Adding Some Soul to Soil

Most of our newsletters deal with biological elements in soil, especially mycorrhizal fungi and the symbiotic partnerships that exist between plants, fungi, and bacteria. We also make disparaging comments about the misguided (in our opinion) emphasis on soil chemistry.

However, to clarify, our real concern with chemistry is mostly about the excessive use of macronutrients- NPK fertilizers that contain only a few major elements. The application of these incomplete"plant foods" year after year to croplands and gardens can cause harmful salt buildups and depletion of important minor and trace elements.

Deep soils rich in mineral elements do have a substantial "forgiveness factor". Such soils can tolerate decades of poor fertilizing practices before showing obvious signs of distress and experiencing yield failures. The inevitable can be delayed by plowing deeper, which is now being done in some areas of the U.S.

Soils that lack good reserves of glacial or volcanic-origin elements can be burned out fairly quickly by repeated applications of high-analysis fertilizers. These depleted soils are then typically abandoned. This is a common practice for developing-country growers who must coax crops from thin infertile soils.

Damaged lifeless soils can be very difficult to fix. It would be better and easier to keep productive soils healthy. We think that periodically applying minerals containing a broad spectrum of elements should be a routine part of maintaining croplands or gardens.

This is where soil chemistry makes real sense - working to provide a full range of macro, minor, and trace elements for soil organisms to digest into forms plants can use, rather than simply applying the major elements.

True, it is much easier to measure the presence or absence of the "big" elements in soil, but tiny amounts of many other elements may be what plants need for full health and disease resistance. Unless those "little" elements also get replenished somehow, problems lie ahead.

Ideally, each and every mineral element from Aluminum to Zinc would be maintained in ideal proportions to each other, but this is impossible. Luckily, growers can employ mycorrhizal fungi to regulate a plant's uptake of elements. These fungi respond to plant needs. They will hunt for scarce elements, screen out excesses of other elements, and deliver a perfectly balanced diet to their host plants. Endomycorrhizal fungi exchange nutrients inside a plant's roots, while Ectomycorrhizal fungi perform the exchange in a sheath coating outside the roots.

The common advice to apply rock dusts to soil is good, except that widely-available granite rock dusts have a relatively low range of elements. Green sand and Azomite-type minerals are much better, and the best I've found is mined from a large deposit of hydrothermally-changed dacite rock (a crumbly clay volcanically steamed for a few million years) near Crater Lake, Oregon. This light gray material contains nearly every known element, including gold and silver! Wehave observed wonderful plant responses to it, especially in combination with biological inoculants. (This material is not being packaged yet, but I'm hopeful it will be in the future.)

The key point to keep in mind is that a grower's goal is to make sure that the broadest possible array of elements are available to the soil organisms for processing. It is less important to have exact

amounts of each element - that's chemical thinking. The smart little soil critters will sort through the materials and pick out what they (and their host plants) need. Simple, eh?

Finally, on a personal note, thanks to all of you who said they hoped I wasn't getting ready to retire after I mentioned that possibility in my last newsletter. However, I am indeed beginning to think about the subject and plan to start the process of finding the right buyer for BioOrganics, Inc.

I'd invite individuals or corporations who might be interested in owning a bio-product business with a good customer base and substantial growth potential to contact me. This simple manufacturing and marketing operation could easily be re-located anywhere in the country and I would provide advisory help as needed.

This could take a while, so don't look for the newsletters to stop anytime soon!

Cheers, my friends,

Don Chapman
President
BioOrganics, Inc.
www.bio-organics.com
January, 2004

Think “Systems” and Not “Ingredients” to Produce Superplants

During the past few decades, we have begun to understand a little more about how plants really function, but as with most new knowledge it will be some time, yet, before it has much effect on current practices. Established habits are... well, established.

Looking at the broad picture, nearly all farmers, gardeners, and landscapers have been taught to think of soil as being a mixture of ingredients. Under this view, if youmake the ingredients right, then your plants will perform well. This is a chemistry-oriented approach, along the lines of baking a cake, and is simple to understand. A cake without a key ingredient won’t taste as good, and a plant lacking some soil element won’t be as productive. Simple logic, right?

While this simplistic “ingredients” viewpoint certainly has face logic, a much better starting orientation for growers would be to look at their soil as being a dynamic and ever-changing system populated with living, breathing, reproducing, recycling, eating-or-being-eaten microorganisms, earthworms, and countless other little critters all jumbled together and bumping into each other. In other words, a perfect place for a plant to sink its roots into, becoming a contributing and benefiting member of the club!

Growing plants with only an “ingredients” perspective invariably leads to heavy macro-fertilization (overdoses, by nature’s standards), which causes disruption of the natural biological processes that would normally provide nourishment and protection to plant roots. This is currently the norm for both farms and home gardens. “How can I get the soil ingredients right?” is the prevailing guiding concept.

However, plants grown in lifeless soils lack many important natural defenses against diseases and insects. The billions of dollars spent each year on toxic “rescue” products for such plants suggest that there might be a better approach to agriculture and horticulture. That better approach will require growers to ask the question, “How can I promote a strong bio-system in my soil?”. You should remember that “system” moment when it happens - it will be the necessary first step toward raising heathier plants with greater yields than you ever thought possible.

We’ve discussed in detail how to restore bio-activity in soils in earlier newsletters (available for viewing at our website), but in general, it calls for restricting fertilization to small amounts of gradual-release lower-analysis organic types, plus using minimal or no tillage, strategic use of cover/companion crops, introducing beneficial biological elements, and periodically applying broad spectrum minerals.

The system is the solution.

Good growing, my friends. Here in the high desert of Central Oregon, there’re piles of snow outside but rows of radishes, peas, carrots, and turnips are beginning to sprout along side their companion-crop crimson clover in my antidote-to-cabin-fever greenhouse. Another good system.

Don Chapman
President, BioOrganics, Inc.
www.bio-organics.com
February, 2004

Seeds and Spores - Performance Partners!

When a seed sprouts, that event does not go unnoticed in nature.

As a first tiny root emerges and begins to poke its way into the soil, an outer mucus layer gives off chemical signals that announces its presence to surrounding organisms. These other organisms may have been lying dormant for months just waiting for such a root signal.

One way or another, most of these other living things see new roots as food. Some, such as nematodes, burrow into the roots and damage the plant. Others graze on roots directly. Still others, including many types of bacteria and fungi, have symbiotic mutually-beneficial relationships with roots. They are nourished by root exudates that are provided through the plant's unique ability to perform photosynthesis - to poke leaves up above the soil to gather solar energy.

The mycorrhizosphere, the zone that surrounds plant roots, is normally rich in life. It would be difficult to even begin to explain all the processes that go on in that bio-activity zone. The complex interactions between the plant and countless other soil organisms are still little understood.

For our purposes, however, let's just focus on what many soil scientists have identified as the keystone factor - Endo and Ecto-type mycorrhizal fungi. At the time a seed sprouts in a normal healthy soil there will also be many thousands of these fungi spores patiently waiting for a wake-up call from a new root. When the signal comes, the closest spores quickly come to life and attach to the root.

Time is then of the essence to both the plant and the friendly fungus. If the mycorrhizal fungi do not rapidly fill the mycorrhizosphere with protective sticky hyphae, the always-lurking root predators and pathogens will gain access. In a worst-case scenario, if there are no benefical fungi spores in the soil, then new roots are dangerously unprotected. This happens in soils where the biological activity has been destoyed by chemicals, excessive tillage, or over-fertilization.

A root that lacks mycorrhizae is not only open to attack, but also cannot uptake nutrients efficiently. This is another evolved role that the fungi performs and some plants will literally starve without the fungi's presence, unless the grower loads the soil with abnormal amounts of fertilizer. (These are the plants that are incorrectly called "heavy feeders" by gardening authors. Rather, they should be called plants that have evolved fungi dependence.)

From the perspective of the fungi, which is nourished only by plant root exudates, if the plant dies, then the fungi won't live long enough to form new spores for next year. So any signal of stress by the plant triggers an instinctive response to a higher level of fungal activity. (We are learning to use this instinct by withholding water from seedlings for short periods of time - the fungal colonization is then greatly speeded up.)

Similarly, if the grower puts high-analysis "plant food" in the soil, especially fast-acting phosphorus, the plants may feel content and not give off the assistance signals that the fungi respond to. This seriously disrupts the natural underground process. With too much P, the fungi may not colonize the roots at all and while the plant may grow reasonably well with the synthetic fertilizer, it will be more prone to insect damage, pathogens, and diseases. The grower loses the "free" nourishment and protection that mycorrhizal fungi normally provide to plant roots.

For sterile potting soils or cropland soils that may not have good numbers of beneficial spores, we recommend treating seeds with our fungi inoculant. One of our products is micronized and clings

nicely to slightly-damp seeds, or can be mixed into water and applied as a drench after seeding is completed.

Create and encourage these natural partnerships and see the difference in plant performance!

A side note, readers: We have developed a new product that features trace-element volcanic minerals, plus long-lasting biostimulants and fungi spores. This new MycoMinerals (TM) product is designed to be lightly scattered and tilled into gardens or depleted croplands, or blended into potting soils. In our grow tests, we have observed excellent plant response, but would now like to see how the product will perform in a variety of situations. If any of you are interested and able to set up comparative tests (such as half a garden area with and half without, or side-by-side plantings in pots, or a small section of a field, etc.), please let me know. I'd like to set up perhaps 50 such tests, especially in poorer soils. For the reasons noted above, the test will require withholding of synthetic fertilizers.

Cheers,

Don Chapman
President, BioOrganics, Inc.
www.bio-organics.com
March, 2004

Seven Things I've Learned about Mycorrhizae

In the eight-plus years that I've been studying and marketing mycorrhizal fungi inoculants, some basic facts have become stuck in my mind.

1. The beneficial fungi are not just a nice little extra for plants. Millions of years of evolution together have resulted in plants that need the fungi to efficiently uptake nutrients; and, fungi that cannot survive without host plants. From a function standpoint, the symbiotic plant/fungiare is more a single organism than two separate ones. This fact should be the foundation element of both agriculture and horticulture.

2. Plants can obviously be grown by overdosing their inefficient roots with increasingly-expensive NPK fertilizer, but why? The eventual soil degradation and water contamination problems from fertilizer run-off are looming disasters. Burning out crop soils that could otherwise be productive for hundreds of years, as well as polluting our children's drinking water with chemical growing methods when there are cleaner and sustainable biology-based methods available seems selfish to my way of thinking.

3. Much of what is published and promoted about mycorrhizal fungi is wildly over-simplified, perhaps necessarily so. These are highly complex organisms that operate as part of an intricate underground system that we still know relatively little about. A top USDA scientist who has devoted his career to studying the fungi once told me that he always sees people's eyes glaze over when he attempts to explain, in any detail, how mycorrhizal fungi function in relationships with many other organisms.

4. From a genetics standpoint, the fungi are older organisms than are plants, occupying land areas first. They are also genetically more similar to humans than they are to plants. (I don't know what this means, precisely, but it always makes for interesting conversation.)

5. The great variety of types of mycorrhizal fungi (more than 150 now named) is a largely unexamined area for future study. Some untested (or even yet-unnamed) types could be the answer to crop yields beyond any that we now consider wonderful. Some theorize that fungi that now support plant life in harsh conditions (deserts or other unfertile soils) may allow crops to thrive with very little fertilizing or irrigation water. Capturing and experimenting with such fungi, matching them up with grains and vegetable crops, could lead to abundant and inexpensive food production from marginal soils.

6. The fungi are both fragile and tough. By leaving durable spores behind when their host plants die, mycorrhizal fungi can bounce back to re-colonize plants for years to come. It takes a long time to eliminate them from soil, but it can - and is - being done.

7. Just as one cannot do a slow and careful back flip, one cannot ease gradually into biological growing methods. Fast-acting, high-analysis, fertilizers have to be completely dropped from cultural practices before the benefical fungi can perform at their best. Plants signal the fungi when they are stressed or lacking a needed nutrient; synthetic fertilizers apparently short-circuit such signals.

Side Note: Thanks to you who have agreed to trial the new MycoMinerals (TM) product. We very much want to see how its combination of trace minerals, biostimulants, and mycorrhizal spores perform in various situations. If there are other U.S. readers who would like to receive a jar (no cost),

please contact me. There is no need to be highly scientific about the testing - just scatter the product across part of a garden area or mix it into potting soil for some plants, or plant a couple rows "with," and a couple "without."

Good growing, my friends!

Don Chapman
President, BioOrganics, Inc.
www.bio-organics.com
April, 2004

Mycorrhizae Creates Drought-Resistant Plants

Most of the articles and research about soil biology focus on plant nutrition - how mycorrhizal fungi greatly boost the ability of plants to uptake nutrients. Indeed, an efficient mycorrhizal plant requires far less fertilizer. A light application of dry organic low-analysis fertilizer at planting time is typically enough feeding for a full season of annual plants.

Of perhaps equal or even greater importance is the ability of biologically-active soils to hold moisture. The millions of tiny root threads of beneficial fungi extend out from their host plant roots and either separate clay platelets or bind together sand particles, depending on the soil type. This results in soil that does not become soggy in the case of clay, or clumps together a moisture-retaining bio-mass in the case of loose sand. For either type of soil, the end result is ideal for keeping a plant alive during drought conditions - a survival tactic that the plants/fungi developed over many millions of years in order to survive low-rainfall years.

We humans can use this to our advantage. As irrigation water becomes scarcer (and in some areas it may become very scarce in the for seeable future) and more expensive, pressure will build to conserve water. For every growing situation, from golf courses to gardens to field crops and especially lawns, it will become important to cut back on watering.

A chemically-fed plant that lacks soil-conditioning mycorrhizal fungi also lacks drought resistance. A few days without water makes the plant's leaves go into wilting status in a desperate attempt to retain water within its system. If water is not provided in large regular amounts by the human caretaker, the plant dies.

Of course, watering all the time also washes away chemical fertilizers (which then contaminate underground drinking water). This heavy watering routine creates the need for frequent doses of "plant food". Unless you happen to be in the employ of a chemical fertilizer company or have a lawn-feeding business, this is not a good thing.

In my own garden, I hold off watering until I begin to see mid-day wilting. If some of the plants wilt slightly in the late afternoon, that's OK and normal. For me, this is part of obtaining maximum yields - forcing the mycorrhizal fungi to go into a higher gear in order to sustain the plants during what they feel is a drought situation. It's alittle trick I play on them, and an effective one!

This is working with nature, not fighting it.

Cheers, my friends. Good growing.

Don Chapman
President, BioOrganics, Inc.
www.bio-organics.com
May, 2004

What Do These Plants Want, Anyhow?

It bears repeating. Providing mycorrhizal fungi spores to plants is NOT giving them something "extra." It is NOT a miracle-plant-food-sort-of-thingy. It is NOT some sort of mystical additive.

Simply put, a plant without mycorrhizae on its root system is not equipped to uptake the necessary nutrients to flourish. You can fiddle with "soil chemistry" as much as you wish, and you may have some short-term success, but if the plant has evolved a dependence on soil fungi over millions of years, that plant will not achieve its full genetic potential without the fungi.

Someday, probably way down the road, it will be widely recognized that nutrients in the soil are not the only important factor for plant productivity. It is far more vital to move those nutrients into the roots on an as-needed basis. And guess what? That is precisely the role that mycorrhizal fungi have assumed. Most plants do not have roots that can do this job by themselves.

To a soil biologist, the frustrating thing is knowing that it can be so very simple to grow food plants that will perform at or near their full genetic potential. But 99 out of 100 growers just keep pouring NPK fertilizer on their fields in the belief that high yields come from expensive chemical methods.

You can plant a beefsteak tomato, drench it with water-soluble plant food every week, and have a decent harvest. I'll take an identical tomato transplant, put it in soil with a small handful of fish pellets and a teaspoon of mycorrhizal inoculant, not add anything else for the entire growing season, and will end up with at least a 50% greater yield than you - maybe 150%. And I'll do it year after year - the soil will never be depleted under a biological orientation.

Higher yields with lower input and long-term sustainability of our valuable crop soils - that's the promise of using biologically-based methods. Using beneficial microorganisms instead of petroleum-based fertilizers is a tough concept to grasp after decades of chemical methods, but the clock is ticking on chem-ag. If we want to leave our children some decent soil to grow crops, it's time to stop burning out our farm acreage and gardens with incomplete "plant foods."

Cheers, and good growing,

Don Chapman
President, BioOrganics, Inc.
www.bio-organics.com
June, 2004

Mycorrhizal Fungi - NOT Just For Food Crops!

One of the top uses of mycorrhizal inoculant is for landscape plantings. Most flowers and ornamental shrubs have evolved a dependence on mycorrhizae for nutrition and protection, and nursery plants rarely come with the benefical fungi already established on the roots. For introduced plants (non-natives), the types of indigenous mycorrhizal fungi in the yard may not be the best match.

A 10-cent dusting of spores in the planting hole can mean a huge difference in the survival of a valuable shrub or in the performance of flowers. A drenching of water-soluble inoculant on a bed of flower seeds or new lawn can enable those plants to thrive with minimal attention and care.

As always, the poorer the soil the greater the benefit that will be seen from inoculation. The most dramatic benefits will occur when spores are introduced at seeding or transplanting time.

For professional landscapers, it should be a routine matter to put mycorrhizal spores on new plantings, as insurance that useful biological agents are in the soil. This is particularly true when dealing with the poor topsoils that are commonly found in new housing developments. (The fungi will actually improve that soil for their host plants.)

Just as you only need one match to start a fire on either a large or small pile of brush, you only need a small dose of inoculant to start a mycorrhizal association on either a large or small plant. The fungi, once introduced anywhere on a plant's roots, will quickly colonize the entire root system and remain with the plant for life, unless damaged by systemic fungicides or overuse of high-analysis fertilizers.

There are a few types of plants, such as rhododendrons, that use a type of fungi that is not available in inoculant form, but probably 90% of all landscape plants benefit from either Endomycorrhizal or Ectomycorrhizal spores being put on their roots at planting time. Our Landscape Inoculant contains a blend of eight Endo types and seven Ecto types. This makes the odds very good that at least one of those 15 types will be a match for any plant in any soil in any region.

Please note that the introduction of biological agents should not, repeat NOT, be viewed as an "add-on" to a standard chemically-oriented routine, but rather as an "instead of" method. With the right soil biology at work, lawns will need very little fertilizing and will never build up thatch, flowers will be far more drought and disease resistant, and trees and shrubs will be more like healthy wild plants that never receive human assistance.

All our inoculants (Endo, Micronized Endo, Root Dip, and Endo-Ecto Landscape) have a two-year guaranteed shelf life at room temperatures, so keeping a jar on hand. Putting a small pinch in every new planting hole is a simple way of giving a powerful gift to your ornamentals. Try some plants with and some without to make an interestingcomparison.

Cheers, my friends,

Don Chapman
President, BioOrganics, Inc.
www.bio-organics.com
July, 2004

The Cluster of Beefsteaks

It's a good time of the year.The beans, corn and new potatoes in my bio-garden are ready to be picked and transported quickly to the kitchen before any of their delectable sugars are lost. I pity people who have only tasted produce that has sat for hours or even days on store shelves - there is just no comparison. And, sadly, most of those non-gardeners have no idea what they are missing.

I'll never forget the amazed look on an urban friend's face when he put the first forkful of just-picked boiled potatoes in his mouth during a dinner at our home. "What kind of potatoes ARE these?", he asked between rapid bites. Actually, they were just plain ordinary old reds - the same types that are in grocery stores - but about 20 minutes earlier they had been peacefully growing in my garden. The moment that vegetables are harvested, their flavorful sugars begin dwindling. The "supersweet" corn tries to overcome this problem, but to my taste buds those have an insipid corn flavor compared to freshly-picked standard types.

I enjoy all the veggies from my garden, but the unchallenged stars are the tomatoes. Over the years I've tested more than 150 varieties, a few new ones each season, and have a long "to try" list in my garden journal. The tomato plants have benefited greatly from my conversion from chemical fertilizers to biological methods. Instead of tilling in granular 10-10-10 (or whatever numbers) in the spring and then drenching miraculous liquid "plant food" during the growing season, I now have beds with huge populations of beneficial fungi, bacteria and earthworms.

I do add a light scattering of pelleted fish, volcanic minerals and a little compost before planting, but only work those materials into the top 4 inches of the soil. When trying to encourage biological activity and beneficial colonization, you don't want to disrupt the established underground system. This limited tillage is gaining ground (pardon the pun) in agricultural circles as well, although few ag advisors seem to really grasp why limited-till and no-till methods work as well as they do.

With absolutely no added fertilization for the entire growing season, tomato plants in a bio-active soil generate super-flavorful fruit in dramatic numbers - far beyond the yields normally consider good. To see a beefsteak variety set nearly every blossom and form large clusters of fruit crowding each other has now become pretty routine to me, but it still gets "Oh, wow!" responses from visitors. (If there's a down side, my large tomatoes rarely have perfect round shapes because of the competition for space.)

The point? Well, I'm just working with natural plant physiology and using the tremendous power of beneficial microorganisms in my garden, rather than trying to improve on nature by giving synthetic feedings, adjusting soil pH, etc. It is a very simple and effective approach as compared to applying incomplete NPK fertilizer, no matter what those slick TV commercials claim.

Also, while I can't prove it scientifically, I am certain that the flavors of my vegetableshave improved since I began using only microbial inoculations, gradual-release organic fertilizer, and the volcanic trace minerals. Some neighbors have occasionally grown the same variety of tomato as me, and we have both agreed that mine have superior sweetness and more complex flavors. But I suggest doing your own testing of bio-oriented vegetable growing, and being ready to sprint from the garden to the kitchen after picking!

Cheers, and good growing,
Don Chapman
President, BioOrganics, Inc. , August, 2004

The Functions of the Fungi

One common image of roots is that of rope-like things in the soil which serve to firmly anchor the plant and absorb nutrients and water. To most growers, those type of roots present a simple objective: They must be surrounded with enough fertilizer and water to keep the plant healthy, productive and/or attractive.

All sorts of chemical formulas and measurements have been developed to satisfy these root needs. There are “complete” fertilizers, “balanced” fertilizers, suggested watering schedules, and so forth. Basically, you put the right amounts of food and water in the soil around plants and enjoy the good results.

Just one problem with this viewpoint: It ignores soil biology. A plant growing in biologially-active soil needs only a small percentage of the fertilizer required to grow chemically-fed plants, and perhaps half the amount of water. When aware of this important point, the grower’s perspective changes dramatically.

Plants that have good populations of beneficial fungi, bacteria, earthworms, etc. around their root systems need relatively little human input to thrive. Nitrogen gets fixed from air and water, other nutrients are obtained from otherwise unavailable elements in the soil, and countless soil organisms contribute plant-perfect fertilizing with their castings and expired bodies. (For just one example, the sticky hyphae of certain fungi can snare and kill nematodes, then transport the resulting body nutrients into plant roots. There are remarkable photos of this process!)

Over millions of years time, many plants have come to depend so completely on mycorrhizal fungi to uptake nutrients and water that they have stopped growing their own tiny foraging feeder roots. For such plants (melons, asparagus, peppers, citrus, grapes, peaches, avocados and many others), sending their “ropes” out into the soil has little benefit beyond anchoring.

A plant without the right mycorrhizal fungi on its roots has abnormally little surface contact with soil, which severely limits its ability to absorb nutrients and water. Hence, to keep those plants healthy, growers must apply fertilizer in huge amounts (at least huge in comparison to natural soils) and must constantly provide irrigation water. The most mycorrhizal-dependent plants are called “heavy feeders”, an entirely-undeserved term that seems to be incorrectly used in gardening articles without question.

Those same “heavy feeders” (or, I guess, “heavy drinkers”) would thrive with far lower inputs if they had their naturally evolved fungi partnerships in place. When those rope-like roots have the normal billions of attached mycorrhizal fungi hyphae threads exploring the surrounding soil, they become a hundred or even a thousand times more efficient. Fertilizing can be drastically cut, wasteful run-through of nitrates and phosphorus can be eliminated, soils gain fertility instead of being depleted, and increasingly-precious water supplies can be saved.

Producing food crops and growing ornamentals, gardens and lawns with less fertilizer/water makes good sense from several stand points, and based on the numbers of orders for test purposes we have received in the past year from researchers all over the world, the use of biological soil science is gaining momentum. I’m just hoping that changes happen sometime pretty soon.

Unfortunately, it seems that impossible-to-ignore acreages will be have to be ruined by over use of synthetic fertilizers, and some major cities' underground aquifers will have to be rendered non-potable before there are any widespread changes in chemistry-based growing routines. I view this as short-sighted "strip-mining" instead of responsible stewardship of natural resources. But maybe future generations won't mind that we depleted the crop soils and left them with polluted drinking water, eh?

Too gloomy a view? Maybe. I hope so.

Good growing, my friends,

Don Chapman
President, BioOrganics, Inc.
www.bio-organics.com
September, 2004

New Sizes and MycoMinerals™!

Rather than describing the functions of beneficial soil organisms this month, I'd like to announce some additions to our line of mycorrhizal inoculant products. I know that many of you use or experiment with soil biology as an alternative method of growing crops, gardens, and ornamental plants, and you might be interested in these new offerings from BioOrganics, Inc.

First, each of our four basic products - Endo Inoculant, Micronized Endo Inoculant, Endo Root Dip, and Endo/Ecto Landscape Inoculant - will now be available in smaller size containers. In past years our only containers have been 3-lb. jars, suitable for commercial growers but too large for most gardeners. These 3-lb. jars can inoculate 500 new tree or vine transplants, up to 5000 small plants such as strawberries, or up to 3 acres of closely-planted seeds.

The new containers will be 1.5-lb. wide-mouth plastic jars (quart size) and can be direct-ordered individually or in cases of 12, for those of you who have retail stores. We will have these new smaller jars added to our website shop in the next week or so, or you can order by calling our tollfree number - 888-332-7676.

The other announcement is that we will begin marketing a new minerals-oriented product, MycoMinerals™. This contains finely ground volcanic-origin rock rich in trace elements, plus humates and 15 types of Endo and Ecto spores. The purpose of this new minerals product is to ensure that garden soils or potted-plant mixtures contain the many minor and trace elements that are essential to full plant nourishment, plus it introduces the important biological agents that help plants uptake these nutrients.

One of the persons who volunteered to test MycoMinerals™ for us this spring said this about it: "I wanted to thank you for the trial product. My tomato and pepper garden is the most lush I've ever seen. I actually have serrano peppers that are 3 feet tall in 6 weeks. I lost count at over 200 developing tomatos in my 14 plant plot (after 6 weeks). Your product has produced eye popping results."

We have seen similarly-impressive differences between plants grown in typical potting soils and those grown in mineral-rich soils during our internal trials. Fertilizers do not contain all the elements that plants must have for maximum performance, plus most soils lack the ideal broad spectrum of trace minerals and beneficial microorganisms.

One note about the volcanic rock in MycoMinerals™: It is not, repeat NOT, common lava rock. Lava typically contains very few plant nutrients. Our minerals are from an ancient hydrothermal rock deposit near Crater Lake, Oregon, and analyses show that it contains more than 40 separate elements, including all those regarded as essential to plants.

As would be expected, the minerals are low in N and we suggest adding small amounts of fish-based pellets to the soil as a perfect nitrogen-providing component. See Peaceful Valley Farm Supply - www.groworganic.com - for these pellets. We recommend the 9-3-5 formula, but the 7-7-2 version can also be used.

I encourage all of you to act on your interest in biology-based growing techniques. There is simply

no legitimate reason for the chemical sciences to dominate the growing of plants, especially in home gardens or potted plants, and you can easily create super-healthy, high-yielding plants with some attention to soil life.

Cheers, my friends,

Don Chapman
President, BioOrganics, Inc.
www.bio-organics.com
October, 2004

The Ignored Parts of Soil

Over the years, I have managed to get on the mailing lists of several trade magazines that deal with commercial agriculture and horticulture. Nearly every issue of these magazines contains at least one article about soil management, but I rarely see any mentions of either trace elements or biological components.

If you knew nothing about soil except what you read in trade journals, you would have to believe that the only role of growers is to create the proper macro chemistry for their plants. There are thousands of astute words about getting the pH and the N and the P and the K just right, and the more sophisticated articles even discuss Iron and Zinc.

However, the common attitude about other minor and trace elements seems to be that they are either "probably already there" or "don't matter all that much", and (with a few exceptions) soil biology is never mentioned at all.

The authors of these advice articles seem to be intelligent and educated people, so I have to assume they have at some time been been exposed to two fundamental concepts: 1.) At least 16 chemical elements are equally important to the full health and performance of plants, although required in greatly differing amounts; and 2.) A substantial percentage of good crop soil consists of beneficial living organisms (tons per acre).

So, why do the ag/hort authors tend to consistently ignore these obvious soil issues? Is it a vast conspiracy by the big chemical fertilizer corporations? (And are there any non-vast conspiracies, perhaps only half-vast ones?)

No, I would instead speculate that discussions of lesser trace elements and/or soil biology have a tendency to get too complicated and confusing. Putting out information that is easily understood and giving advice that is easily followed does make far more sense from a simple-to-grasp standpoint (by editors as well as readers).

I do have to admit that relating to the living things in soil (many of them invisible) is not always easy, and that focusing on just three or four major chemical elements is more measurable-manageable than worrying about 16 or more. However, for those growers who really comprehend words like "sustainability" and who are getting tired of constantly battling pest and disease problems caused by unhealthy soils, some added depth to advisory articles might be a welcome resource.

Perhaps the trade magazines could put a caution on their covers - "Warning: Contains new ideas!"

Listen to the plants, folks.

Don Chapman
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November, 2004

Bringing the Dead Back to Life!
Soil Restoration Methods

One of our dealers in Florida recently asked what we would suggest for restoring life to soils that have been damaged by years of over fertilization and chemicals. As there are probably others among you who face this same issue, here is how I replied to him...

Hi Jeff -

There's an old saying about when you find yourself in a hole: The first thing is to stop digging deeper. With soil that has had its biological components damaged or destroyed, the first step toward restoration is to stop adding any more chemical fertilizers. Nitrogen is usually not a lasting problem, but phosphorus and potassium levels are often extremely high in over-fertilized soils - there may be years and years worth of P and K present in such soils.

Lawns and croplands are two different animals as far as treatment is concerned. For lawns, the best remedy is to aerate by physically removing plugs (not just probing holes with spikes), raking off the plugs, scattering a biological inoculant, and then immediately applying a couple inches of compost - raking it all into the holes before they close - and finally watering regularly for a few days. Our standard Endo spore BEI is normally used, but I'd also suggest experimenting with our new MycoMinerals product which adds essential minor and trace minerals to the soil.

Especially in soils like you have in Florida, (which did not get the benefits of glacial or volcanic activity), the addition of trace minerals can make a dramatic difference in plant performance. After you have completed this renovation of the lawn, apply only dry slow-release organic fertilizers in the future. Never apply any liquids or synthetic NPK stuff, as that will counteract the good biological soil activity that you have started. You should find that very little fertilizer is needed. If a mulching mower is used, that will be about all the input required. There will be no thatch build-up - the soil organisms will recycle the clippings - you will notice a great increase in earthworms.

For crop acreage, a different approach is called for. I would suggest the strategic use of a cover crop for a few weeks - an annual egume, such as Crimson Clover, with the seed inoculated with our micronized BEIM product can fairly quickly restore soil health. Don't let the crop go to seed. Till it under when it blooms so you don't have undesired sprouting afterwards. (This is why I don't recommend a perennial legume.) If you have any local source of affordable rock dust, it would be beneficial to till some in at the same time. We have some wonderful mineral products available out here in Oregon, but that doesn't do you much good in Florida with the high shipping costs these days. Finally, if higher-value crops are going into the soil, Ilightly inoculate transplants to make certain that the right type of benefical fungi spores for that particular plant are on the roots. Here's the tricky part: The grower will have to cut way back on fertilizer (or even not fertilize at all) to get the best biological performance. I find that growers all have a strong urge to "feed" their crop. If you tell me what crop is going in, I can help you with more specific advice.

What you are doing is important. I think you might show the way for many others to convert from soil-damaging methods to a healthy biological approach, and I hope you will set up several side-by-side comparisons to document the difference. Keeping small samples of each customer's soil for before-and-after comparisons could also make for very useful analyses.

Let me know how I might help.

Best regards,

Don Chapman
BioOrganics, Inc.

There is obviously some effort involved in restoring bio activity to soil, but the benefits can be dramatic and lasting. (Here's that word "sustainable" again!) And, once soil has been brought back to a good state of tilth with natural biologically provided fertility, the expensive chemically oriented inputs can be stopped. A periodic dusting of trace minerals and shallow tilling-in of crop residues and cover crops may be all that is ever required. I would particularly like to see the tonnages of high-analyis "lawn food" cut back, as this is such a major (and unnecessary) contributor to water contamination. Getting lawns off the chemical feeding treadmill should be a goal of more communities who are experiencing nitrate buildups in their drinking water supplies and excess phosphorus runoff into ponds and rivers.

Best wishes for the holiday season, and for a happy prosperous (with less phosphorus) new year.

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December, 2004