SOIL PREPARATION: BUILDING THE SOIL

By Skip and Pamela Hein.

Good soil is the key to a successful garden. Soil may be the most overlooked aspect of gardening – and the most important! Good quality soil provides plants with essential nutrients necessary to reap a good harvest.

In general, the goal is to enrich soil with compost to provide needed nutrients. Compost, leaf mould, or well-aged manure will increase the ability of your soil to both drain well and hold moisture…the "sponge factor." Never use fresh manure! It can harbor dangerous pathogens and will burn tender plant rootys. Compost it for at least 6 to 12 months.

Here are some guidelines to help ensure your soil is tip-top:

- Test your soil. Results will reveal its pH, phosphorus, lime, potassium, soluble salts, and texture. For accurate results, contact your local cooperative extension service office for a free (or low-fee) soil test. They will provide recommendation for any needed amendments.
- Start with well-drained, snady loam and add as much organic matter as possible. Plant roots penetrate solf, loamy soil more easily.
- If you have sandy soil, add humus or aged manure, peat moss, or sawdust,. Heavy, clay-rich soil can also be added to improve the soil.
- If you have silt soil, add coarse sand (not beach sand) or gravel and compost, or well-aged horse manure mixed with fresh straw.
- If you have clay soil, add coarse sand (not beach sand), compost, and peat moss.
- If you have impossibly rocky soil or solid clay, consider building some raised beds that you can fill with good soil. Growing vegetables in containers or grow bags are also options.
- Property drainage is essential; water-logged plant roots will negatively impact plant health

Soil Amendments

If your soil needs replenishing, these materials can be of help:

- Bark, ground: made from various tree barks; improves soil structure
- Compost: excellent conditioner
- Leaf mold: decomposed leaves that add nutrients and improve soil structure
- Lime: raises the pH of acid soil and helps loosen clay soil
- Manure: best if composted; good conditioner
- Peat moss: conditioner that helps soil retain water
- Sand: improves drainage in clay soil
- Topsoil: usually used in combination with another amendment for added soil

Remember: You should build your soil, but also you have to work with nature. If you have cold, clay soil, it takes longer to warm up in the spring. Consider raised

, beds, plastic, plastic mulch, and indoor seed-starting to get started earlier. If you have light soil, your early crops will thrive but you may struggle with later crops which dry out;
consider building trenches alongside plants and irrigate more often to keep soil from drying out.

SOILLESS SOIL (also referred to as Potting Mix)

A standard **recipe** for a homemade **soilless mix** consists of half sphagnum peat moss and half perlite or vermiculite. To **mix** ½ bushel basket or four gallons of media: Start by pouring two gallons of peat moss into the bushel basket. Add two gallons of either perlite or vermiculite and **mix** thoroughly.

- **Lighter, finer-textured mixes** are best for use when starting seeds and rooting cuttings.
- **Mixes containing a high percentage of coarse sand or pine bark** are best for potted trees and shrubs.
- **DIY potting soil with a sandy or gravely texture** is ideal for cactus and succulent growing.
- **When growing a mixture of annuals, perennials, vegetables, and tropicals**, the best fit is a general, all-purpose potting mix – one that's suitable for growing lots of different kinds of plants.
- **Requires watering more often** as it doesn't hold the moisture as well as soil.
- **Great for use in containers and raised garden beds.**

POTTING SOIL INGREDIENTS:

Sphagnum peat moss:

Primary ingredient in most potting soils is sphagnum peat moss. Peat takes a long time to breakdown and is widely available and inexpensive. It bulks up potting mixes without adding a lot of weight, and once wet, it holds water fairly well. It's very low in nutrients and has an acidic pH between 3.5 & 4.5. Limestone can be added to help balance the pH. (1/2 c lime for every 6 gallons of peat moss).

Coir fiber:

A by-product of the coconut industry, coir looks and acts a lot like sphagnum peat moss. It has more nutrients and lasts, but more expensive. Coir fiber's pH is close to neutral. Often sold in compressed bricks, considered by many to be more sustainable.

Perlite:

Perlite is a mined, volcanic rock. When heated, it expands, making perlite particles look like small, white balls of Styrofoam. It is lightweight and a sterile addditive. It holds three to four times its weight in water, increases pore space, and improves drainage and has a neutral pH of 7.

Vermiculite:

Vermiculite is a mined mineral that is conditioned by heating until it expands into light particles. It's used to increase the porosity of commercial and DIY potting soil mixes. In potting soil, vermiculite also adds calcium and magnesium, and increases the mix's water-holding capacity.

Sand:

Coarse sand improves drainage and adds weight to potting mixes. Mixes formulated for cacti and other succulents tend to have a higher percentage of coarse sand in their composition to ensure ample drainage.

Limestone:

Add pulverized calcitic limestone or dolomitic limestone to peat-based potting soils to neutralize their pH. Use about 1/4 cup for every 6 gallons of peat moss. These minerals are mined from natural deposits and are readily available and inexpensive. Jobe's is a good brand of lime for use in DIY potting soil.

Fertilizers:

Add fertilizers to peat-based potting soils because these mixes don't naturally contain enough nutrients to support optimum plant growth. A good DIY potting soil recipe includes a natural fertilizer, derived from a combination of mined minerals, animal by-products, plant materials, or manures, rather than a fertilizer that's comprised of synthetic chemicals.

Composted wood chips:

Composted wood chips lighten up potting mixes by increasing the pore sizes, and allowing air and water to travel freely in the mix. They're slow to breakdown but may rob nitrogen from the soil as they do, so the addition of a small amount of blood meal or alfalfa meal is necessary when using composted wood chips as an ingredient in DIY potting soil recipes. Use composted wood chips in potting mixes designed for potted perennials and shrubs. To make your own, get a load of wood chips from an arborist and let them compost for a year, turning the pile every few weeks.

Compost:

Containing billions of beneficial microbes, and with superior water-holding capacity and nutrient content, compost is an excellent addition to DIY potting soil. Because it plays such a huge role in promoting healthy plant growth, I use it in all of my general homemade potting soil recipes. But, I don't include it in recipes for seed-starting as it's too heavy for young seedlings.

Good quality, DIY potting soil should be light and fluffy, with a well-blended mixture of ingredients. When it's dried out, it does not shrink significantly or pull away from the sides of the container.

Best Compost Tea Recipe for Boosting Plant Growth

All compost teas follow the same basic recipe.

Ingredients and Supplies

- **Non-chlorinated water (use rainwater, or allow tap water to sit for over 24 hours)**
- **1-2 cups of inoculant (either worm castings or compost)**
- **¼ – ½ cup of food source for bacteria or fungi**
- **5 gallon bucket**

Bacteria need simple sugars and proteins, and usually one of the easiest sources is unsulphured molasses. Fungi need more complex sugars, with common sources including fish hydrolysate (essentially ground up fish), kelp/seaweed, and humic acid.

Many people create a mixture of both molasses and fungi food to create a good balance of nourishment for both fungi and bacteria, and it may come down to what you have readily available.

If you want to avoid purchasing chemical products like humic acid, a great recipe includes:

Easy DIY Compost Tea Recipe

- **Non-chlorinated tap water (enough to fill a 5-gallon pail)**
- **2 cups fully finished organic compost (it should smell nice!)**
- **1 tablespoon unsulfured blackstrap molasses**
- **1 tablespoon liquid kelp fertilizer (or soak kelp meal in water)**
- **1 teaspoon liquid fish fertilizer**

HOW TO DO A PROPER SOIL (ACIDITY) TEST FOR YOUR GARDEN

A **soil test** can determine the current fertility and health of your **soil**. By measuring both the pH level and pinpointing nutrient deficiencies, a **soil test** can provide the information necessary for maintaining the most optimal fertility each year. Your soil's pH level, the relative acidity or alkalinity, affects how plants take up nutrients and thrive. Soil pH ranges from 1.0 (highly acidic) to 14.0 (highly alkaline), with 7 being neutral. A soil test indicates your soil's pH level—the relative acidity or alkalinity—which affects how plants take up nutrients and thrive. Soil pH ranges from 1.0 (highly acidic) to 14.0 (highly alkaline), with 7 being neutral. In rainy regions, soil is typically more acidic; in desert areas, soil is more alkaline. Soil in these areas needs to be amended accordingly for plants to thrive.

To raise too-low pH (acidic): Add lime, dolomite limestone, or wood ashes.

To lower too-high pH (alkaline): Add horticultural sulfur, composted oak leaves, or pine needles.

How to acquire the soil for the test?

1. Collect **Soil**. To begin, collect **soil** from six different areas around your garden, using a trowel.
2. Mix Samples. To get an average **soil** sample of a large area, mix using gloves, a little bit from each pile of **soil** in a 5 gallon bucket or a wheelbarrow. ...
3. Add Water. Use the plastic eyedropper that came in your kit. Use distilled water to test your soil; water with additives can alter the results of your soil test. Fill the soil test vial with water until you reach the dotted line. Put the lid on the test kit vial and shake vigorously so that the soil, the testing powder, and the water are all mixed together. Do not touch with your bare hands due to oil residue.

To evaluate results, let your shaken vial sit for 1–2 minutes, allowing the liquid to settle and take on a color. The color of your liquid will determine what pH level your soil is at—see your soil test kit's guide. For best judgment of color, hold your vial up to the sun.