Why Organic Is Not Enough

Presentation to the Olympia Free School on February 1, 2005
by Gary L. Kline

This is going to be fun because tonight I'm going to be talking dirty. Actually I'm going to be talking about soil and about health…your health and the health of the plants you eat and also animal products (meat, fish, milk, eggs) that you may also eat. By the way, do we have any vegans or vegetarians in the group? [Yes?] You have my sympathy. Now, why would I say that? Two reasons: 1) I think you are missing out on a lot of tasty, healthful food; and; 2) vegetarians and vegans need to be <u>especially</u> concerned and careful to get <u>all</u> the essential vitamins, minerals, fats, and proteins in their diet…which goes along with the point of my talk and with a vital message usually missing in the growing and selecting of organic food.

The topic of my talk is "Why Organic is Not Enough…" when it comes to food and health that is. For most of you, it probably was shocking heresy to hear such a question raised. I'm sure some people stayed away because they don't want to hear my unsettling message. For those of you brave enough to attend, let me begin by asking some questions and doing a little survey:

1. How many of you are gardeners?
2. How many have grown food gardens?
3. How many of you are organic gardeners?
4. Other than manure, compost, and other organic matter such as leaves and grass clippings, how many of you put fertilizers on your food garden? What kinds?
5. How many of you lime your gardens? Why?
6. How many have had college or high school chemistry?
7. How many have studied horticulture or agriculture?
8. Who can tell me what growing organically means? How would you define it?

In my view, success in gardening is about 75% dependent on the soil you are working with and what you do to it. In other words, soil condition and fertility is the key to growing an abundance of high quality crops with a minimum of losses and problems. Green thumbs are connected to dirty hands….only we call it SOIL. So we should say soiled hands. I hope to explain <u>why</u> SOIL is the key to gardening success and I plan to do it by asking, 1) <u>what</u> things are made of, and 2) <u>where</u> did they come from.

From a physical and chemical standpoint the entire universe is made up of atoms of elements. Who can tell me how many natural elements there are in the universe? The answer is 92, as far as we know. There are also 17 man-made elements, most of which I believe have only existed for a split second, so they don't really count. I brought with me a table of the 109 elements which I will pass around. Note that only eleven are gasses or liquids, while 88 are considered metals. We know that the entire universe is made up of 92 natural elements. What are they made of? Where did they come from? I'll leave that for another class…to be taught by an astro-physicist.

While there are fewer than 100 elements on earth, there are more than 6 billion known combinations of these elements and quite a few of them were created by man, mainly through the wonders of organic chemistry and those include some of the most toxic and polluting substances now in existence. However, it can legitimately be said that everything is chemicals. Some are bad, some good and essential for life, and others not.

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Planet Earth supposedly came from the sun. But what is it made of? The ancient Greeks said the planet or world was made of four things: earth, wind, fire, and water. By wind they meant air; and sunlight was included under fire. The ancient Greeks would not have believed, most of them, that the earth is not flat; or that it is swishing through space at a thousand miles per hour along an elliptical orbit 300 million miles long, circling a giant thermo-nuclear fireball at the center over 93 million miles away. They might have found these facts unsettling. Better to believe the sun is a small fireball carried in Zeus' chariot. Actually, it was the Greek Philosopher, Democritus, back in 430 B.C., who first came up with the idea of atoms.

But when you think of it, the air, water, rock or dirt, and sunlight, plus plants and animals, is all there seems to be on earth. When we break these down, however, we find there is quite a bit more to their composition. I'll come back to that.

Now let me ask what are the 6 factors of plant growth? Who can name them? The answer is much like what the Greeks said. To grow a higher plant, such as a willow tree or a rose bush, there must be air, water, light, warmth, nutrients, and anchorage, or something for the plant to sink its roots in to be supported. Humans don't need anchorage, but we need the other 5, and arguably need shelter. If you are having trouble growing a plant, it has to be due to one of those 6 factors, or maybe some combination of them.

For the most part, unless you are growing in a greenhouse or other enclosed, artificial environment, you have very little control over most of the six factors. You can't make the sun shine longer, the clouds go away, or the rains begin or stop (though you can usually supply water). You can't control the weather or make it get hotter or cooler when you want. You can choose where to put a plant or sow a seed and you can work the soil to possibly improve conditions for a plant to root or get anchored. But often you are limited to where you can put a garden and must work with the soil that exists.

The one factor you <u>can</u> work with and do a lot to change or control is nutrients. The other factors are relatively simple. Supplying nutrients to achieve optimum soil fertility, however, is extremely complex. You could study soils and fertility all your life and only make a dent in fully comprehending them. In fact, I don't think we will ever fully understand soil and all that's involved in it and in growing plants. However, there is a great deal we can do with what we do know and it can make a big difference in the plants we grow and what crops do for us nutritionally. But generally we must unlearn as much as we learn. Prepare to do some unlearning tonight.

So what is soil made of and where does it come from? Before answering that I want to ask the same questions about air and water. Putting aside light, temperature and biological creations, the planet is comprised of air, water, and earth or seemingly solid ground. Of the 92 elements found on our planet, who can tell me what the most abundant element is? Surprisingly, the answer is oxygen. Think about it. You would think there is more air than anything else, but the blanket of air over the earth, is only about 15 miles deep. The earth itself, the solid part, is 8,000 miles through and 24,000 miles around. The highest mountain stands six miles above sea level. Not much oxygen up there. The deepest part of the ocean is 8 miles.

The composition of air varies with altitude, but at sea level it is about 20% oxygen and 78% nitrogen. Those two total 98%. Argon makes up just under 1%, while carbon dioxide, a very critical component, is just three hundredths of one percent (0.03%). The remainder, discounting dust and pollutants, is mainly inert gasses totaling less than one tenth percent. These are volume

percentages. The thing to note about air is that anywhere you go around the world, it will have this same composition, and oxygen will be about 20%. Different books give slightly different numbers. One source lists oxygen as nearly 21%. Another lists nitrogen at 79%.

Water covers about 74% of the earth and most of it is salt water. Very little of it is drinkable. Humans are about 70% water, and plants vary a lot but probably average 85 or 90% water. The two main elements of water are, of course, hydrogen and oxygen. The H_2 in H_2O is 10%, leaving Oxygen as 90%. There has to be some percentage of dissolved oxygen for fish to breathe. Looking at Ocean water, more than 99% is hydrogen and oxygen. However, ocean water contains all of the 90 other elements. The saltiness is due to minerals, of which sodium and chlorine are far the most abundant, followed by magnesium, sulfur, calcium and potassium. These six elements are all land plant and animal nutrients, but in roughly upside down order.

Again, the notable thing about seawater is that, except around sources of pollution or river mouths, it is extremely uniform anywhere you go. In contrast with air, which has perhaps a dozen elements, a bucket of ocean water will have all 92 elements and anywhere you sample it there will be essentially a constant percentage of each of them. You could say the ocean is thus uniformly fertile for plants and animals able to grow in salt water. Soil is very different from air and water in that regard.

Almost no two spots of terra firma have exactly the same soil composition. There are thousands of soil types and make-ups. If you were to walk out on a patch of bare ground that was ideally suited for gardening, you would be standing mostly on oxygen. Most of the oxygen however would be combined with minerals. Nevertheless, an ideal garden soil contains 45% air, of which a fifth is oxygen. And, in fact, when you lump the oxygen of the air, water and ground or crust all together it makes up 50% of everything. Some say planet Earth should have been named Water, but Oxygen would have been more fitting.

When we look at the ground or soil, examination of almost any cubic foot would also reveal all 92 natural elements. The make-up of the earth's crust, which is miles deep, differs somewhat (chemically) from the shallow layer that is soil or topsoil, although the top 10 elements are the same and in the same order for both. The earth's crust is 49.5% oxygen, 25.7% silicon, and 7.5% aluminum. Oxygen as a gas is a plant nutrient and silicon may be a trace nutrient, although it has yet to be recognized as a plant nutrient. Silicon, the second most abundant element in the earth, is what computer chips are made from. Chemically, it is similar to carbon. Aluminum is not a plant nutrient (that we know of) and can be toxic to plants when very acid conditions exist. The acid itself probably does not bother plant roots. By the way, roots require oxygen and they "exhale" carbon dioxide like we do.

In topsoil aluminum is 8%, silicon is 27.9% and oxygen is 46.5%. Together they make up 82% and interestingly, as well as very significantly, these 3 elements are predominantly what clays are made of. Next in order are iron, calcium, sodium, potassium and magnesium which make up 16%. That leaves just under 2% comprising all the other 84 natural elements. In other words, just 8 elements make up 98% of the solid portion of soil, discounting water and air, I believe.

You want to remember those last four elements, which are calcium, sodium, potassium, and magnesium. These are what are known as cations that essentially control fertility and plant nutrition. They are positively charged and have an affinity for tiny clay and humus particles or colloids which magically carry a big negative charge and thus can form the major warehouses of soil fertility elements or, more accurately, ions. Ions are electrically charged atoms or molecules.

These nutrient ions get plucked off the colloids by plant roots through what is called cation exchange whereby the roots give off acid containing hydrogen ions that change places with the calcium, magnesium, potassium, and sodium held by the clay and humus portions of soils. To a lesser degree this also happens with certain of the trace elements, or more correctly, the micro-nutrients. It's kind of like static electricity holding dust on a TV screen. In this case the hydrogen ions are not a nutrient. However, it is important to point out that not all clays do this well and under some conditions the cations may have been plucked clean or washed out by excessive rainfall or erosion. Also, until you saturate the colloids with nutrient cations, the roots can't easily get them off. Another very important point is that the more humus or organic matter you put in the soil, the fewer minerals you have, because they are diluted. Thus, the more mineral fertilizers you have to add to bring the colloids up to saturation level with nutrient cations.

I hope I haven't lost you. That last part is rather complicated but very important to understand. Now let's look at plants. Where do they come from and what are they made of? Some plants reproduce vegetatively, but let's look at sexually reproduced plants since this covers most of the crops we grow and eat. They come from seeds. The seed could be fairly big, such as a bean seed, or could be very small, such as a cabbage seed. You put it in the soil, water it, and in a few weeks or months it may multiply hundreds or thousands of times in weight and bulk. How did that happen? Where did all that bulk come from? You think you know the answer, but probably most of you will be wrong.

Let me ask, how many known plant nutrient elements are there? The answer is 18, but probably that number will grow and it may be that plants really need 40 or 50 or more of the 92 natural elements. Who can name the 18 nutrient elements? I'll list them for you in roughly the order of abundance required to grow a crop plant. Carbon, oxygen, and hydrogen, which are the main components of all organic compounds; nitrogen, which is required to make proteins; phosphorus; sulfur; potassium; calcium; magnesium. The rest are called trace or micronutrients that now include sodium, plus iron, copper, zinc, manganese, boron, cobalt, chlorine, and molybdenum. Humans need 27 or more nutrient elements and these come ultimately through plants. Where else?

Think about it. You started off as a tiny, microscopic, "fertilized" seed and within 20 years weighed a hundred, 150, or maybe 200 pounds. Your body multiplied thousands of times in size and weight. How did that happen? What are you made of and where did it come from? Well, you are made of muscle, skin, bone, blood, and other things. You are an organized mass of protein, fats, water, etc; but no carbohydrates. All of these things came, obviously, from food. But what is food made of and where does it come from before it gets to the grocery store or to the dining table? Food markets today carry very little real food, by the way. And half the stuff at health food stores isn't really healthy, even if organic, when you look into it. Horrors!

Well, it happens that 99% of all living matter, i.e. plants and animals including humans, is made up of just 6 elements. Actually, 95% is made up of carbon, oxygen, and hydrogen. Carbon itself makes up nearly 50% of plant tissue. Next comes nitrogen, phosphorus, and sulfur. But if the water, which is about 70% of human body weight, is taken away, the greatest mass is not flesh or muscle, but bone. Bone is made up principally of calcium and phosphorus. All true or real food eaten by humans comes ultimately from plants. But, again, where does the food of plants come from? How do they go from a tiny seed to a large vegetable plant or a giant tree?

Ancient people wondered the same thing and they had a variety of answers. Some explained it as magic or cosmic forces. The Jewish Bible said God created everything. He (or She?) created

man from dust; so the story goes. Around the 1600's, different authorities and investigators said there was a life force or principle that passed from dead organisms to new life. Some said plant roots ate tiny particles of humus or particles of mud or the salts in manure. Others believed in spontaneous generation. In the 1600's, a Flemish chemist named van Helmont said that if you stick a dirty shirt in the hole of a barrel of grain and wait 21 days, mice will appear out of nowhere in the shirt. But in 1630 [or 1635], he asked himself: how does a tree grow? Where does the stuff come from that turns a sapling into a big tree? He decided to do an experiment which was actually fairly brilliant and scientific.

Van Helmont got a big tub and filled it with exactly 200 pounds of oven-dried soil. Then he planted a 5 pound willow in the soil and covered the soil with heavy fabric leaving only a small hole in which to pour water. Apparently, no rain or dust got in. He waited five years, and then carefully removed the willow and all of its roots. The tree had gained 165 pounds. He then dried the soil and weighed it. The soil had lost 2 ounces. Obviously, the bulk of the tree's tissue did not come from the soil, and he reasoned that the two ounces was probably an error in weighing. He was stumped, but eventually he decided that the increase in tissue mass of the tree came from the water which he had applied. But he was wrong.

Who would have guessed that the vast solid bulk of the tree came from the air! It came via photosynthesis of carbon dioxide and water. That tiny 0.03% of the air is essentially the origin of the entire supply of carbon and the source of all life on earth. The earth's original primeval rock contained almost no carbon and the same was true for nitrogen. And still today there is very little elemental carbon and nitrogen in the ground and most of it is contained in dead or live organic matter. Plants make their own food, it is said. But it is equally true and significant that the willow tree did "eat" those two ounces of minerals that were missing from the soil and it would have died without them.

Photosynthesis is the main miracle that life is based on. Scientists have not been able to duplicate it, and probably never will. Although textbooks seldom point it out, you can not have photosynthesis without tiny amounts of a wide variety of minerals. Nor can the physiology of the plant function without them. Most, if not all, enzymes and vitamins must have minerals in their make-up. Without iron to provide the central catalyst in hemoglobin, oxygen would be useless to you, since it is carried in the bloodstream by hemoglobin. There can be no proteins or amino acids without nitrogen; no chlorophyll without magnesium; no energy transfer without phosphorus; no nutrient passage into cells without calcium; no sugar production without potassium; no seed sprouting without manganese and on and on. Typically, only about 5% of a plant, not counting its free water, is minerals. But, oh, what a critical 5% those minerals are. This is the **missing mineral message.**

Carbon, hydrogen, and oxygen for making plants come from the air or from water. They can be regarded as the organic constituents of living matter and possibly nitrogen can as well. All the rest are inorganic and, being earth-derived, may all be considered minerals. Sometimes water is thought of as a mineral, as are petroleum and coal, but not in our context here. Although carbon is the primary plant nutrient, you can't feed it to plants via the soil. Carbon is found in coal, oil, lime, and diamonds.

Next we may ask, what exactly is soil? What is it made of and where did it come from? Scientists believe that originally all soil was more or less solid rock. That is to say it was all inorganic minerals and not yet soil. Physical forces of wind, rain, heat, and freezing, plus landslides, volcanoes, glaciers, and other forces, worked (and still work) to break up the rocks

into smaller and smaller particles. Eventually, living or primitive organic organisms developed in the seas and moved onto the land, which were capable, with the help of photosynthesis, of further dissolving and etching minerals out of the rocks. They didn't do this to stay busy; it was an essential part of their food and make-up. Who would have believed, before 1674, when the Dutchman, van Leeuwenhoek, peered through a microscope at a drop of water, that there are living critters smaller than the eye can see? Or that there are more microorganisms in a tablespoon of soil than there are people on earth? The role of microorganisms in soil fertility is immense, but I won't attempt to go much into that. Perhaps in another lifetime.

As these organisms evolved and as they multiplied and died-off, they created or became humus. In fact, some scientists believe true humus is the bodies of microbes. The mixture of humus and minerals became soil. It is the interaction of microbes, plants, and minerals, over thousands of years, that makes the soil, and makes fertility. There is no soil without plants, and no plants without nutrient minerals. While only a small part, the minerals are every bit a part of the plant's food as are the sugars and starches made by photosynthesis. These simple carbohydrates supply energy; they do not contain life. For that you must have nitrogen to make proteins, and minerals to coordinate and run the machinery. Nitrogen in the air is useless to plants; it must be converted to other forms and delivered through the ground. That's another story.

Only about 8% of the earth surface is suitable for agriculture and less than half of that for growing crops. A good agricultural soil consists of four things: air, water, minerals, and organic matter. An ideal soil will be half air and water in equal proportions by volume, and half solids, consisting of minerals and humus or decomposed organic matter. However, in the case of the solids, the proportions need to be 9 to 1, minerals to organic matter. In terms of the four parts of ideal soil, the minerals need to be 45% and the organic matter 5% by volume. By weight the organic matter should be only about 2% of soil! Think on that.

Here is the important point: organic matter (or humus) is critical for growing crops. It should never be below 3%, but it also should not be above 6%. Above the ideal of 5%, more is not better; generally; it is harmful to the crop and harmful to your health because it will be minerally or nutrient deficient… especially if you don't add any mineral fertilizers. Also it will give the microbes too much carbon to process and they won't leave any food for your plants until they are done. Microbes eat first.

That is a hard pill for dyed-in-the-wool organic gardeners and farmers to swallow. There is such a thing as too much organic matter and beyond a certain point of plowing in manure, compost, or other organic matter, you are not building up the soil. Instead, you are degrading it. When I say this, Conventional Organic Wisdom (abbreviated C.O.W) worshippers go into convulsions. This is sacrilege to followers of the sacred COW. However, what they need to realize is that I am only trying to wake up people and help everyone be healthier. I am also offering correct fertilizing materials for people who see the wisdom in buying and applying them. Black Lake Organic carries over 100 kinds of natural and organic fertilizers, including many that are not minerals as such.

Lest you think I am a total heretic, I want to quote a paragraph from page 193 in the 1955 book titled Organic Gardening by J. I. Rodale, who is the acknowledged father of organic gardening and farming in America. "Plants strongly attacked by insects are often nutritionally unbalanced. Be sure that you give them a completely fertile soil, rich in organic matter and all the minerals. Using a good-sized mulch and making compost will help, as well as adding minerals in the form of natural rock fertilizers." The underlining emphasis is mine, but it also needs to be yours.

If you open any textbook on soils you will find that the ideal soil for growing crops is a loam with 5% organic matter. Somehow, Sacred COW growers are blind to that simple fact. They seem to think (and they've been told over and over) that you can't get too much organic matter in your soil. And worse than that, many of them think organic matter and ordinary compost is the best fertilizer there is and nothing more is ever needed. In most cases, especially here in the Maritime Northwest, this is totally untrue. Let me quote again from Rodale's 1995 book on page 33: "I wish to stress here that too many organic gardeners have been working to their own disadvantage and have produced an unbalanced soil. They have piled prodigious amounts of organic matter into it, and have neglected the mineral side." Whoa! Have they ever.

I'm here to tell you that often times, application of even a small quantity of minerals in the right balance and completeness can make a spectacular difference in the amount and quality of produce you will get. You may not get more poundage, but you will get more food that is worth eating and nutritious. And there are bonuses beyond that, which include: fewer diseases or pests, better taste, and longer storability.

Ever notice how much produce from the "grocery" store you have to throw away? Why play Lotto with your budget and health? Properly grown food doesn't rot over night. The reason for this is that the mineralized crop is more nutritionally complete and more resistant to attacks, just as you are if you are getting your proteins, minerals, and vitamins from nutritious, real foods. I'm including in that not just vegetables and fruits, but raw milk, cheese, yogurt, eggs, fish and meat, especially from animals raised on mineralized grass and herbal pastureland. To accomplish that you need to begin with a professional soil test to tell you what nutrients you have, and what you need to add to bring them into balance and completeness at sufficient levels. I call this the ABC's of fertility: Amount, Balance, and Completeness. People have to get over thinking fertilizer is a bad word and chemicals are always terrible.

Now I want to go back and look at soils from another angle. While subsoils make an important contribution to fertility and soil condition, I want to focus on topsoil and the top 8 inches or shovel depth. This is about the limit to which the bulk of oxygen-requiring beneficial microbes are found and it is the depth where most root growth occurs and which gets worked in ordinary gardening. An acre of soil down to this depth typically weighs two million plus pounds. Divide by 43 or 40 and you have the amount in 1,000 square feet or an area roughly 32 feet by 32 feet.

The typical agricultural soil is a mineral soil, which means, technically, that it has less than 20% organic matter content and more likely less than 10%. However, we don't want to make the mistake of thinking these are all or mostly nutrient minerals. Remember that silicon and aluminum, tied up with oxygen, makes up 82% of topsoil minerals, on average, and they are not nutrients. At best, only 18% of topsoil is nutrient minerals in native soil. Much of this 18% will usually be chemically locked up and not available for crop plants to use. Mycorrhizal fungi, bacteria, and other microbes in combination with humus can aid greatly in unlocking or freeing them. But why exhaust all the minerals in the 3% of topsoils we have to work with? Why not go out into the areas not usable for farming and get the necessary minerals to enrich our gardens and farms?

Unlike air and water, the fertility elements in the world's soils are not evenly distributed; far from it. This means that in many parts of the world you have to go outside your local area to get minerals that you may be lacking for balanced fertility. This is where mineral fertilizers come in. Wishful thinking and piling on organic matter won't cut it. Yep, you're going to have to spend

some money to get what your soil, your crops, and your body needs. Remember, I stated that this is 75% of gardening success. We have to get this down right. Our health, and ultimately now our species' survival, depends on it. People are incredibly uneducated about this most fundamental requirement of everyday existence, namely food and how to properly grow it.

Soil textbooks will tell you that there are basically four kinds of soil or soil texture based on the particle size. They range from gravel and sand to silt particles almost too small to see, to clay which has ultra microscopic particles. What the books don't often make clear is that there is a tremendous difference in the chemical make-up of sand compared to clay. It isn't simply a matter of particle size; not by a longshot. Sand is mostly silicon dioxide that won't break down in a thousand years. It is easy to plow, but almost totally devoid of nutrients or ability to hold nutrients and water. Unlike clay, sand particles carry little or no electrical charge. The fact that clays do, is a saving miracle. Choose clay over sand.

Pure clay is very hard to work, but can be very rich in mineral nutrients and holds onto them and to water. Silts can go both ways. They can release minerals to recharge clays and what's left may be very resistant to decomposition. Silt is intermediate to clay and sand in its physical and chemical properties. The best soil, however, is a combination of sand, silt, clay, and humus that is known as a loam. That's what you want to create or imitate if you don't have it.

You can improve both sandy and clayey soils by adding organic matter to them. However, if you already have a nice loamy soil with 5% or slightly more of decomposed organic matter you can't improve on that. Save your energy. Use your compost somewhere else. Instead, look at your mineral and lime status. Actually, lime is a mineral, but don't overdo it either. The correct type and amount can work magic. Too much chemically ties up the trace nutrients.

Organic matter primarily improves soils physically. In the case of clay it helps loosen the soil and aerate it and <u>may</u> permit better drainage. Added to sand, organic matter helps hold it together and improves water retention. It also feeds microbes and earthworms, but is seldom a full and balanced diet. Both have to have minerals and when these are sufficiently present these critters make little admixtures combining minerals, humus particles, microbes, glues, and excretions that permit granulation or crumb structure and lend excellent structure to topsoils. Worm castings generally work great in this regard and contain good fertility, depending on what the worms eat or are fed. Some materials being marketed as worm castings are little more than washed-out cow manure, sadly lacking in nutrients. Some people never catch on: your worms are what they eat. And you are what your food eats.

You would think that you could improve clayey soil by mixing sand into it, but this is almost impossible because of the quantity required. Remember how much an acre of average topsoil weighs. If you use the wrong sand particle size you could make a sort of concrete. However, in making soil mixes, coarse sand, pumice and perlite may work to loosen and aerate the clay component. Sometimes not; especially where the clay is thick and deep.

In the garden, however, an easier and inexpensive loosening tool is lime. Calcium carbonate lime works to physically loosen soils, whereas high magnesium lime or dolomite works to tighten soil. It is important to get the right amount, which can vary greatly with the soil type and also to get the correct ratio of calcium to magnesium. A professional soil test is the best way to determine the type and amount of lime to use. A professional soil test can tell you how to balance those magical four cations (calcium, magnesium, potassium, and sodium) in the

approximate ratio of 65:15:4:1 for optimum cation saturation of your clay and humus soil colloids.

So, the first big thing to take home is:
1.) Don't overdo organic matter. A little bit does a lot. Remember what J. I. himself said. Let me quote him once more from page 64 of Organic Gardening, the book. "There is a point beyond which the application of organic matter in gardening may cause actual harm." So now who is mainstream organic and who is the infidel?

The second biggy is:
2.) Lime is a fertilizer, more than simply "adjusting" pH, its main function is to supply needed calcium and/or magnesium for feeding your microbes, earthworms, etc. They, in turn, feed your plant roots in natural and organic fertilization schemes.

The third biggy to take home is:
3.) The MISSING MINERAL MESSAGE. How ever did it get lost? You almost certainly have to add them to virgin soils and to exhausted soils or over-composted soils to achieve nutritional health.

Organic matter, or being organic, in the sense of not using chemicals or of letting nature take its course, is not enough. In most cases you need to augment the soil with minerals, which is why organic is not enough. The wise course is to graduate to Mineral Augmented Organics, which is the thrust of what Black Lake Organic is all about. I have brought with me copies of what we call Gardening Information Leaflet No. 1, titled "Superior Soil Building: The Mineral Augmented Way." What we say is this: "Doing it Right," and it's "The Only Way to Grow." If you are buying rather than growing most of your food, be wary of growers who do not use professional soil tests or do not follow through with applying the proper fertilizers called for by the soil tests. If your health is important (and whose isn't?), you will do these things.

Another Gardening Information Leaflet I brought is titled "Fertile Mulching," which tells about how to both fertilize and mulch established plantings. Despite what you may read, mulch by itself has very little to offer crops in the way of nutrition. Several of our customers who were having poor production and sickly fruit trees have tried this method and come back the next year to tell us it has made phenomenal improvements in the fruit production, taste, and in health of the trees. What we are doing is combining minerals, microbes, and organic matter in a synergism that greatly magnifies what any of them could do alone. Notice that plant and animal meals, as well as minerals, are part of the fertilizing scheme. The mulch holds in moisture and makes a nice environment for microbes.

I have one more thing I want to discuss regarding minerals. Supposing you don't get a professional soil test, but you want to cover your bases and assure you have all the minerals present and bring up the overall mineral levels. One way to do that is by using kelpmeal and using liquid fish and kelp fertilizers applied both to the ground and to the foliage under the proper weather conditions. Plants can take up fertilizer nutrients through their leaves; especially micro-nutrients. Another method is to use natural rock mineral powders that contain nearly every trace or micro-nutrient. Two of those we carry are Azomite and Glacial Rock Dust that we are going to put into all of our organic specialty fertilizer mixes. However, you can also apply them separately and I want to talk in further detail about the Glacial Rock Dust, which comes from British Columbia.

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A few days ago, I received a package of information and a small bag containing a very fine, brown powder which I take to be the same, or similar to, the Glacial Rock Dust that we carry at Black Lake Organic. I brought the bag to pass around. Along with it came a lab report listing 70 trace minerals and the percents found in this powder. Remember that there are 92 known elements in the universe. Considering that some of these in pure form are gasses and liquids, they wouldn't be in there. Included in the 92 natural elements are 6 inert gasses that cannot take part in chemical or biological reactions. That means nearly every element that could possibly be there, is in this dust. I'll pass the lab report around too. It is at least partially true that "Dust thou Art; and to dust thou shalt return."

Notice on the lab report that I have underlined the known plant elements and there are 15 out of 18 present. There is no nitrogen and no measurement for oxygen and hydrogen. Those are the missing three. There is, however, a small amount of carbon. Notice also that the leading elements are silicon at 24.5%, aluminum 6.6%, iron is 7%, calcium is 4%, sodium 2.2%, magnesium 1.8%, and potassium is 0.78%. There they are: the big six plus one. All of this is to be expected for a mixture of rocks churned and piled up by a glacier.

Essentially, there is no organic matter in rock dusts, but there are all the minerals that might only be present in insufficient amounts or absent from organic matter. We can't make the assumption that because there are living beings or plants there must be enough minerals to meet all the needs, particularly when we are talking about food crops and supplying all the necessary nutrients to make the crops and us superbly healthy. The fact that people, plants, and animals do get sick and weak is testimony that soils they depend on are often deficient, especially where man has messed with the original conditions. Nature plays a never ending game called natural selection. If you're not smart in what you eat, you will be selected out.

There was a testimonial CD that came with the rock dust sample which has a nurseryman describing all the things their product did for his plants. I have no doubt that the testimony is true. It is amazing and it doesn't take much to "Do It Right."

One final thing, if you have internet access, I recommend you look up an article titled The Remineralization Imperative, by Graeme Sait at:
http://www.nutritech.com.au/interviews/interviews.htm
It's free…and it will make you rich!

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