Big Global Problems? - Fiddle-Dee-Dee!

I promise that upcoming newsletters will focus on the practical uses of biological methods for growing crops, gardens, and ornamentals; but let's do just one more on big-picture issues.

We the people, collectively, don't worry much about world problems because it is difficult to relate them to our individual day-to-day lives. Topics such as global warming, energy supplies for the future, trade imbalances, atmospheric ozone layers, bird flu pandemics, and a host of other such great issues generally take a back seat to more immediate problems like paying family bills. That's just the way we are.

However, I think that an article in today's morning paper is worth some attention, even if it deals with off-in-the-distance issues. The article describes warnings by an environmental researcher with good credentials, Mr. Lester Brown, president of the Earth Policy Institute.

Here's a few sentences from the article:

> *Per-capita income in China will equal that of the United States by 2031 if the Chinese economy continues to grow at its current pace. With a projected population of around 1.4 billion at that time, a China as prosperous as the United States would:*
> ** Burn 99 million barrels of oil a day, 18 percent more than is now produced globally.*
> ** Consume two-thirds of the world's current grain harvest.*
> ** Use twice as much paper as the world currently produces.*
> ** Drive 1.1 billion cars, more than the world's 2005 fleet of 800 million - forcing it to pave roads, highways and parking lots equal to the area it now plants in rice.*
>
> *"There go the forests", said Brown. "China is helping us to see that the days of the old economy are numbered", he said. "It is hard to find words to express the gravity of our situation and the momentous nature of the decisions we are about to make. One way or another, the decisions will be made by our generation."*

Brown is the author of a new book, "Plan B 2.0", updating a report "Plan B" which he issued two years ago. He calls the present global economic trend "Plan A" and argues that it is not sustainable.

As noted in earlier newsletters, my specific concern is with our burning out the future health and productivity of crop soils by relying too much today on petro-chemical fertilizers. I think countries that adopt measures to protect their croplands will be hugely rewarded some day.

But I suppose we should also consider that projections of population and existing technology in 1900 would have warned that New York City would be armpit-deep in horse manure by 1950.

There are certainly ways in which the citizens of the world can slow down population growth, restore forests & fisheries, protect croplands and water supplies, develop sources of energy other than oil, halt global warming and fix other such problems...but realistically, will we? The idea that "our generation" has their hand on this steering wheel is not a comforting one. Let's face it, down-the-road-someday worries are not our strong suit.

But, hey, maybe we'll change - enough gloomy-outlook stuff for a while. I'll get back to making suggestions on how to use bio-methods in your fields and gardens next newsletter - promise!

Good growing, my friends,

Don Chapman, President
BioOrganics, Inc. - www.bio-organics.com - January, 2006

Getting Down to Earth about Using Inoculants

Those of you who have been receiving these newsletters for some time know that many of them have dealt with big general issues relating to agricultural growing methods.

Such topics have included the depletion of crop soils by overuse of chemical fertilizers, increasing problems with soil compaction and salt buildups, fertilizer runoff into streams and underground drinking water, the relative absence of research funding to explore biological alternatives, and whether current soil chemistry practices are sustainable.

You also know by now that I'm rather pessimistic about anyone actually doing anything about any of the above, at least until situations reach disastrous can't-be-ignored levels. Just like a small leak in a dam, it's relatively easy and inexpensive to fix problems at early stages. Right now would be a better time to begin protecting the beneficial soil organisms in our crop soils than in future years. Unfortunately,it's not happening.

But, as promised, let's switch to a more positive gear and put the focus of this issue on how to use the power of microbial organisms to grow plants today. For some, it would be very simple to do. For others,more difficult.

The easy ones: Home gardeners,landscape installers, lawn-care, small market-vegetable growers, and those putting in new orchards/vineyards. For these purposes,just introducing the right types of mycorrhizal spores to plant roots and then avoiding fast-acting fertilizers can work wonders in terms of plant health and performance - with minimal human involvement required.

Actually, one of the biggest problems for bio-growers is making themselves fight the urge to "feed" their plants like the persuasive TV commercials recommend. From a soil-biology perspective, applications of synthetic fertilizers can do much more harm than good.

A few examples of easy and effective applications - put a pinch of our BEI inoculant on vegetable transplant (tomatoes, peppers, eggplant, etc.) roots as you set them out; scatter a tablespoon of our LA landscape inoculant in ornamental planting holes, dissolve our BEIM micronized product in water and apply as a drench to lawns, dip the root tips of bare root transplants (fruit trees, grapes, etc.) in our RD root dip before planting; or blend our MycoMinerals powder into garden beds and then just plant as usual. See www.bio-organics.com or www.mycominerals.com for more details.

The more difficult situations: Large plant nurseries, lower-value crops, and big farms. A nursery should actually be a very logical place to create mycorrhizal relationships on plant roots, as then the pre inoculated plants take off like a shot and are more disease-protected when transplanted, but we have found that most large nursery operations are pretty much locked into established chemical routines. Another problem is if bark-based potting media are used - may have fungicidal effects, which is not a good thing when working with beneficial fungi.

For large farms, especially those growing lower-value crops (grain, soybeans, etc.), converting from chemical to biological practices can be a scary proposition, especially when chemical fertilizers are still generating good yields. I receive many calls from farmers who would like to experiment with our Inoculants, but want to try them as an add-on to standard fertilization practices. I have to explain that high-analysis NPK is not compatible with mycorrhizal fungi, and that it would be a waste of money to inoculate seeds that are going into what amounts to a toxic situation for the fungi.

Farms that do want to move to bio-methods can arrange to have our BEIM micronized inoculant blended into

seed coatings, or dust the BEIM onto slightly-damp seeds as they are loaded into the planting machine. We suggest using at least 1 lb. of inoculant per acre. (Note that the number of seeds does not matter - they are merely being used to distribute the mycorrhizal spores evenly throughout the field.) Compost or plant residues tilled into the soil would be very helpful to the restoration process, but this is not always possible.

Another way for farms to restore biological activity to large acreage is to inoculate cover crop seeds. This can have a powerful effect on following crops, but for soils that are in production year-round it requires "taking a break" and foregoing some immediate profits.

I'm reminded of when a guy in a neighboring office asked if our spores would do anything for potted plants. He had a small plant in his reception area that looked nearly dead. I probed a hole in the soil with a pencil, put in a bit of inoculant, pushed it down to the roots, and forgot about it. He called me over a few weeks later to show me a vibrantly-healthy plant that was about to bloom for the first time ever. Ten seconds of time and a couple cents of inoculant made all the difference in the world in that situation.

So, why not do the easy ones?

Cheers,

Don Chapman, President
BioOrganics, Inc. - www.bio-organics.com - February, 2006

How to Try Out this Biology Stuff

OK, so you have been reading more and more about using soil biology instead of chemistry - letting mycorrhizal fungi, beneficial bacteria, earthworms, etc. nourish and protect plants. Are you ready to give it a try, but not ready to make a complete commitment with your farm, nursery, landscape business, or garden? Fair enough. Let's look for ways to put your toes into the water instead of going off the high board into the pool.

The first step is to stop and think about how to set up a valid comparison. You need the same type of plants growing in similar situations, with the only difference being fertilization. (Mycorrhizal plants will require less watering, too, but let's keep the variables to just one for sake of simplicity.)

For farms, mark off a small area of a field - either a block or a strip - and avoid putting ANY fertilizer on that area. Instead, inoculate those seeds with our BEI or use BEI on transplants - see www.bio-organics.com. Also avoid using pesticides and side-dressings on that test area during the growing season. You should notice that the bio-inoculated plants will look weaker than the fertilized ones early on, but as the mycorrhizal fungi colonize the soil in that area, the plants should show superior insect resistance and yields.

Nurseries can usually set up grow-test comparisons fairly easily, but may have a problem with their potting media. Some partially-composted bark-based media can have fungicidal properties which inhibit mycorrhizal fungi. We suggest peat, coir, or fully-composted wood/bark material may be needed to get benefits from biological methods. Bioassays of roots are recommended as a way to gauge inoculation effects (which is true for all types of growers - bioassays can be far more useful than tests of soil pH and NPK levels).

Landscapers can simply dust our Landscape Inoculant (LA) on the roots of some plants as they are being set out and not on others. However, note that it will be critically important to NOT apply fertilizer, especially in liquid form,to the inoculated plants - that will ruin the test. Remember to advise the homeowner or maintenance crews to avoid "feeding" the bio-inoculated plantings. Again, the inoculated plants may look weaker until the fungi can colonize the surrounding soil. Be patient for a few weeks.

Home gardeners have the best of it. They have planting areas that are manageable in size and can usually keep close controls over inputs. We have developed a product specifically for them - MycoMinerals - see www.mycominerals.com. This is basically finely-ground volcanic minerals with mycorrhizal spores blended in. The minerals provide a broad spectrum of minor and trace elements that may not be present in soils, and the spores introduce the powerful effects of good biology. It is intended to be worked into soil before planting, so just use the product on one section of a vegetable garden or flower bed, or work it into the area around some larger plants (tomatoes, melons, squash) and not others. And NO fertilizing - none, nada! - either before or during the season.

But what about nitrogen, you may be thinking. How will the plants get that element that we all know is so necessary? The volcanic minerals have little or no N, so where will it come from? Answer: from the biological activity in the soil. Where do you think wild plants find enough N to thrive and never deplete their soils? It's all a very complex process, but the excretions and dead bodies of the soil biota represent perfect plant food, and mycorrhizae is the mechanism by which plants uptake those great nutrients. If you can get high populations of beneficial organisms going in the soil, the "good little bugs" will handle most of the plant feeding and root protection functions.

Skeptical? Fine. But what's the harm in trying it on just one small spot?

NOTE: If you are dealing with long-term valuable crop plants like grapes or orchard trees, you may lose the

chance to introduce superior types of mycorrhizal fungi if you do not inoculate at planting time. There is enough established evidence of the value of inoculating these type of plants that we suggest leaving only a few "control" plants if you want to make with-and-without comparisons.

Cheers and good growing, my friends,,

Don Chapman, President
BioOrganics, Inc. - www.bio-organics.com - March, 2006

Spores at Planting Time = Happy Plants

The modern grower who really understands plant physiology knows that plants have evolved close partnerships with many other organisms - some above the ground like pollinating honeybees, and some under the ground like mycorrhizal fungi. Without their natural symbiotic partnerships, plants are incomplete and may have low yields, be subject to diseases, or may even fail to survive.

The important role of pollinating insects is relatively well-known, in part because of their visibility at flowering time, but the benefits that plants receive from living organisms in the soil is hidden from sight. It also doesn't help that some of the most beneficial soil organisms are microscopic in size.

Earthworms are the obvious soil dwellers, but unseen bacteria and fungi also have vital roles to play in the health and productivity of plants, and the fact that they are tiny in size doesn't mean much when their numbers go into the billions per ounce of soil. Over one-fourth of the total weight of healthy soil can be comprised of living organisms, which is why forest soil is fluffy and loose when nearby crop soils have compaction problems after years of microbe-killing fertilization and tillage.

Keep in mind that these multitudes of tiny living things in the soil are all continuously decomposing organic matter, solubilizing soil minerals, reproducing, excreting, and dying. The latter two functions are of particular interest to plants, which obtain wonderful nutrients as a result. Actually, the nutrients that are obtained in this manner go beyond wonderful, they are perfect - because plants have evolved with them. We humans cannot begin to duplicate this dynamic plant food.

Mycorrhizal fungi can be thought of as a "bridge" between the soil organisms and plant roots. The actual surface area of roots in contact with soil is quite small, which severely limits their uptake capabilities. It is therefore mycorrhizal fungi's role in nature to fully colonize the surrounding soil with millions of tiny root-threads and bring the perfect nutrients described above into plant roots.

Putting a seed or transplant in the ground can be an enjoyable task. Strategically arranging for that ground to contain a broad spectrum of minerals and some organic matter, plus adding the correct types of mycorrhizal spores at seeding-transplanting time can produce extremely successful plants.

We now have a website for home gardeners and market growers - see www.mycominerals.com - or commercial growers can see advice on using our Inoculants at our regular BioOrganics site.

Good growing, my friends,

Don Chapman, President
BioOrganics, Inc. - www.bio-organics.com - April, 2006

Will Fertilizer Costs Finally Force a Switch to Biological Methods?

Our local newspaper recently ran an article about local farmers and the problems they are having. Here are a few sentences from that article:

About 70 to 90 percent of the cost to produce nitrogen-based fertilizer is directly related to natural gas prices. The cost of such fertilizer has doubled in the last six years, from $225 to $550 per ton. One Central Oregon farmer said he and others have felt the pinch. "We're squawking-mad because we've got fertilizer costs going double on us, and we've got diesel costs going double on us... The future is not very bright for agriculture right now."

The era of inexpensive petroleum-based products -gasoline, plastics, synthetic plant foods, etc. - has probably come to an end. If not now, then certainly in the foreseeable future. For many farmers, big jumps in fertilizer costs combined with higher diesel costs may mean that growing lower-value crops will no longer pencil out - just breaking even may be impossible.

But perhaps this sort of crisis in agricultural production costs will lead to a serious reexamination of how things are currently done. If using petrochemistry to grow crop plants is now too expensive, maybe the time has come to try a different way?

And there definitely is a different way, a way based on harnessing natural soil biology. As I've described in previous newsletters, smaller market growers and home gardeners can fairly easily make a transition from direct-feeding plants to using beneficial soil organisms to satisfy plant nutrition needs with minimal input. Many growers around the country are already doing this. There was an interesting article at htrnews.com about a bio-based market grower in Wisconsin, and judging by the number of orders we have received from agricultural researchers, the interest in developing bio-methods for larger farming operations is now going up as well.

For big farms, it won't be easy to reestablish the natural plant-tending soil organisms that have been wiped out by decades of chemical practices, but it can be done. And once the biological health of the soil has been restored, production costs will drop dramatically from that point onward.

Cheers and good growing, my friends,

Don Chapman, President
BioOrganics, Inc. - www.bio-organics.com - May, 2006

Modern Fruits and Vegetables - Are Good Looks Good Enough?

I see that a study of 43 different crops found that many of today's fruits and vegetables do not have the same nutritional content as 50 years ago. For those of us who grow our own, the flavor gap between supermarket produce and that from our garden seems to have widened, especially when comparing heirloom varieties to the latest "improved" hybrids. However, the decline in nutrient content is also something worth noting.

Researchers led by Dr. Donald Davis, a bio-chemistry professor at the University of Texas at Austin, compared chemical analyses by the USDA from 1950 and 1999 to see how nutrient contents may have changed. They found that average levels of protein, calcium, phosphorus, iron, riboflavin, and vitamin C had all dropped anywhere from 6% (for protein) to 38% (riboflavin).

There may well be other drops as well, but the comparisons were limited to the nutrients reported in 1950, so the researchers could not gauge changes in such things as magnesium, zinc, vitamins B & E, fiber content, nor important phytochemicals discovered more recently. My guess is that these would also be reduced.

The researchers feel that the most likely explanation for the decline in nutrients was changes in varieties stemming from intensive efforts to breed new varieties for greater yields, increased resistance to pests, or adaptability to different climates - with pursuit of higher yields being dominant. Other contributing factors might be yield-enhancing strategies such as more irrigation and heavier fertilizing. This has all led to modern crops growing larger and faster, but apparently with less nutrient value - an unintended consequence.

A related thought is my memory of a USDA research scientist telling me that his organization had only just recently hired a specialist to study crop flavors. I think his exact words were, "It has never been much of an issue to us." This was surprising to me, as I had always assumed that the flavor of a food item would be a routine and important part of selecting new varieties.

Now I'm obviously biased on this topic, but I'd be willing to bet that the decimation of biological microorganisms and depletion of trace minerals in conventional crop soils also have a lot to do with both the declines in flavor and nutrient value. I doubt that vegetables that are fed incomplete NPK fertilizer in lifeless soil have as much chance of ending up tasty and nutritious.

Yes, I know - I'm being preachy about big-picture issues again, and why bother? Well, I could be wrong, but I think the mindset of growing only for appearance and bigger yields can be changed. If horticultural researchers really put their minds to it and began regarding flavors as being more than a side issue, I'm sure they could develop high-yielding varieties that taste better and pack more nutrients. Of course, first they must want to.

I suspect that superior flavor and superior nutrients are linked, so informed consumers can push the researchers by simply choosing the tastiest produce available. As a model, I would point to the success of the Fuji and Gala apples in knocking down sales of the old Red Delicious variety, a tragic example of an originally-tasty fruit ruined by "improvements." Unfortunately, I see that the Fuji is now being made more red, and, at least to my taste buds, is becoming less flavorful. (Sigh)

Hey, pay a little more for organically-grown stuff and give those misshapen yellow tomatoes a try next time - it could benefit all of us down the road some day!

Cheers,

Don Chapman, President
BioOrganics, Inc. - www.bio-organics.com - June, 2006

A Time of Tomatoes

Summer is a good time for me. The crush of planting season orders has slowed down, and my vegetable garden can be given more attention.

I have five large in-ground beds in my greenhouse. One is permanently devoted to strawberries, leaving four available each summer for optional crops. At our elevation (4300 feet) in Central Oregon's high desert, we often get hard frosts in July and August so a greenhouse is a must if you want tender crops. And I do.

Typically, I devote two beds to corn and two to tomatoes, with bush beans and a couple zucchinis squeezed in around the edges where they can flop over into the pathways, but this year my list of "to try before you die" tomatoes had reached the point where they had to be given a third bed. Sorry, corn.

I decided to go with a striped theme, and consequently have 23 different varieties with names like Marvel Stripe, Red Zebra, and Striped German. Some of the 23 are heirlooms, while others are hybrids. The sizes range from beefsteaks to cherry types. My favorite must-grow Pineapple has been joined by its never-tried cousins Golden Pineapple and Black Pineapple. Ah, the anticipation!

All, of course, are being grown using bio-organic techniques. I lightly scratched in some compost and a little slow-release organic fertilizer, plus volcanic minerals to provide essential minor and trace elements. I never till more than 2-4 inches deep to avoid disturbing the earthworms and other valuable bio-life in the soil. Each plant's roots was given a dusting of mycorrhizal fungi spores at transplanting time. Nothing else besides water will be added all season long.

This growing of many different varieties has a purpose beyond simply taste satisfaction, (although that would be reason enough, mind you). I've observed that different varieties respond differently to biological methods. Heirlooms and older hybrids generally all thrive and produce wonderful yields with my low-input approach, but newer varieties often struggle. Happily, some great-flavored older hybrids such as Big Girl, Park's Whopper, and Lemon Boy have been amazingly productive in my garden with little or no fertilization - nearly every blossom sets fruit.

I would speculate that the newest types of tomatoes have been bred and selected to be grown in lifeless soils with chemical fertilization routines. The presence of mycorrhizal fungi, beneficial bacteria and other natural plant-tending organisms is probably no longer as necessary to them. This is convenient for commercial growers, but I wonder how long it will work. At some point, the degradation of soil health may reveal what the ignorable word "sustainability" really means.

I hope that what I'm learning may prove helpful for both home gardeners and market growers some day, assuming that I ever get around to writing that how-to book on bio-growing. And maybe next year will be the year that I grow only my two or three all-time favorite types and stop testing many different varieties...but what if there is another Pineapple out there and I never get to taste it?

Cheers, my friends,

Don Chapman, President
BioOrganics, Inc. - www.bio-organics.com - July, 2006

Extending the Reach of Roots

Mycorrhizal fungi benefit their host plants in many ways - protecting roots from soil pathogens and diseases, helping build up populations of nutrient-processing bacteria, fluffing up hard-packed clay, as well as performing many other valuable underground functions.

The best-known functions are the seeking out of nutrients and moisture from the soil surrounding a plant, thereby allowing growers to use less fertilizer and irrigation water. This is a complex process and involves the fungi linking together different plant root systems into an underground network - sort of an underground spider web arrangement on a huge scale. A healthy undisturbed soil will have every square inch filled with root-threads (hyphae) of the beneficial fungi.

Through many millions of years of evolution, plants came to rely more and more on mycorrhizal fungi to do the seeking out of nutrients and moisture, to the point where many plants essentially stopped growing fine feeder roots. It is actually the fungi's vast network of interconnected hyphae throughout the soil that provides the surface contact needed for effective foraging. This is why a mycorrhizal plant can uptake a hundred times or more moisture and nutrients - in effect, it gains physical access to far greater soil areas because of the fungi.

A plant that is fortunate enough to take root in a fungi-rich soil has many advantages. Looking at the difference from a physical perspective, plants that lack mycorrhizae have only a small surface area where the roots are in actual contact with soil. Think about rope-like asparagus roots or the few thick roots of a rose - besides the minimal surface contact, these type of roots are not really designed to effectively draw in nutrients and moisture. The soil needs heavy amounts of fertilizer and water, much of it wasted by run-through, to maintain plants with inefficient root systems.

The popular view on plant roots seems to be that they have only two purposes - to anchor plants in soil and to suck in fertilizer and moisture. It would be helpful if growers could see roots more as "main arteries" with mycorrhizal fungi attached as the "foraging capillaries" that provide valuable access to surrounding soil.

A plant with mycorrhizae has no need for the large amounts of fertilizer and water that are being used by most farmers and gardeners. This may have important significance in the future, as growers explore the biological sciences for lower-input methods of producing food crops.

Cheers, and good growing,

Don Chapman
President, BioOrganics, Inc. - www.bio-organics.com - August, 2006

Build 'em Up or Knock 'em Down Agriculture?

So there's this patch of soil that's been farmed for decades - pretty much like all the other crop land in the county. For centuries, it was native grassland with lush growth year after year, with no added fertilizer (other than maybe some buffalo dung now and then).

And then the sod busters came with their plows. Again, the "virgin soil" was very productive with no added fertilizer. A few farms had cow manure available, but supplies were usually limited.

And then came the big change. Enterprising chemical corporations, looking for a new market after World War II, developed NPK fertilizers in convenient granular form. Plow, fertilize, seed, harvest, plow, fertilize, seed, harvest - the agricultural equivalent of Henry Ford's production line. The soil began throwing off yields far greater than ever before and farmers bought air-conditioned tractors.

But the soil was changing. The microscopic organisms and earthworms that had provided nutrients for native plants were either greatly reduced in numbers or completely eliminated by the new procedures. The new "crop grasses", primarily corn, were now dependent on the tons of human-provided "plant food" trucked in from distant factories. The soil became nearly devoid of life and essential humic, minor and trace elements were depleted. Salt buildup and compaction were increasing problems.

Modern agriculture is nearing a decision point. Will we continue overusing synthetic fertilizer and ignoring soil biology until our valuable crop acreages are completely destroyed? Will it be the cost of nitrogen fertilizer or nitrate contamination of drinking water that finally forces us to change? It's every grower's choice: continue reducing the plant-friendly organisms in their soil or begin reintroducing and rebuilding those microbial populations.

We can't promise overnight restoration of damaged soils, but using nature's powerful methods of growing plants can most definitely be used to grow abundant food crops. The beneficial soil organisms really don't distinguish between native grasses and introduced plants like corn or soybeans - although some selective breeding will be needed to identify plant varieties that are the best adapted to biological methods, just as so many varieties were bred to be chemically fed.

Those who want to explore alternatives to NPK fertilizer should contact me. Last year, a large California farmer actually ordered mycorrhizal inoculant because his Extension Agent (typically a very chemistry-oriented bunch) said his yield problems were probably due to a lack of beneficial organisms in the soil - a first! Perhaps this coming year, I'll get two or three such calls?

Hey, encouraging signs are always welcome here.

Cheers, and good growing,

Don Chapman, President
BioOrganics, Inc. - www.bio-organics.com - September, 2006

Making Good Soil into Great Soil

One of the most valuable uses for mycorrhizal inoculants is to allow plants to grow in inhospitable soil - restoration of mine tailings, freeway landscape plantings, bad pH situations, no-topsoil urban lawn areas, etc. In such conditions, a plant with mycorrhizal fungi on its root system can thrive in soil that would usually mean death for plants on their own. (In the worst situations, the fungi may have to be established on the roots in a nursery - being given a head start before being set out.)

Also, it seems likely that giving farmers the means to produce good yields from poor and marginal soils is something that will become tremendously important in the future, as world populations increase and now-productive farm soils are depleted through overuse of chemical fertilizers.

However, there is another area that should not be overlooked - the effects of introducing specific powerful types of beneficial microorganisms to good soils. For growers who have worked hard to build up organic levels in their soil and are proud of their big earthworm populations, the strategic use of microbial additives can often take yields from Very Good to "Wow!" levels.

For example, when the right types of mycorrhizal fungi are matched up with the right host plants, and the surrounding soil contains a broad spectrum of mineral elements, and all the millions of living soil creatures have good amounts of organic matter to digest, the results lead to plants performing at their full genetic potential. In many cases, this is pretty spectacular to see - clusters of beefsteak tomatoes, bell peppers crowding against each other, sweet corn developing extra ears, melon vines growing twice as long as usual, and giant squash getting, well, even more giant.

The best thing about microbially enhancing good soils is that it's so easy. Just adding a pinch of the superior mycorrhizal fungi spores in our inoculant products to any transplant roots can lead to colonization of an entire garden bed. Or, scattering our MycoMinerals product on a bio-lawn, or dusting our micronized Endo-inoculant on dampened crop seeds, or dipping the tips of bareroot trees into our Root Dip product can do the job - no big complicated deal.

I've proven all this to myself through thousands of test-versus-control plantings - and I'm not easy to convince! You can try it yourself by inoculating plants in one area and not another (do all the "without" plantings first to avoid accidental transfer of microscopic spores on your hands or tools). Note that you can only do this experiment the first year - after that, there will probably be residual spores in the soil, which will make it impossible to do a valid with-and-without test.

For decades, the chemical industry and their sponsored university researchers have worked on developing soil chemistry techniques that boost yields. I think treating the soil as a living structure and using biology-based growing methods can do even better.

It's time to take yields and plant health beyond simply using organic inputs. Let's use the tools that nature has given us to make our good soils great.

Cheers, and good growing,

Don Chapman, President
BioOrganics, Inc. - www.bio-organics.com - October, 2006

Matching Fungi to Plants

A subscriber in Wisconsin writes, "Enjoy your newsletter and appreciate your product. You stated, 'When the right types of mycorrhizal fungi are matched up with the right host plants...' Perhaps in your next edition you can explain what the matches are and how one achieves them."

Well, I'll try. The most basic match is with Endo or Ecto-type fungi, and in very general terms most of the plants on Earth, more than 90%, match with Endo types. Ecto-type fungi match with pines, oaks, birches, and a few other plants. There are also specialized types of mycorrhizal fungi - orchids have their own type, plants in the Ericaceae family (blueberries, azaleas, rhododendrons, heath, heather) have their own type fungi (not available in inoculant form, as far as I know), and it seems that mustard and cabbage-family plants do not form mycorrhizal relationships (although the mycorrhizal fungi will gladly scavenge dying cabbage roots to take those nutrients to host plants).

That's about where the agreements end, and I wouldn't be surprised if I hear from someone telling me about errors or omissions in the paragraph above. For example, I'm aware of one soil scientist who states that she has found Ecto-type fungi on grape roots, and I wouldn't doubt her. Another well-known scientist told me that he doesn't even bother trying to get into all the complex details of this topic - that he can see people's eyes get all glazed over when he does.

The practical view - which is the orientation of my newsletters - is that farmers and gardeners need Endo types, and they should examine inoculant labels to make sure Endo spore counts are guaranteed. (Be careful about labels that give a combined count of Endo and Ecto types - a billion tiny and inexpensive Ecto spores won't do a bit of good for a tomato plant.)

There are currently more than 150 named types of Endomycorrhizal fungi. The great majority have not been seriously evaluated for their effects on plants, and certainly not on a wide variety of plants grown in various types of soil. I have personally observed great variation in benefits to identical pot-grown plants when different types of fungi were introduced to roots - all the way from not differing from the control plants to showing dramatically better growth and yields.

This sort of grow-test would allow us to choose a predictably-good fungus for more of those plants in that same growing medium, but how about when those plants are in other soils? It might not be the same. A tomato in New Jersey soil and that same variety in California's Central Valley will both benefit from mycorrhizae, but is the same fungi the best choice for both? Maybe not.

BioOrganics puts eight Endo types in all of its inoculant products. This inclusion of several types of spores makes the most sense for producers of packaged commercial inoculants. A "shotgun" approach may seem unscientific, but it works. Maybe some day we can customize inoculants for regions or even for specific crops within regions, but not yet.

Interesting subject. I expect we'll be able to put a finer point on it in the future.

Cheers, and good growing,

Don Chapman, President
BioOrganics, Inc. - www.bio-organics.com - November, 2006

When Did Flavor Fall out of Favor?

Last week, I bought a bag of carrots at the local supermarket and steamed a few of them for dinner. After dinner, I tossed the rest of the bag onto the compost pile. Carrots are normally one of my favorite veggies, but these had virtually none of the tasty characteristics of garden carrots. They looked the same, but my one-word description of their flavor would have to be "Gack!".

This is just part of a disturbing trend for supermarket produce - the varieties are being selected more for qualities such as appearance, disease resistance, ease of harvest, earliness, shippability, and apparently every other factor except flavor. No wonder so many kids refuse to eat vegetables. (Mine loved anything that I grew - no coaxing needed.)

Everyone pretty much agrees that most supermarket tomatoes are poor imitators of garden tomatoes, but I wonder how many people realize how different, and better, other veggies could taste, too.

In an earlier life, I was in the marketing research business - measuring consumer reaction to new products and product reformulations. One time, a major manufacturer of salad dressings (you would recognize the brand) hired my company to diagnose their gradual loss of market share to competitors. I reviewed their product taste-testing results, which showed that none of the several ingredient changes they had made over the years produced a significant drop off in preference from previous product to new product recipes.

Then, I asked how their latest recipe performed against their old original recipe and was surprised to be told they never measured that. When they did, they were shocked at the near 100% preference for the original formulation. The gradual erosion of flavor from one reformulation to the next was not enough for most people to pick up on, but over time the wonderful flavor of their original product had been substantially lost.

I suspect the same is true for much of the produce we are offered today and most supermarket shoppers would not believe the wealth of good flavors they are missing. An older-variety Nantes-type carrot grown in mineral-rich soil is so different in flavor from the pretty orange things in cello bags that they should not be called the same product. For you home gardeners reading this, try the Nelson variety for a revelation in texture and taste.

The increasing popularity of farmer's markets is perfectly understandable to me. I had the pleasure of eating a Fuji apple bought at such a market in Thousand Oaks, California, during a recent visit there. It was nearly all green and not perfectly shaped, but what a wonderful flavor and crispness! The "improved" redder and prettier versions of Fujis in stores are not nearly as tasty, and I'm guessing they are headed in the same sad direction as the Red Delicious variety (which, believe it or not, used to be actually delicious).

Well, that's my rant for today. Should it be that hard to buy a decent tasting carrot? They don't even have the fragile-shipping excuse of tomatoes.

Look at our MycoMinerals web site for a good product to blend into garden soil or flower beds before planting next spring - the volcanic minerals with mycorrhizal fungi spores will make good organic soils perform even better - and also add wonderful flavors to older "unimproved" vegetable varieties! www.mycominerals.com

Cheers,

Don Chapman, President
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