



# J&L Garden Center

The All Season Gift and Garden Center

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## 'Healthy Garden Soil'

The topics of good *soil health* and proper *soil conditions* are becoming more and more important. As *'new home'* gardeners begin to try to improve their gardens and properly take care of their plants, they need to keep these two topics in mind. Without good soil health, and without the proper soil conditions, gardening will not be easy nor will it be enjoyable.



Gardening will become a chore, and will produce many undesirable, and often disastrous results. Whether you are starting with a brand new house, or starting from a brand new addition to your existing home, these topics are important to consider. Take time to improve these two gardening situations before you start gardening and you will have much better success.



*'New home'* landscaping is often a major undertaking with very poor soil health and terrible soil conditions. Poor soil health is usually the result of extensive excavating and intensive grading. Much of the native topsoil is removed at the beginning of the construction project and is replaced with the subsoil after construction is finished. During the excavation and grading process most of the organic material in the soil is lost and all of the beneficial bacteria and fungi are destroyed. In addition, the soil is usually heavily compacted during all of these processes.



By the time you, the homeowner, takes possession of the new home, the soil is often in a state of extreme compaction. The soil probably has very poor soil structure and texture. And perhaps worse, the soil is usually lacking - in any sense, of any kind, of a natural cycle, or of a 'living soil'.



Quite often the home-owner's first strategy of starting the landscape is to dig a hole, put in a plant, and hope the plant can survive in this new, hostile environment.

Unless the soil structure is modified and improved, and the soil is inoculated with the beneficial microbial complexes that stimulate an efficient relationship between the soil and plant roots, the plants will often just barely survive. Sometimes the plant may just give up and die while trying to grow new roots in this hostile environment.



### Improving The 'Living Soil'

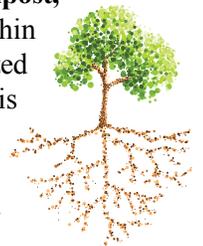
*Feed your garden soil - not just your plants.* Your garden's soil condition is the most important part of gardening success. Some of the insect and disease problems your plants struggle with during the summer can be prevented

just by making sure your soil is well prepared before you plant them.

Remember, *Garden Soil is not Dirt*. Dirt is the stuff you wash out of your clothes after working in the yard. Garden Soil is a complex mixture of minerals, air, water, organic matter, microbes, and other critters. Soil is full of life and deserves your attention. Perfect soil is hard to come by in most home gardens. It will take a little extra effort to obtain this type of soil.



The best way to start improving your garden soil is by adding **Organic Materials** - every year. The best time to apply **Organic Materials** is in the fall, not in the spring. Mix as much **Bumper Crop, manure, compost, Soil Pep**, or other organic materials (within reason) as you can afford. You will be amazed each spring how much better your soil is than it was the previous year. Many garden soils may take four, six, or even 10 years to completely change, but you will notice an improvement each year.



In addition to *'mulch'*, good soil needs beneficial microbes for plants to utilize. One of the best microbes is a fungus known as **Mycorrhizae**.

The term mycorrhizae means 'fungus roots' and is the name given to a class of soil fungus that live in a symbiotic relationship with plant roots. The fungus grows both inside the roots (endo mycorrhizae) and on the outside of the roots (ecto mycorrhizae). These fungi gather water and nutrients that benefit the host plant. The host plant responds and helps spread the fungi further into the soil as the roots expand, grow, and develop.

For example, phosphorus, one of the major plant nutrients, is often locked up within the soil in such a way that the plants have a hard time absorbing and utilizing it. Mycorrhizal



fungi are able to extract this nutrient from the soil and make it available for the plant to use. In return, the plants provide essential carbohydrates, through the process of photosynthesis, that the mycorrhizae need to survive.



Mycorrhizae afford the plants the ability to live in harsh environments that may be deficient in water or nutrients. The use of mycorrhizal fungus has been used for many years in forestry management. New tree seedlings are inoculated with mycorrhizae and planted in locations where the plant is wholly dependent on the fertility that is available in the native soil, and the water that is only provided by natural rainfall.

Most native soils contain some forms of mycorrhizal fungi. However, soil compaction, erosion, and other forms of topsoil removal reduce the native populations. Not all soils have the same types or species of mycorrhizae, depending on what types of plant materials have been previously growing in that soil. Unfortunately, newly planted trees and shrubs may not benefit from the species of mycorrhizae that may be naturally present in the native soil. Disturbed soil and sub soil usually have no mycorrhizae at all.

It is very beneficial, for all types of trees, shrubs, flowers and vegetables, to add mycorrhizae to the soil right while you are planting them.

When inoculating the soil with mycorrhizae, make sure the inoculant blend contains several types of both endo and ecto mycorrhizae, so all the plants can benefit from these important soil fungi.

### ***The application of mycorrhizae inoculants may be accomplished in a number of ways.***

1. Transplant inoculants are most effective when introduced right into the soil while back-filling around the plant. Mix Dr. Earth Starter Fertilizer right with the soil dug from the hole.



2. Mycorrhizae inoculants are also very effective when applied as a root-ball drench at the time of planting. Contact with the actual root ball is most important to ensure proper inoculation.

3. Topical applications, after the plant has been established, are not as effective. A soil injection procedure, one reaching the root system, is required since mycorrhizae must come into physical contact with the plant roots. Poke holes 10" to 12" deep around the drip line of the plant. Put two tablespoons of Dr. Earth Starter Fertilizer down each hole and water it in.

Most plants, 90% of all plants, take advantage of the special relationship that these beneficial fungi have with their roots systems. Mycorrhizae create a bridge between the plant root system and the surrounding natural soil. However, there are limits to what a mycorrhizal inoculant

can do for a plant through its roots and associated soil. Mycorrhizal fungi should be considered as only one of many useful and available tools to help promote the re-establishment of the natural 'microbial soil systems' in sites where the soil has been severely disturbed.

## **Definitions**

***Endo mycorrhizae*** - endo means inside - form microscopic treelike structures and little sacs inside the root cells. These arbuscules, or 'tiny trees', and sacs produce loose strands of vegetative growth from within the roots that lead outside to the surrounding soil. The extensions, called hyphae, work in an analogous fashion to the roots of the plant. This network of hyphae extends far beyond the roots themselves, expanding the effective area for collecting nutrients and water. Endo mycorrhizal fungi mainly form associations with herbaceous plants and with the broadleaf woody plants.

***Ecto mycorrhizae*** - ecto means outside - grows between the root cells and on the outside of the root itself. This ecto form of fungi produces a dense network of hyphae that covers the roots of the plant. This mantle covers the roots, acting as a protective sheath, and may help protect the plant against many destructive root-borne diseases. These hyphal extensions also work to gather nutrients and water beyond the reach of the plant roots, helping the roots to grow faster into the surrounding soil. Ecto mycorrhizae are most often associated with woody plants, particularly pine trees and other conifers.

Please read a copy of our handout about '***Dr. Earth Fertilizers***' for more information about beneficial bacteria and organic fertilizers.

## **Improving Soil Conditions**

Adding new '*healthy*' topsoil is an excellent way to improve your soil immediately. Make sure you buy a good topsoil or you may just get more soil problems to deal with. Do not just put a few inches of good soil over existing soil and leave it. Roots cannot penetrate through extreme changes in soil texture or structure; they need a transition zone. Thoroughly mix the new topsoil with the existing soil as deeply as possible.



### ***Adding organic matter is another way to start fixing your existing soil.***

Organic matter helps hold more water and it helps grab onto nutrients; making the soil more fertile immediately. Organic matter helps create larger air spaces allowing water to drain away more quickly. Organic matter supplies many nutrients, helps build better soil structure, creates a home for many soil dwelling critters (worms) and adds the micro-organisms and insects necessary to build a healthy soil.



Well-composted materials are the best types of organic matter to add for improving soil. Composted materials are stable and do not require extra nutrients from the soil. Composted materials also supply significant amounts of **'Humic Acid'**; a gluey material that helps to bond soil particles together into aggregates, creating more airspaces in the soil. Humic acid helps plants absorb nutrients more efficiently by *chelating* these nutrients into usable forms. Humic acid also helps improve plants' disease resistance and it stimulates soil microbial activities. You can add humic acid to your soil with Natural Guard HuMate Garden Soil Activator, or IFA Bountiful Earth Humate.

Even if you do not have well-composted materials available, be sure to add what ever organic matter you have. It is better to add fresh organic matter, than to just let the soil remain in the same condition; you can always 'fix' the amendments.

All organic matter needs bacteria to help it decompose and turn it into compost. This bacteria needs nitrogen to grow and multiply. The fresher the organic matter the more bacteria is needed and the more nitrogen is necessary to feed the bacteria. Add extra nitrogen when you add fresh organic matter, otherwise the bacteria will take the nitrogen from the soil. Plants will not get all the nitrogen they need. Consequently, fresh compost will sometimes stunt plant growth, unless extra fertilizer is supplied.

You cannot add as much fresh compost to the garden soil as you can add well-rotted compost, so be careful using fresh compost.

## Humate - Humic Acid

Humic acid is derived from humates, a mined product that is an excellent soil additive. Humic acid helps improve the soil structure by *gluing* individual soil particles together into aggregates, creating more air space in the soil. Humic acid helps plants absorb nutrients more efficiently by *chelating* these nutrients into usable forms. Humic acid also helps improve plants' disease resistance and it stimulates soil microbial activities.



Humates are highly compressed, prehistoric organic materials derived from both plant and animal sources. They were composted for thousands of years and were compressed by layers and layers of rock and soil covering them. Through volcanic eruptions, humates were brought to the surface, available for mining them to use. Because of the high carbon content available in humates, they provide many beneficial activities that help plants grow more profusely.

Add humates to your garden soil every year or two. Humic acid does not provide a *quick fix* to the soil, but you will notice an immediate improvement, both to the soil structure and in the plant's growth. Continued use of this product will produce amazing results each year. Use



humic acid to supplement the compost and fertilizers you apply, not to replace them.

## Don't Forget the Critters

One of the best cures for fixing an ailing soil is beneficial insects, microbes, and worms. By making sure your soil can sustain and support microorganisms will help make it good for growing plants.



Earthworms are a barometer of your soil's health. When you turn over a shovel full of black, moist soil, and spot three or four earthworms squiggling away, you know you're working with rich, healthy soil. By the same token, a lack of earthworms in your garden indicates a condition that prevents them from living there. The soil may be fertile, but if no earthworms are present, the situation calls for a soil analysis and further attention. If you don't find any in your soil, buy some and let them loose in your yard.



A good soil needs beneficial microbes for plants to utilize. One of the best microbes is a fungus known as **Mycorrhizae**. The term mycorrhizae means 'fungus roots' and is the name given to a class of soil fungus that live in a symbiotic relationship with plant roots. The fungus grows both inside the roots (endo mycorrhizae) and on the outside of the roots (ecto mycorrhizae). These fungi gather water and nutrients that benefit the host plant. The host plant responds and helps spread the fungi further into the soil as the roots expand, grow, and develop.



Every time you plant new flowers, vegetables, trees or shrubs, add Dr. Earth Starter Fertilizer. This will add mycorrhizae, and many other beneficial microorganisms. You will see an immediate improvement.



We have excellent handouts about mulches and improving garden soils. Please read our **'Garden Soil Basics'** and **'HuMate Soil Activator'** handouts.