management Recipes: a series of “fertilizer” blends** I mix these together on a tarp and store in sealed plastic containers and sealed is the key!!! If these get wet – beware!! They're designed to spike microbial activity and they do -when concentrated...need I say more??

**Basic planting mix** – used in all annual and perennial installations. Rate adjusted by type and vitality of plant material and history of the garden. As mentioned this is mixed together on a large tarp and stored in sealed plastic containers. I mix four - five batches a year.

- 100 lbs NCO Pro Gro
- 100 lbs Alfalfa meal

- 40 lbs Azomite



The gardens in these photos have been fertilized using the basic planting mix.

**Woody planting mix** – developed to try and get ericaceous material to settle in faster, but I find that it works really well for all kinds of woody material, even a bare rooted, 3.5” caliper locust planted in late May. Prep the roots for planting. Coat the root balls with the mix (work in well with fingers or knife) and work more mix into the top 6” of the soil.

- 50 lbs Alfalfa meal
- 50 lbs Jersey Greensand
- 40 lbs Azomite
- Bio-stimulant – so many to choose from – figure out what works best for you. Woody plants are ectomycorrhizal most other plants are endo-mycorrhizal

Elemental Sulfur, Gypsum and Rock phosphate are added based on soil test results or known problems on the site.

**Fall soil development mix** – used in open gardens that are coming in to production, edges of existing gardens that need refreshing or other soils that need to open up (compaction, etc.). It’s spread on the surface at the rate of about 25 lbs/100 sq ft and either rototilled in if the bed is open, or hand cultivated if the bed is already planted. Promotes a strong bacterial reaction and feeds the worms well – they develop heavy muscles (almost blue in color) that allow them to really turn soil.

- 100 lbs Layer Mash – non-medicated (chicken food)
- 100 lbs Greensand
- 40 lbs Azomite
- 80 lbs Gypsum
- I’ve included stone dust from a local quarry to the mix for beds in which too much organic material has accumulated with spectacular results.



These gardens have been fertilized using the general planting mix along with the fall development mix.

**Odd mix out** - liquid blend for containers and annuals that need to be held in full color until late in the season for a wedding or other outdoor event.

In a 32-gallon trash can mix

- 2 cups Miracle Gro (I know – heretical!) I actually use a commercial High magnesium granule
- 1.5 cups liquid kelp
- 2 cups molasses.
- ½ cup liquid humates

Mix together well and water as usual. Molasses provides an instant source of carbon to buffer the fast nitrate in the Miracle Gro and the kelp helps to provide tolerance to the stresses of containerization or cold or both. The humates increase the energy in the soil so uptake is easier for the plants. This can also be worked up in a watering can at a 1-1-1 & drops ratio of a tablespoon each per gallon.



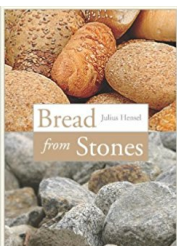
## Stone Dusts

Let's look at stone dusts...

what the heck are they and why should you care????

Here's why they can help to recharge the soil in ways regular fertilizer can't. Stone dusts can't repair major deficiencies in soil chemistry, but they are excellent at recharging the whole composite "soil battery". I use Azomite in all of my planting. It's a raw stone dust from Utah – the remnants of an old inland sea. Adding other new rock dusts into projects carry a different energy and mineral complexity – each unique but able to work together.

The current soil remineralization movement traces its roots back to the German biochemist, food nutritionist and agricultural chemist Julius Hensel. In 1894 he published Bread from Stones: A New and Rational System of Land Fertilization and Physical Regeneration that touted the use of 'stone meal technology,' the term used at the time to refer to rock dust remineralization. He thought the industrial agricultural practices at the turn of the century were



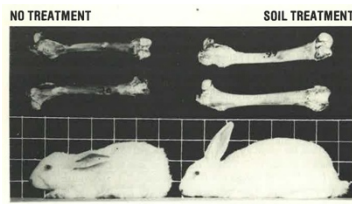
dysfunctional to say the least (we were just starting the move into modern industrial agriculture) and he proposed that growers should use more natural, wholesome fertilizers such as granite meal (our modern stone dust) based on the original creation of soil as a degradation of rock, addition of organic material and living root tissue.

He was countering the ideas of von Liebig's **Law of the Minimum** that states that yield is proportional to the amount of the most limiting nutrient, whichever nutrient it may be. The Law of the Minimum is the backbone of our modern NPK fertilizer programs – and soil test analyses. As in so many things – each had part of the picture but von Liebig's theories won the information wars of the times and the concept of complex minerals in soil as part of soil health had to wait several generations before their value became more noticeable.

Today -we see that same difference of opinion played out in conventional vs organic growing practices... and the funny thing is that both practices may grow poor quality plants if the soil is not healthy and both practices can produce quality produce if the soil is healthy and rich in all kinds of minerals. Both approaches can use the concept of remineralization and see benefits.

Hence my interest in Mount Tom stone dust – and others like the Pandolf Perkins stone dust. Mt Tom stone dust is different from most stone dust because it's a basalt (volcanic in origin) and paramagnetic [weakly magnetic] into the bargain. I bought 22 tons because that is the minimum order. If you are interested in experimenting with it, I am selling it in much smaller quantities – like 5-gallon buckets. And just to make you feel a little better about stone dusts – you're already familiar with quite a few: lime, greensand, rock phosphate, Azomite, leonardite etc.

In case you were curious if you could use this information for something other than gardens (veggie or flower) – you can!! You can take all of this information on stone dust and help critical trees in your yard – or other trees that you may also choose to help. I've used the following information to help stabilize the two 100-year-old European beeches in front of the Westminster Library.



*The weanling rabbits had the same pedigree, so did the crop plants making up the hay, but treatment of the soil with some extra fertility to grow better feed made the rabbit on the right different in appearance and body structure as the bones also illustrate.*

I've mentioned nutrient dense food in the past and soil health plays into human and animal health as much as to the plants. William Albrecht's research documents the effects of poor soil, hence poor nutritional value, shown quite clearly in this picture from one of his books. We'll take the rabbit on the right, thank you!!