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PREPARING YOUR SOIL FOR SUCCESS

Healthy soil that sustains a wide variety of ornamental, edible and shade giving plants in our North Texas home landscape can be achieved by addressing these basic healthy soil necessities:

- **The soil must be deep enough and of a texture that allows free movement of air and water.**
- **The soils pH must be within an acceptable range for the plants that will be grown in it**
- **The soil must contain adequate moisture.**

In North Texas, our heavy, sticky clay soil is basically deficient in two things - air and organic matter, and needs to be amended before you plant a new bed. Plant roots don't get enough oxygen in unamended clay soils, but raised beds, compost and other amendments help. **Back to Earth Composted Cotton Burrs** and **Expanded Shale** are two of the best soil amendments, which can be added to our Texas gumbo to ensure success in your garden beds. North Texas soils tend to retain water, which is good for dry summers, but can literally drown plants in the spring rains. Properly preparing the planting bed will allow the roots of your new plants to quickly grow throughout the area. Deep watering the soil and allowing it become dry an inch or two down before you water again will also encourage deeper root growth in your new plantings.

Expanded Shale, a gravel-size rock that is pumped full of air, aerates clay soil making it easy to work and helps soil drain better. You only need to add expanded shale to the soil once and work it into the beds to a depth of 6-8 inches. Test plants have been shown to have larger, healthier root systems with expanded shale.

Compost is made up of decomposed organic material that is produced when bacteria in soil break down biodegradable matter. Compost improves soil structure and attracts earthworms to encourage aeration of the soil. The nutrients in compost feed plants slowly throughout the growing season. Compost can be made at home or purchased ready-to-use in our **Back to Earth Composted Cotton Burr Blend** which is ideal for amending clay soils. Cotton burrs produce humic acid as they decompose which helps to break up clay soils. **Compost provides a carbon energy source for beneficial soil microorganisms.**

Healthy soil teems with microbes: bacteria, fungi and other organisms that recycle the nutrients found in dead plant and animal matter back into the soil where they become available for uptake and use by living plants. Encouraging the growth of soil microbes requires incorporating organic matter into your soil which the microbes consume as food.

Mycorrhizal Fungi - Mycorrhizal fungi are a naturally occurring fungi in the soil that attach themselves to plant roots and help the plant make use of water and other nutrients in the soil. A healthy mycorrhizae fungi population can also boost a plants' immune system and help the plants' uptake of phosphorous from the soil. The addition of these spores to garden soils, potting soil and lawns will ensure the presence of these valuable plant allies. The difference in plant health and performance can be dramatic, especially when dealing with less-than-perfect soils. The best way to nurture the natural mycorrhizal fungi population in the soil is to add compost to the garden.

Fertilizers

Confused about fertilizer numbers? A plant needs nutrients to survive. Most of these are provided by the soil, but soil varies tremendously in nutrient amounts, soil type, pH, and nutrient availability.

The three main nutrients that have been identified as absolutely necessary for plants are **nitrogen (N)**, **phosphorus (P)** and **potassium (K)**. These three are also known as macronutrients, and are the source of the three numbers commonly found on fertilizer labels, which represent the percentage by weight of the N, P, and K found in the fertilizer. They are always listed in this order.

Nitrogen (N) is essential for the growth of stems and leaves. Nitrogen is crucial for the formation of chlorophyll, the green substance in plants responsible for photosynthesis. Nitrogen can be applied organically in many ways, including **composted manure**, **blood meal** and **bat guano**.

Phosphorus (P) is important for the production of flowers, seeds, and healthy roots and is used more heavily during blooming and seed set. Phosphorus is easily rendered unavailable to plants when the pH is slightly unbalanced. It is released in soil through decomposing organic matter. Organic phosphorus can be found in **rock phosphate**, **bone meal** and various liquid organic fertilizers such as **fish emulsion**.

Potassium (K), sometimes known as potash, is important for general health of plants. It is key in the formation of chlorophyll and other plant compounds. Potassium strengthens plants against cold, heat, disease, and pests, and it's the key ingredient in fertilizers labeled as "winterizers." Sources of organic potassium include **Texas greensand**, **liquid seaweed or kelp meal** and **compost**. The potassium compounds in compost are water-soluble, which makes them readily available to plants.

While **chemical fertilizers** are reliable, easy and effective at supplementing essential soil nutrients; you cannot depend on chemical fertilizers alone to maintain soil fertility. An exclusive reliance on chemical fertilizers dooms the gardener to use ever increasing quantities, since the organic matter in soil is constantly declining, most rapidly in soils aerated through regular cultivation (esp. vegetable, gardens, annual gardens). In soil with low organic content, added fertilizer nutrients are quickly washed away and lost. Water soluble fertilizers make nutrients available to the plant immediately, but their effects are short lived since they are often rapidly leached from the soil. By supplementing your soil with compost and organic materials you will naturally over time decrease your reliance on chemical fertilizers.

Soil pH

Soil pH is measured on a scale from 0 to 14. Acidic soils have smaller pH numbers and alkaline substances have larger pH numbers. The pH scale is a logarithmic scale that helps to measure large differences in soil pH. While a pH of 7 is neutral, a pH of 6 is actually ten times more acid than a neutral 7. Many gardeners look for soils that have roughly a pH of 6.5, as this is the soil pH where nitrogen, phosphorous, potassium and the trace minerals are most easily absorbed by plants. The soil in North Texas is clay with a high pH level, and is hence alkaline. The best remedy for alkaline soil is to amend it with organic matter before planting.

Fertilizers containing ammonium sulfate, aluminum sulfate or ammonium nitrate decrease soil pH. Adding organic materials such as pine needles or peat moss to soil will also decreases pH. Adding ground limestone increases soil pH while adding **sulfur** decreases it.

Because changing soil pH progresses slowly, add soil amendments annually, especially if your garden contains Texas' clay soil.

More **iron** is required than any other micronutrient. It has often been considered both a macronutrient and in a category by itself. Most soils contain iron, but some conditions make the iron unavailable to your plants. An improper relationship between soil pH and availability of iron causes iron chlorosis, or fading of the normal green of the youngest leaves making them yellow. Beginning with a pH of 5.0 to 6.0, the iron in your soil becomes progressively less available as you approach the most alkaline point of 14.0.

Plants that thrive in acidic soils but can be grown successfully in North Texas include: Azaleas, Gardenias, Dogwoods, Blueberries, Camellias and Japanese Maples.

Iron, organic matter/compost and sulfur will lower your soils pH or make it more acid.

It can be argued that tilth and texture of soil is more important than pH. As long as the numbers aren't terribly acidic or terribly alkaline, your plants will likely prosper.

Mulches reduce the rate at which water evaporates from the soil's surface. Mulches also reduce weed growth, further reducing water consumption.

Mulch beds after planting with shredded **cedar** or **hardwood mulch**. Cypress is also a good choice however it does not break down as rapidly. **It is desirable for the mulch to break down, as this is what creates the true natural food for feeding microbes and plant roots.**

Shredded leaves and ground pine bark are also situationally fine; but they have a tendency to wash out in heavy rainfall and thus aren't our preferred choices unless a bed is perfectly level with effective borders. Never use whole dried leaves; they can plate together and form a barrier to air penetration.

Maintaining a 2 to 3 inch layer of mulch on all your garden beds will preserve moisture, help control erosion, suppress weeds and keep the soil surface cooler, which benefits earthworms, microorganisms and plant roots.

Raised Beds are recommended in North Texas to correct poor drainage, and they improve growing conditions for plants by lifting their roots above poor soil. Also, the height of raised beds make them easier to maintain: **12-18 inches high is optimal for vegetables; 8-12 inches high for all other ornamental plantings.**

Covington's Soil Builder is three great soil amendments in one convenient application. Covington's Soil Builder contains **Back to Earth Composted Cotton Burrs**, **Expanded Shale** and one pound of **Texas Greensand**. Use in all newly prepared landscape, vegetable and raised beds and to top dress or replenish depleted soils in all parts of the landscape.