CROP SERVICES INTERNATIONAL

Soil Testing, Consulting & Quality Products

Grower Grazier Newsletter

Fall 2015

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CEC & LaMotte, Biological– soil, compost & compost teas

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Sustainable/Organic & Beyond

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Liquid Fish
Kelp, Seaweed
Minerals and Microbes
Biological Inoculums
Compost Tea Brewers
Field Broadcasters
and More!

Support

On YOUR Farm
over the phone:
800.260.7933

Did you miss our winter newsletter? Silent Spring!

We hope this newsletter finds you knee deep in a bountiful harvest. During the time our last newsletter should have been published, CSI was on the road meeting people just like yourself. We exhibited at fifteen organic/ sustainable conferences throughout the eastern US and even traveled to Canada. After teaching the 2-day pre-conference track at ACRES, we switched sides of the desk and became students at the Advanced Soil and Nutrition Course hosted by Arden Anderson. Traveling over 18,000 miles didn't allow us time to get our Winter newsletter out. This was brought to our attention in May, when one of our customers called and said, "Every spring when I get your newsletter that is my reminder to order seed treatment. It's May and I didn't get my reminder!" Rest assured, he received his seed treatment in time for planting, however we were shamed for not taking care of business. It won't happen again!

As we mentioned in the last newsletter, the office moved out of Phil and Louisa's house. Dr. Phil has taken more of a back seat role with the business. He and Louisa are spending some quality retirement time organizing and growing a community garden, boating and traveling without the hassles of everyday business. I had the opportunity to visit them a few weeks ago on their houseboat, and they are both doing marvelous!

We are changing the format of the newsletter to cover more specific topics, concepts and ideas. In this issue, we have articles on carbon sequestration, compost tea, crop residue management and a variety of others. We have developed a new garden program that will be covered and published on our website. We hope you like the changes!

Happy Harvesting!

CSI welcomes smaller growers and homesteaders!

CSI welcomes everyone in the growing community, not just large acreage growers. According to the National Gardening Association, 1 in 3 households are growing food on their own or in community gardens. We are excited to be working with these home gardens as well as diverse operations including small livestock production, intensive fruit, vegetables, and flowers. It is great to see soil tests coming in from independent farms, CSAs, and urban and public gardens from all over the US, and Canada. These all represent a global movement toward locally grown, "Slow Food," "Nutrient Dense Food" and the expanding "Organic Markets". CSI is happy to be a part of that growth.

As a smaller operation, one challenge is finding a consultant who is willing to help you achieve your goals. Another challenge is finding products sizes that are small enough yet are cost effective. To provide solutions for smaller growers, CSI sources products in sizes from 1/2 lb. to semi-loads. With our connections we can arrange to have a custom blend of minerals (and microbes) and have them delivered to your operation in 1 ton totes, or in 50 lb. bags.

CSI is uniquely positioned with the best services, products and technology necessary to meet the needs of all growing sizes and types. Call today for details.

800-260-7933

Contact information:

Crop Services International
10332 Shaver Road
Portage, MI 49024

800.260.7933
team@cropservicesintl.com

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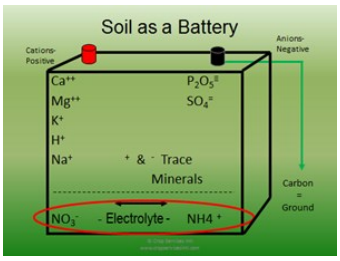
Think of your soil as a battery

If you think of soil like a battery with *plus* and *minus* poles, you will find **Calcium** and **Potassium** are the major components of the positive side and **Phosphorous** and **Sulfur** are the major negative charges. Now imagine trying to start an engine with a battery low in any of the four major components…no one would expect much! It only makes sense that we want **Calcium, Potassium, Phosphorous** and **Sulfur** in balanced proportions in our soils to supply a steady charge and maximize



growth. In truth our soil battery is much more complex, with no less than 17 elements (look at a CSI soil test) involved in plant growth and development, not to mention the biological system's role in producing a more stable, continuous supply of energy. The bottom line is, 'Do you or don't you have each of the crucial minerals? Are they balanced? And if not now, When?'

Get your soil test done this Fall and supply the minerals necessary to get it balanced. Don't start the year with a weak battery!

Biologically Speaking

By Joe Miazgowicz

Now that it's near the end of the growing season in most of North America, growers should use this time before the cold and snow cover of winter descends to keep the soil biology functioning at a high level. There can be a lot accomplished during this time to improve the conditions in the field well before spring rolls around.

Depending on which mineral imbalances may be occurring and what is being grown, fall can be an ideal time to add mined mineral soil amendments to improve soil structure. Improving the soil structure makes a big difference to the tiny workers in the soil, (bacteria, fungi, protozoa, nematodes, micro-arthropods, and worms), in their ability to hold moisture and nutrients in place and gradually cycle them to the plants above.

Making the microbes happy involves giving them something to do. The first order of business for them is cleaning up the mess after harvest. Plant debris, stems, stalks and leaves from the crop and from the weeds and even the mulch put down to suppress weeds all need to be decomposed by the bacteria and fungi into valuable humic materials that will set the stage for vigorous growth in the spring. This process can be helped along by the grower with the addition of populations of these soil creatures and the food resources to stimulate their activity. Compost, compost teas, compost extracts, and some commercial products containing great numbers of microorganisms that specialize in breaking down plant materials can speed that process along. (See Crop Residue Management article pg. 3)

A compost extract can be an efficient, effective means to get a diverse population of microbes into the crop residue for speedy decomposition. What is a compost extract and how is it different than a compost tea? Both are based on immersing a biologically active compost in fresh, unchlorinated water to get the little critters loose from the organic matter and spreadable in liquid form – much easier to apply than the bulky compost.

A compost tea relies on high Oxygen content in the water to wake up the benefi-

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Crop Residue Management

Incorporating crop residues (stalks, roots, stubble) **can** be very beneficial to the soil as a source of food for the soil microbes. The emphasis is placed on the word **can** because depending on the health of your soil these residues can also fuel the fire for fungal problems during the next growing season.

In the case of compacted soil due to mineral imbalances, lack of beneficial microbes, worms, etc., these residues break down by a anaerobic (low oxygen) process that is more "rotting" than "decomposition". This creates the perfect environment for pathogens and disease to flourish as most are anaerobes. Unfortunately the beneficial microbes (aerobes) suffer from these conditions as population and diversity are not at a level where they can outcompete the bad guys. At some point during the next growing season (typically when it is hot and humid) those pathogens will win and wreak havoc on your crops.

> *"Two weeks after I applied Complete there were very few stalks left!"*
>
> Randy M, Pittsburgh PA

Make every effort to avoid this situation by applying microbes and a food source this fall. CSI recommends applying compost teas or extracts (see Biologically Speaking article). CROP RECLE for fall applications, or COMPLETE for Spring applications are two such products from Living Stone Organics. These dynamic products are dry soluble powders that easily go into solution. They are loaded with beneficial microbes known to enhance residue digestion. Included are Humic and Fulvic acid, kelp and soft rock phosphate as sources of carbon. Depending on the residue, we generally recommend adding fish, as a food for the fungi especially to break down cellulose and lignin from corn stalks. Randy M., a farmer in Pittsburgh, Pa. applied 1/2 lb. per acre of Complete with 1lb of Fish Alive (also from Living Stone Organics) and in 2 weeks had virtually no stalks left.

Using inoculums may be beneficial in all soils, but especially in those soils that are transitioning and do not have minerals balanced and/or the biological activity to be considered a healthy soil. In healthy soils, plants are healthy and not as susceptible to diseases. So until your soil is healthy enough to aerobically digest these residues, use some form of insurance to encourage

Biologically Speaking cont.'

(Continued from page 2)

cial aerobic microorganisms. Food resources are added to the liquid mixture to promote rapid population increases in bacteria and growth and activation of the fungi, nematodes, and protozoa in the compost. Once the microbes are active (no longer dormant), they produce glue-like substances that allows them to stick immediately to whatever they are sprayed on. This fact makes compost tea very valuable as a foliar spray. The compost microbes will adhere to plant surfaces protecting them from pathogens and directly feeding the foliage and promoting efficient photosynthesis.

In contrast, compost extract does not need aeration and is not fed with microbial foods. This keeps the Oxygen demand low, so the resulting liquid can remain stable and effective for much longer – several days, in fact. Since inoculating crop debris with decomposers doesn't require adhesion to living plant surfaces, and there is no growth to promote, the dormant compost extract microbes can be distributed over the field or bed with plenty of water to soak into the debris. Once exposed to the Oxygen-rich atmosphere and given the dead and dying crop residue to feed upon, the microbes in the extract will wake up and start feeding on the debris.

To make an extract you need good compost, fresh water, and a means of gentle agitation to get the microbes into the liquid. A five gallon bucket with four gallons of water and a pound or two of compost in a mesh bag (400 micron mesh is ideal, but a paint strainer bag will work reasonably well) are all the materials you need. Put the compost in the bag, immerse the bag in the water and massage the bag gently as you might massage someone's shoulders. Do this for just a minute or two and use the liquid to spread on the crop residue. You can add more water to get the extract to cover a wider area. A very rich compost extract processed this way could cover about 5000-6000 sq. ft.

For larger applications, commercial compost tea brewers/extractors that use air or mechanical means to strip the microbes from the compost work well. CSI offers their "Bio Brewer" for compost extraction as well as for compost tea brewing. Use about one pound of compost for every five gallons of water. You can add more water just before application to get the spread you wish or to soak the debris more thoroughly.

Unlike a compost tea, which should be applied

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Sequestering Carbon...a biological Process

by Dane Terrill

Organic, Sustainable, and Biodynamic farmers have long used biological farming concepts. By adding bacteria, fungi, protozoa and nematodes through compost, compost teas, and manures, organic farmers nurse and fuel the soil food web. The benefits include improved soil tilth, increased water holding capacity and higher quality crops. As important – but perhaps less visible to the eye – are the benefits of carbon sequestration by these microbes...especially mycorrhizal fungi.

The oldest, cheapest, and most efficient form of carbon sequestration comes from the root exudates of actively growing plants. This has been happening for thousands of years, as indicated by the old prairies and forests that boast multiple feet of top soil (carbon). It is well documented that up to 50% of the carbon produced during photosynthesis is exuded through the roots into the surrounding soil. While this "dumping" action has multiple purposes, it mainly serves to attract and feed the soil microbes. Australian soil scientist Christine Jones goes into great detail about this process in the many articles she has written (www.amazingcarbon.com). In these articles she talks about the "Liquid Carbon Pathway," and states this form of carbon sequestration is the main mechanism to regenerate soils.

In order for photosynthesis to occur at optimal rates, good mineral nutrition to the plant is necessary through the soil and foliage (foliar feeding works). In addition, microbes in the soil and on the leaf make minerals available for the plant to feed on. CSI has always been a huge proponent of using fish, kelp and molasses to bio-activate microbes in the soil and on the leaf. Coupling those applications with mineral and microbe products like the soluble powders and the biological inoculums offered through CSI insure that diverse populations of microbes are present and will provide good mineral nutrition.

> The photosynthetic process is one that produces sugars; hence our plants are "sugar" factories – the most important process in agriculture!

The photosynthetic process is one that produces sugars; hence our plants are "sugar" factories – the most important process in agriculture! Plants' green leaves draw carbon dioxide from the air, energy from the sun, and water from the soil to create simple and complex sugars. These sugars are translocated throughout the plant but most importantly, to the roots and out into the soil. Brix testing on a weekly basis indicates how well your sugar factories are producing. In biologically rich soils with good mycorrhizal colonization of the roots, these sugars (liquid carbon) are taken up by the mycorrhizal fungi in return for the minerals that the symbiotic fungi and complementing bacteria solubilized.

Mycorrhizae are not decomposers, they receive their energy directly from actively growing plants. This liquid carbon becomes a food source for these fungi, and some of that carbon is morphed into complex carbons. These transformed carbons are exuded through the fungal hyphae into the soil and become stable humus, which can remain in soil for hundreds of years (Carbon Sequestration).

Certain farming practices should be reduced or eliminated in order to facilitate colonization of the of the roots by mycorrhizal fungi. Excessive tillage, and applications of herbicides, fungicides, and superphosphates compromise this colonization.

Adding compost, vermicompost, teas, extracts, humates and biochar have positive impacts on building soils, increasing biological activity and growing healthy plants. Carbon sequestration is the net outcome of this process. ■

Biologically speaking (Continued from page 3)

within a couple of hours after being removed from aeration, the extracts made this way can be saved for a few days before applying without losing effectiveness.

The crop debris should break down quickly. You should be able to see the difference in a few days although cold weather will slow the process. In Northern climates snow cover will provide good insulation and the microbes will continue to work at the soil level. Come spring there should be little left of recognizable plant material. The result will be an increase in Carbon content in the soil and a better environment for the soil biology and the crops to be planted for next season. ■

Call Joe at CSI for more information on compost tea/extract brewing, recipes, etc.

Compost Tea on Turf grass and Landscapes

In the last newsletter an article was written about CSI's office moving. That move included partnering up with Flowerfield Enterprises (FE) of Portage, MI. FE was started 40 years ago by the late Mary Appelhof who was one of the pioneers in vermicomposting. Vermicomposting is a process where worms decompose organic waste into worm poop (aka castings). Nancy Essex continued the business selling in-house vermicomposting bins, books, videos and worms. In 2006 she choose to diversify operations and started an Organic Lawn Care service.

FE brews and applies Compost Tea to residential lawns, landscapes, CSA's, community gardens and athletic fields.

Applications of compost tea inoculate and feed the microbes in the soil. Through Qualitative testing (assessing microbe populations and diversity through a microscope) the staff monitors progress in the soil of customers who desire to eliminate using chemical fertilizers and pesticides. Most lawns and landscapes respond to this increased microbial activity within a few weeks. Over the course of one growing season progress is visible above and below ground.

Obviously this service is only available to customers whom are regionally located in SW Michigan. The good news is you can brew compost tea on your own. CSI/FE sells a 5-gallon compost tea brewer kit that includes enough of our own compost and microbial foods to brew three batches of compost tea. Simply apply this through a hose end, or back pack sprayer.

Applying compost tea won't magically make a lawn weed free. Improving soil health with compost tea applications, core aeration, compost top dressing and over seeding, coupled with changing cultural practices of mowing higher and leaving clippings on the lawn to feed the soil will greatly diminish weed pressures. ■

Introducing our Garden Programs

by Ron Ward

In response to the increasing number of soil tests we receive for gardens, CSI has developed two new Garden Programs. These programs make growing a Sustainable or Organic garden simpler by giving you step-by-step instructions in an easy-to-read format. Go to our website and click on Garden Programs, or cut and paste http://www.cropservicesintl.com/organic-sustainable-gardening-programs/ into your browser. Here you will be able to download and save or print the instructions. Our goal is to guide you to growing more nutrient dense crops.

Growing nutrient dense food is the culmination of having the necessary minerals in the soil to grow plants and microbes in the soil to make those minerals available. Most soil tests that come through our lab indicate that minerals are not balanced and there is a lack of balanced biology. Ultimately your plants suffer as this leads to poor mineral nutrition which lays the foundation for insects, disease and pest damage, and poor yields.

The condition of your soil is directly affected by you. Is this your first year growing a garden, or have you been growing for years, applying minerals, compost and biology to build your soil? Regardless of your answer, soil testing takes the guesswork out of what to do next.

The basis for either program is soil testing. Most growers haphazardly apply "fertilizers" when planting a lawn or garden because that's what they were sold. In short, fertilizers are energy sources that make plants grow or reproduce. Too much fruiting energy can cause plants to blossom before they should. Too much growth energy and plants might not reproduce. (Having a tomato plant with lots of lush growth but no blossoms is an example of this.) Using results from soil testing as a guide to apply minerals necessary to achieve balance is an essential step in building healthy soil.

> Poor Mineral Nutrition lays the foundation for insect, disease and pest damage, and poor yields!

CSI's approach is to balance minerals and bio-activate microbes. As you read through the Programs you'll see there are multiple times throughout the growing season when we make application to the soil and to the plant (foliar feeding). This helps the plant grow through the season and supports it at every stage - germination, growth, reproduction, and fruit fill. Both programs utilize products that consist of minerals and microbes designed specifically to enhance these critical stages of plant growth.

The Organic Gardening Program consists of inputs that will satisfy organic certi-

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CSI, INC.
Soil Testing, Recommendations & Quality Products

CROP SERVICES INTERNATIONAL

10332 Shaver Road
Portage, MI 49024

Phone: 800-260-7933
E-mail: team@cropservicesintl.com

Check out our Sustainable & Organic Garden Programs

www.cropservicesintl.com

Our Mission:

To provide the most advanced soil testing, technology and proven quality products to enable farmers and growers – of all sizes and types – to improve the health of their soils, crops, livestock and humanity.

CSI on the Road

Dec. 1 or 2 (TBA)	Missoula, MT– 1 day class, Soil Health
Dec. 3-5	Montana Organic Conference, Bozeman, MT
Dec. 9-11	ACRES Conference, Pittsburgh, PA
Jan 27-30	SSAWG, Lexington, KY
Jan 29-30	Northern Michigan Small Farms Conference, Traverse City, MI
Jan 29-30	Guelph Organic Conference, Guelph, ON Canada
Feb 4-7	PASA– Farming for the Future, State College, PA
Feb 13-14	OEFFA– Conference, Granville, OH
Feb 25-27	MOSES– La Crosse, WI

Stop by our booth and say "hello"!

Garden Programs (Continued from page 5)

fication requirements. CSI offers dry soluble powders that are easy to mix in a watering can or sprayer. These dynamic products are loaded with a diverse microbial population as the base is worm castings. In addition, specific strains of bacteria and fungi are added to protect roots and foliage and solubilize minerals. Micronized (very soluble) minerals top off these products in precise combinations to support the different stages of the plant. To enhance the efficacy of these products, we recommend adding fish, kelp and molasses. This addition will assure a healthy start and maintain productivity throughout the growing season.

The Sustainable Gardening Program utilizes easy to use liquid products, some of which are organic. "Sustainable" products are those that indicate they are safe and present minimal risk to the diverse soil life we are working to maintain.

In this program, CSI recommends two premium fertilizers, one for root development and flowering, called Bloomtastic, and Palm Pro that promotes growth. Essential is another product consisting of fish, seaweed and humates which adds energy to these products. Added to this program is Companion® a registered biological fungicide. This product has multiple modes of action in preventing, controlling and suppressing plant diseases; and results in strengthening the plants systemic resistance to disease (Induced Systemic Resistance) whether applied in the root zone or on the foliage.

These Programs give you step by step instructions starting with pre-plant applications through fruit fill. They will assist you on application amounts and mixing instructions, application timing and whether to apply to the soil and/or directly to the foliage of the plant. We hope this format will be easy to follow, and will provide you with a system to grow healthier, nutrient dense crops.

If you have any questions or comments, please call us!

Save money on either program by purchasing products this fall. There is a 25% discount on all in-stock packaged products through December. Call CSI for availability!