Soil Carbon Sink at Columbia Agriculture Park
Work Plan for Amendment Application, May 2021

Ingredients are applied in a sequence of layers to optimize mixing, merging & adsorption into a blended media that quickly kickstarts strong microbe growth into a full-function Soil Food Web. Biochar’s unique porosity is a substrate to assemble water, minerals & microbes, encourage their interactions, accelerate soil building processes:

Step 1: MOWING
Late April, farm manager Tony Minnick will flail-mow the hip-high cover crop, reducing top-growth to a thin, rough layer of plant debris on the soil surface. Cover crop roots and symbiotic microbes are left undisturbed in soil to reduce the need for tillage. At this first stage to turn heavy clay into soil quickly, tillage is necessary to mix amendments into the dense clay.

Step 2: MEASURE & MARK
Sweet potatoes will be in 4-foot rows, with amendments applied in 2-foot bands, with 2-foot unamended paths. Treatment concentrated on half the site in effect doubles application rate within 12 inches of any potato plant.

Step 3: SURFACE PREPARATION
Five days later, spray stubble with strong Humacarb™ solution (liquid fulvic & humic acid with humin), with:
1) SEA-90™ sea minerals: full menu trace elements;
2) Liquid Kelp: sea minerals with carbon & nitrogen;
3) PacificGro Hydrolysate™: liquified fish, shrimp & crab shell, with ultrafine biochar. Rich in chitin proteins used by fungi to grow mycelium threads;
4) SumaGrow™: blend of 16 bacteria & 9 fungi in 12% humic acid to inoculate inert clay with fundamental microbes to seed a Soil Food Web;
5) Mycoapply™: ultrafine spores of mycorrhizal fungi to pump water & nutrients into plant roots;
6) Boron: major trace element, important for sugar transport & metabolism within plants;

Step 4: BIOCHAR
Immediately sprinkle on a layer of fine texture biochar to cover sprayed, mineralized, inoculated biomass, thus shade soil, lower temperatures, conserve moisture, shelter microbes. Biochar won’t be broadcast, but sprinkled in 2-foot beds to concentrate in root zone of sweet potato plants. Base layer of biochar absorbs water, minerals & microbes applied on top.

Step 5: ENRICHMENT
Sprinkle measured amounts of minerals and microbes on the biochar layer:
1) Basalt Dust: igneous rocks from magma supply unreacted major minerals, trace elements, transition & rare earth elements – missing in MO soils. Basalt minerals react with CO₂ to fix into carbonates, thus sequester more carbon, and buffer soil pH;
2) Azomite™: clay powder sea floor sediment rich in trace elements;
3) SEA-90™ sea minerals: soluble trace elements
4) Kelp Meal (macroalgae): biologic source of trace elements packaged with carbon & nitrogen
5) Rock Phosphate: geologic source of phosphorus, key anion to power plant growth;
6) Oyster Shell Flour: biosource of calcium & trace elements, key cation crucial in sugar synthesis;
7) Diatomaceous Earth: biosource of silica;
8) any other mineral or microbe clay & crop need.

Step 6: COMPOST
Cover (biochar-mineral-&-microbe) with equal volume of Bluebird compost, main source of minerals, nutrients & inoculant microbes. Biochar is hungry, and soaks up minerals, microbes & nutrients seeping down;

STEP 7: STRAW MULCH
Scatter on a very thin, light straw mulch to shade, cool & protect naked soil, shelter microbes, feed fungi;

Step 8: MOISTURE
For 3 days, lightly wet with fine mist to moisten char & mobilize minerals, microbes & compost to begin creating Soil Food Webs;

Step 9: TILLAGE
After 3rd moistening, rototill to thoroughly mix surface layers into a few inches of clay;

Step 10: MULCH
After sweet potatoes are planted, cover with thick straw mulch as shelter for soil and biocarbon food for fungi;

Step 11: COVER CROP
Sow low-growing cover crop to grow more roots to pump more sugar & metabolites into the dense clay;

Option 6a:
Spray/scatter humic acid (or Humacarb™) on compost for ultra-fine carbon able to penetrate & loosen clay;

Option 9a: CHISEL PLOW
To deeply score & stir up the dense clay surface and insert amendments deeper. Tony Minnick will decide if & when to apply the operation.

Option 10a: WOODCHIPS
Thin layer of woodchips on the soil surface as mulch can deliver more slowly digestible biocarbon. Properly placed woodchips improve earthworm habitat.