What Is A Healthy Soil

by John Ferguson, Nature's Way Resources

(Part 1)

Several times over the last couple weeks the question "What is a healthy soil?" has come up.

So, what is a healthy soil and how do we get there? Almost every gardening book I read has some definition of a healthy soil. We go to the garden center and we see all these colorful bags making wild claims about how wonderful and great the product is. But is it really? How many of us have torn a hole in the bag when no one is looking so we can see what is inside? Experienced gardeners know that the large majority of these products are worthless.

So again, what is a healthy soil?

Most folks would say it is a mix of sand, silt, and clay (topsoil) with some organic matter mixed in. But is that always true? What about the microbial content or the air and water in the soil? What about the available nutrients? What form are they in and how are they delivered?

What about the type of organic matter? Is it high quality humus that one gets from good compost or is it sawdust from the local sawmill?

In the last 15 years as our understanding of the tremendous importance of soil microbiology and the role it plays in plant growth and health has changed, it has caused our understanding of a healthy soil to change. I hope every gardener reading this newsletter has read the book "Teaming With Microbes" by now.

Is a healthy soil for cactus and succulents the same as a healthy soil for blueberries? Is a healthy soil for turf grass (ex. St. Augustine) the same as for trees? Is a healthy soil for bluebonnets the same as a healthy soil for swamp mallows or gingers?

As you can see from the questions above the answer varies depending on what we are growing. To have healthy soil we have learned that there is three major aspects that need to be looked at:

- 1st. We need to define, what is a healthy soil in relation to the plants we wish to grow
- 2nd. We need to quit destroying it
- 3rd. We need to nourish and replenish it

Hence the answer to the question (What is a healthy soil?) is a combination of the components below:

1) Organic matter from almost fresh to totally decomposed in the form of humus (humins, humic, fulmic acids)
2) Minerals (nutrients, sand, silt and clay)
3) Soil life (microbes and macrobes)
4) Air & water
5) Plant choices
6) Care for and do not destroy the health of the soil one has

We will look at each component in detail. Fall and winter are some best times for improving one's soil.

What Is A Healthy Soil - Part 2

This week we are going to look at the first two components organic matter and minerals and the role they play in a healthy soil.

1) Organic matter - What do you think of when you hear the term organic matter?

Humus, plant waste like leaves and twigs, animal waste like manures, dead bodies of animal's or insects and microorganisms?

Sometimes, people use the terms organic matter and humus interchangeably, however, all organic matter is not humus but all humus is organic matter.

In general humus is the mythical and elusive dark brown to almost black substance that doesn't dissolve in water easily but can hold over 15 times its weight in water. It will often be 30% each lignin, protein, and complex sugars. It will contain 3-5% nitrogen (N), 55-60% carbon (C), and has a C:N ratio of 10:1. It is a major component of good quality compost and helps give compost the dark chocolate brown to almost black color.

What are some of the major functions of humus in the soil?

It is the source of food and energy supporting most soil dwelling life forms. Humus is continuously broken down into humic acid, fulmic acid and humins, vitamins, enzymes, and minerals. Two of the major functions performed by humus is holding nutrients till needed (prevents leaching) and holding water till needed. It also buffers pH and adds tilth to soils. However, the most important function may be regulating the availability of minerals in the correct proportions to each other and providing food for the beneficial microbes.

The amount of humus required for a healthy soil is determined by our plant choices. Many plants like azaleas, ferns, ivies, blueberries, will grow in pure organic matter with extremely high levels of humus. However, if we grow cactus, the soil should have very low levels of organic matter especially humus. In this case the high water holding capacity and nutrient levels in humus will lead to root rot and plant death.

As a general rule, plants that grow in shady moist conditions require lots of organic matter and humus (up to 100%); plants that grow in the sun prefer about 25% organic matter by volume, and the desert plants and many succulents only 1-2% humus.

Price point at your local nursery will tell you what you are buying, if you are paying $6 or less per bag it is probably fresh organic matter like sawdust and contains zero humus. This low quality organic matter causes gardening problems from insects and disease, to nutrient tie-up and poor plant growth.

This is the reason so many people say they have a "brown thumb", they use low quality materials. To use the computer analogy, "garbage in = garbage out". Translated to gardening, "cheap low quality soils = lots of problems and eventual death of plants".

2) Minerals

These trace minerals are found in granite and basalt sands, products from the ocean (seaweed and fish emulsions), green sand or glauconite and a few other mined products that were all discussed in detail in previous newsletters and are available on the website.

We have talked about humus and minerals which play extremely important roles in the soil, but typically compose less than 10% of the total volume of the soil. The remainder of the soil consists of sand, silt and clay particles. These are technically minerals which are called silicates; an example is the feldspars that have quartz (SiO_2) as their basic building block.

Of these, clay is the most important and valuable in horticulture and agriculture. Clay contains nutrients, it helps the soil hold onto other nutrients (high cation exchange capacity or CEC) which prevents leaching, and helps hold water.

Clays are the smallest of soil particles, they have high nutrient and water retention capability, and they help bond larger soil particles together. However, a high percentage of clay can make the soil difficult to work, shrink and swell as water content changes; they become slippery when wet, very hard when dry, and have very poor aeration. Clay particles are so small that it might take a hundreds or more to be the size of a silt particle. When wet and rubbed between ones fingers, clays feel smooth and slippery.

Silt particles are also made of quartz minerals that are between clay and sand in size and properties, important in loam soils but not important by themselves. Silt soil rubbed between fingers feels like talcum powder.

Sands are the coarsest of all soil particles and made almost exclusively of quartz minerals. Sandy soils are well aerated, they drain rapidly, and the looseness is ideal for root growth; however moisture and nutrient retention are very poor.

Each soil component has good and bad points so how do we as gardeners overcome this problem? We use, find or make, what is called loams which are soils that contains equal amounts of clays, silt, and sand, plus some organic matter. Is this the ideal garden soil?

Pretty close. It is easy to optimize soil conditions from here for a given plant. For example the brassica family (cabbage, Brussels sprouts, cauliflower, etc.) prefers a slightly alkaline soil with a higher percentage of clay.

This contrasts with peppers and tomatoes that prefer slightly acidic soils high in silt and sand with less clay. However, both plant groups grow better in soils high in humus and both will grow fine in opposite conditions if there is enough good quality organic matter (quality compost) mixed in.

What Is A Healthy Soil - Part 3

Continuing our discussion of what is a healthy soil we are going to discuss item #2 below: Minerals.

1) Organic matter from almost fresh to totally decomposed in the form of humus (humins, humic, fulmic acids)
2) Minerals (nutrients, sand, silt, and clay)
3) Soil life (microbes and macrobes)
4) Air & water
5) Plant choices
6) Care for and do not destroy the health of the soil one has

For ease of discussion I am going to divide this topic into the elements or nutrients and the base materials that form all soils (sand, silt clay).

2) Minerals- The mineral requirement in a soil for healthy plant growth is a subject that is constantly being changed and expanded every year. First it was assumed that plants only needed NPK (nitrogen (N), phosphorous (P), and potassium (K)) what are known as the "macro-nutrients".

Later on, it was discovered that calcium (Ca), magnesium (Mg), manganese (Mn), iron (Fe), copper (Cu), and sulphur (S) were required. Over the last 25 years research has shown that zinc (Zn) and a little sodium (Na) were essential. Research over the last 10 years has shown that boron (B) is essential.

There are about 90 elements naturally found in the earth's crust and seawater hence we still have dozens of elements to go.

What about aluminum (Al)? The synthetic fertilizer industry says it is not required by plants. However when plant tissue is chemically analyzed it is present in small amounts. Other tests have shown that some plants grown in soils without aluminum will die, while others tests have shown plants without aluminum are disease prone and are subject to higher rates of insect damage.

What about cobalt (Co)? Most agricultural scientists say it is not required by plants. However, the vitamin B-12 molecule which regulates the immune system of mammals (including humans) and it is essential for hemoglobin formation and for the prevention of nerve degeneration is built around a cobalt atom.

For us as people whom consume food to obtain minerals, the mineral must be in the food we eat. This means it has to be in the plants, which means it has to be present and available in the soil for microbes to build the B-12 molecule and for the plants to absorb.

NO cobalt in the soil means NO vitamin B-12 in our food. Recently it has been discovered that Cobalt is needed in legumes for nodule formation and nitrogen conversion, seeds started without cobalt will not grow into a viable plants. It has also been found in the bodies of microorganisms that live in the soil. Is it important?

How about Selenium (Se)? This element is not generally thought of as a plant nutrient. However it is important in protecting humans against chronic degenerative diseases, as it is required in the production of

powerful antioxidants such as vitamin E and glutathione peroxidase. Medical studies have found that America's "Stroke Belt" runs right across America where selenium content in soils is low. Is selenium important? - You bet it is.

How important are these other minerals?

Studies have shown that people who live in igneous areas with highly mineralized soil and water, the Hunza's, the Vilcabamba's, etc. have life spans averaging 127 years old, without the aid of medical technology.

Current theory, confirmed by animal tests, indicates the presence of all the trace minerals in the water and soil where they live which allows the human body to work more efficiently to repair itself, prevent disease, and slow down the aging process.

The message I want to leave with you is:

"We as scientists do not really know for sure what is important and what's not".

As a result, modern soil scientists researching organic and biological methods take the position of having all the possible minerals be present in the soil and then let the plants and microbes take what they want and need.

Sort of like when we go to the cafeteria to eat, we have dozens of items to choose from, but we only take a few, and different people take different things based on what they need (what they are hungry for).

What Is A Healthy Soil - Part 4

Continuing our discussion of what is a healthy soil we are going to discuss item #3 below: Soil life.

1) Organic matter from almost fresh to totally decomposed in the form of humus (humins, humic, fulmic acids)
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3) Soil life - This is the 3rd major portion of a healthy soil and the most frequently neglected and most easily destroyed. One pound of healthy soil, barely a double handful, will contain over 9 billion microbes. Not million but billion and some studies are now suggesting trillions of microbes in a pound of real healthy soil! As these microbes live and grow they break down silicate minerals releasing the nutrients. Many of these have the ability to obtain nitrogen from the air which is assimilated into their bodies in the form of proteins, enzymes, amino acids, vitamins, etc. all beneficial to plants, wildlife and ultimately humans.

The microbes consist of bacteria, fungi, protozoa, nematodes, microanthropods, and many others. Microbes turn dirt into soil. They give body and texture as well as the feel and smell of healthy soil. Microorganisms break down detritus into useful soil products like humus. Microorganisms help hold soil aggregates together, creating channels through which plants roots grow, soil animal's move, and water percolates.

Microbes protect roots from pathogens; mycorrhizal fungi have been shown to benefit plants by: enhanced nutrient absorption, increased drought tolerance, improved transplant survival, and reduced susceptibility to root diseases. Mycorrhizal fungi increase the length and mass of root systems enabling the plant to absorb nutrients better, they also convert nutrients in to a form easier for plants to use and absorb. As the root mass and size increase moisture can be absorbed from a much larger area giving plants greater drought resistance. Several species of fungus, traps, attacks and destroys parasitic nematodes.

Over 1,400 species of nematodes have been identified and only 20 are bad for plants. Most species of nematodes are beneficial, some species attack and feed on pest larva in the soil such as grub worms, fleas, ticks and even fire ants while others help cycle nutrients.

Researchers have discovered a group of fungi that protect lawn grasses from pests. The fungus is called endophytes and lives in a symbiotic relationship that benefits both plant and fungus. The fungi produce toxins that are harmless to the grass (and humans) but repel chinch bugs, sod webworms and other surface feeding insects. Research at Rutgers University indicates that grass plants inoculated with endophytes are more vigorous, and able to stand drought and weed invasions better.

In addition to the army of microbial workers, macrobes (earthworms, beetles, centipedes, ants, arthropods, burrowing frogs, etc.) churn and till soil increasing porosity and tilth. This burrowing action stimulates root growth in most plants. Of this group earthworms are the most valuable, a gardener's best friend.

What Is A Healthy Soil - Part 5

Continuing our discussion of what is a healthy soil we are going to discuss item #4 below: Air & water.

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4) Air & water - this is the 4th components of a healthy soil. Plant roots and soil life forms; require air (oxygen and nitrogen) and water. For the soil to breathe, which healthy soil does, there has to be pore spaces for the air and channels that air can flow, sort of like air conditioning ducts in our house, a characteristic we call permeability.

Additionally, the carbon dioxide (CO_2) produced by the respiration of microbes and other soil life and the breakdown of the carbon stored in the organic matter has to escape the soil and let oxygen back in or the good life dies.

How do we get air into the soil? We have a few options:

Tilling - a temporary solution at best, destroys long term soil structure, creates a hardpan layer, and kills soil animal life and the beneficial fungus that makes soil healthy. Accelerates the breakdown of organic matter causing the soil to lose its ability to hold and store water and nutrients, greatly accelerates erosion.

The only time one should till is to mix ingredients together when forming a new bed.

Core Aeration - another temporary solution which can provide short term benefits especially if fine screened compost is applied to the area and allowed to fill into the holes created by the cores. The compost keeps the holes open and allows the exchange of air and water to enter the soil.

The microbes in the compost will break apart the clay particles over time creating a more loamy soil. Best usage is on new sod grown in a clay soil. The coring breaks holes in the clay and helps water and air enter the soil.

Note: Healthy soil never needs core aeration as the microbes, earthworms and other soil life does it for you.

Dead roots - most plants have some of their roots die every year as the soil around the root is deplenished in nutrients and new roots grow into fresh areas. As the old roots decompose they leave tunnels that air and water can use (Note: they require oxygen to decompose), this is common in mature forest systems. Also many of our annual weeds provide the role of improving aeration in soils.

For example, Dandelions that have large deep taproots provide this benefit. When they die their roots decay

leaving a tunnel that air and water can use. Nature uses this plant to correct soil problems as they grow best on tight compacted soils.

Burrowing animals - the largest amount of aeration is caused by the insects, earthworms, and burrowing mammals. Earthworm tunnels are like the ductwork in our houses and along with the microbes; they produce chemicals that glue soil particles together forming a friable crumb structure, honeycombed with voids for air and water.

Water is stored in the soil in several ways.

First it is bound chemically by the clay and humus in the soil, next it is stored as a film or coating on soil particles and last it is stored in the void or interstitial spaces between grains of soil (too much and we call it a water logged soil as the air is displaced).

There is a 4th way that we are beginning to understand and that is in the life forms in the soil. As these life forms eat each other the water and nutrients stored in their bodies is released into the soil.

Our largest storage vessel for water is the soil. A soil with only 3% organic matter by weight will have a 60% porosity. If 35% of this pore space is air and 25% is water then the soil will hold over 120,000 gallons of water per acre in the top 18 inches of soil.

A real healthy soil will have over 8% organic matter and go down several feet!

I remember as a boy growing up my Grandmother would listen on the radio to our first gardening guy Dewey Compton. Dewey had a saying that has stuck with me:

"It is far, far, far, far cheaper to put a one dollar plant into a ten dollar hole than a ten dollar plant into a one dollar hole."

If one does not get the soil correct it does not matter how much one spends on the plant material.

Even today, a colleague of mine, Randy Lemon of the Gardenline radio show is still constantly stressing the importance of getting the soil healthy.

This issue is the single biggest mistake that gardeners make!

When one uses low quality soils, mulch, fertilizers, etc.; they will get insects, diseases, weeds and eventually plant death.

Then they often say, "I have a Brown Thumb".

What Is A Healthy Soil - Part 6

Continuing our discussion of what is a healthy soil we are going to discuss item #5 below: Plant choices

1) Organic matter from almost fresh to totally decomposed in the form of humus (humins, humic, fulmic acids)
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Healthy soil is relative to the plant one is growing. For example a soil that is great for Louisiana Irises will kill a cactus. Conversely, a Louisiana Iris will die in a soil that cactus and succulents grow well in.

5) Plant Choices - Planting the right plant in the correct place. This is the easiest objective to accomplish. There is a tremendous amount of information on plant choices.

One can start with the ***Lazy Gardener and Friends Houston Garden Newsletter*** as Brenda does a great job of telling folks about all sorts of plants and showing them examples.

Randy Lemon of GardenLine fame (KTRH/740AM) also does a great job of giving folks information on correct plant choices.

Tip: The best information comes from books written by local authors for our climate and soils.

For example a plant that may grow in full sun up North must have afternoon shade in Houston and a national book will not tell you this and your plant will die.

There are also regional differences. My wife and I have purchased a few acres of land near LaGrange to build our retirement home and I want to fill the property with plants beneficial to wildlife from butterflies to quail and wild turkeys.

A few weeks ago I was researching the "Black Cherry" (*Prunus serotina*) as it is great fruiting native and a host plant for butterflies.

I found that there are at least 5 different sub-species of this tree growing in Texas. The one from East Texas prefers sandy slightly acidic soils moist soils hence it will die in the slightly alkaline clays that are much dryer around La Grange. However there is a variety that grows in the Hill country around Austin that will work fine.

The message is to use local resources so one gets information for the area in which they live.

A couple great books for the Greater Houston area (they make excellent Christmas gifts for gardeners or even

new homeowners) include:

• ***A Garden Book for Houston and The Texas Gulf Coast,*** River Oaks Garden Club, 5th edition, 2013, edited by Lynn Herbert, ISBN 978-0-578-09149-6. For shrubs, flowers, groundcovers, and general home use the River Oaks Garden Club book is tremendous resource.

• ***Year Round Vegetables, Fruits and Flowers for Metro Houston*** by Bob Randall, PhD., Retired Executive Director Urban Harvest. For those that wish to grow vegetables, fruits, and herbs this book is an excellent reference: A resource guide on how to grow plants in the Houston area organically and where to get the supplies you may need. It is sold at many area gardening centers. This is one of the very best resources for Houston and Gulf Coast.

• The Texas A&M University through the agricultural extension services has recommended plant lists for every county in Texas, from fruit trees to flowers. Additionally, all the plant societies have plant information available. Local gardening clubs are another resource to learn more.

There just is no excuse for putting a plant into the wrong soil at the wrong location as there is too much information easily available.

TIP: Beware of shopping at big box stores and large discount gardening chains for plants and supplies. Much of what they sell does not do well in our area. I have gone into these stores and found that half of the plant varieties they sell will not do well in our area and are almost guaranteed to die. For the best gardening success shop only at local privately owned nurseries.

What Is A Healthy Soil - Part 7

Continuing our discussion of what is a healthy soil we are going to discuss item #6 below: Care for, and do not destroy the health of, the soil one has

1) Organic matter from almost fresh to totally decomposed in the form of humus (humins, humic, fulmic acids)
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How to quit destroying your soil (The "Do Not's") - When I was in college over 40 years ago, it was all about the chemistry and physics of the soil. Today we know the biology of the soil is 10-15X more important to plant growth and health than the chemistry and physics. This new knowledge has caused our understanding of a healthy soil to change.

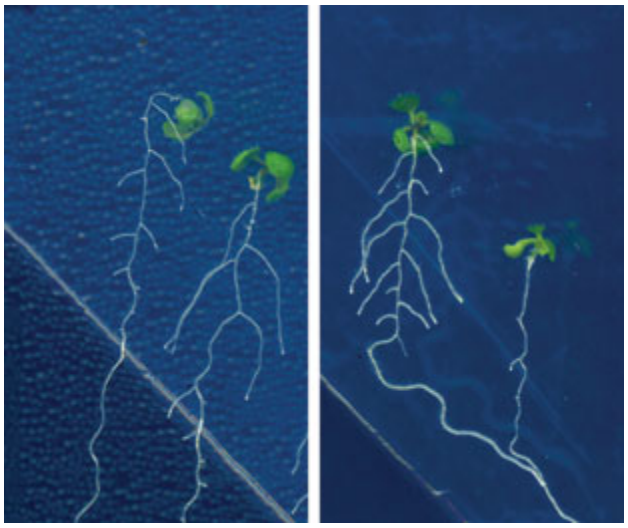
• DO NOT USE HIGH SALT PRODUCTS. THEY DESTROY SOIL AND WEAKEN PLANTS.
We now know that there is a good bacterium in the soil whose major function is to control soil diseases like the fungal disease called brown patch (Rhizoctonia solani). Ask yourself this question: "Why do we put salts into canned goods, ham, jerky, etc?" - TO KILL BACTERIA!

All synthetic fertilizers are chemically salts. They kill this good bacterium and with no natural control we get brown patch and many other fungal soil diseases.

Soils along the Gulf Coast are high in sodium from many sources, salt domes to salt swept inland from tropical storms. Salts stunt kill beneficial microbes, stunt plant growth, and prevent plants from absorbing water. Plants roots cannot tolerate salts.

These means if we want a beautiful garden along the Upper Texas Gulf Coast we do not use high salt products. These include cow manure, poultry manure, spent mushroom substrate (sometimes called Mushroom compost), and artificial/synthetic fertilizers.

This photo shows the effects of salt on root growth.



The diagonal line is a special membrane that does not let salt pass through. The photo on the left does not have any salt in the growing media and the roots penetrate the membrane and grow into the medium below. However, on the right picture there is a very mild salt solution below the membrane. Notice how the roots sense the presence of the salt and grow away from the medium with the salt.

(What Is A Healthy Soil - Part 7 - continued)

As we all know salts dissolve in water and gravity pulls the salts downward into the soil. As the soil dries the salts are left behind forming a layer a few inches down into our soil. The salt does two things: 1st - it prevents the roots from growing deep into the soil as they sense the presence of this salt layer and quit growing down which results in very shallow root zone.

As a result roots cannot reach moisture deeper in the soil and it dries out quickly. Hence we have to water very frequently and 2nd - the salts lock the soil particles together forming a hardpan layer that prevents air and water from penetrating the soil. The low oxygen conditions favor the growth of many soil pathogens.

To give an example of how salt locks soil particles together think of a pair of pliers left outside for a few weeks. The pliers rust and the pliers are frozen and will not open. Rust is chemically a salt composed of iron and oxygen. All artificial fertilizers are chemically salts.

• DO NOT USE ARTIFICIAL FERTILIZERS.
We started learning as far back as 1999 that insects are attracted to plants fertilized with synthetic fertilizers (***Journal of Environmental Horticulture***, 17(2):95, June 1999). Due to osmotic pressure, plants will absorb nitrogen faster than they need or can use it.

To prevent nitrous which could kill the plant, it causes fast growth made of weak tissue (the lignin of the cell walls becomes thinner) that actually attracts pest insects as they see in the ultraviolet portion of sunlight and can see the weakened tissue; hence they know it is easy to eat into. This also decreases a plants resistance to disease as the thin cell walls are easy for pathogens to penetrate.

• DO NOT USE PESTICIDES.
They work, but they kill beneficial insects, butterflies, and bees. One of the problems is that most pest insects breed 10 times faster than the beneficial insects hence the pests come back worse than before the pesticide was applied. When it rains or we turn on our sprinklers it washed into the ground and kills earthworms, good nematodes, microanthropods, etc. that turn leaves into humus just to name a few.

The same idea applies to herbicides and fungicides. Read the articles on Round-Up to get an understanding of the toxic and extremely dangerous nature of these products.

Toxic synthetic horticultural chemicals do not work. According to USDA data in 1900 crop loss due to insects was 3-4%. By the 1940's crop loss due to insects was 7% and by the 1990's crop loss due to insects was 13%, despite a 33X increase in the volume of pesticides applied and at least a tenfold increase in toxicity. This is over a 330 fold increase in killing power and yet the problems have gotten worse.

The bottom line is that these toxic chemicals are expensive and time consuming to use, do not work very well and this does not mention the side effects to one's health and to the environment. This is why more and more soil scientists and horticulturalists are using modern methods based on soil biology that is often referred to as "organic methods".

When we use dangerous synthetic chemicals in our gardening, we create most of our own problems. It is like a bunch of dominoes going down.

Turf grass Example: It starts when we use a synthetic fertilizer on our lawns in spring. The salts present kill off good bacterium that controls fungal diseases and earthworms, which results in soil compaction and poor drainage. Without the good bacterium, fungal problems like brown patch develop. We are told to treat brown patch with a broad spectrum fungicide like terraclor which kills all fungus in the soil (This is analogous to going to a Texan's game with 80,000 fans in the stadium and killing everyone to get the one criminal).

This does several things as it also kills beneficial fungus living in the soil like the endophytic fungus which lives in a symbiotic relationship with grass roots. This good fungus receives food from the grass and in return produces toxins that repel/kill chinch bugs and sod webworms. The fungicide also kills the good fungus that breaks down dead grass so we get a buildup of thatch as the weather warms up. This thatch layer makes a good home for chinch bugs (or webworms) since the fungus that repels and kills them is gone.

Chemical companies tell us to apply Diazinon or other pesticide to control chinch bugs. Pesticides kill the earthworms and microanthropods that aerate soil preventing compaction. Earthworms also eat weed seeds destroying them. Air (oxygen) can no longer get into the soil hence root growth is very shallow. This requires us to water several times a week as the soil cannot hold much water and there is very little root zone for the grass to draw water from.

Note: This excessive watering leaches nutrients from our soils that pollutes our bayous and streams and eventually leads to the dead zone in the Gulf of Mexico. Now we have to apply the artificial fertilizer 3-4 times per year to replace what was lost. Additionally the chlorine (Cl) in our public water systems in combination with the sodium (Na) in our soils forms sodium chloride which is known as table salt. This additional salt aggravates the problems a gardener experiences.

We are now told that we need to do a core aeration to break up the compaction and help air and water move into the soil since we no longer have the earthworms and other soil life doing that for us. Many of the plant species we call weeds are designed to grow on compacted and chemically out of balance soils. So without the earthworms and other soil life we have created a condition that favors weeds. The salts from the artificial fertilizer can cause a calcium (Ca) tie-up in the soil.

For weeds like Dandelions to germinate and grow they require soils with low available calcium and low oxygen (compaction) hence we have created conditions that favor weeds over turf grass. Now we are told we need to use an herbicide or a weed and feed fertilizer since we have weeds.

The above scenario is very easy to avoid. One just needs to use an organic fertilizer instead of an artificial one. My favorite organic fertilizer is called MicroLife which I use for everything from house plants to fruit trees and turf grass. Next apply a compost top dressing to the lawn to build organic matter and inoculate the soil with beneficial microbes.

Note: Cheap low quality compost does not work well and some may actually kill turf. During the 1980's when the composting industry was getting started, a massive amount of research by the EPA, USDA and many universities. They found to have high quality compost there had to be a little manure used in producing it.

I enjoy the exercise I get from spreading compost but for those that are interested there are organic companies like "Green Pro" (713-553-7675) that will pick up the compost and do the work for you. If you listen to the Garden Line radio show every weekend, Randy Lemmon has been repeatedly telling folks for years how important this simple compost top dressing procedure is.

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