

Amending Your Garden Soil - Making Good Soil out of Bad

What is Good Garden Soil?

Soil is generally evaluated on fertility and texture. Fertility is a combination of essential nutrients and a pH that makes these nutrients available to the plants. Texture refers to the size of the soil particles and their cohesiveness.

Nutrients:

The three primary nutrients used by plants are nitrogen, phosphorus and potassium.

Nitrogen is largely responsible for healthy leaf and stem growth. In the soil, nitrogen is made available to plants by nitrogen fixing bacteria, which convert nitrogen into nitrates, a form plants can use. Even so, an excess of nitrogen will cause a lot of foliage growth at the expense of flowers and fruit!!

Phosphorus is very important for root growth. Flowering bulbs and root crops can always use some phosphorous. That's why bone meal is often recommended for fall bulb planting. It also is crucial for producing flowers and you will sometimes see fertilizers with a high phosphorous content advertised as flower boosters.

Potassium is needed for overall plant health. It keeps the plants growing and aids their immune systems. Like nitrogen, potassium is also water soluble and needs to be replenished from time to time.

Besides the three primary nutrients, there are several trace elements that are necessary for good plant health like: calcium, magnesium, zinc, molybdenum, etc.

pH

A lot is made of soil pH. In laymen's terms, pH is a measure of the soil acidity or alkalinity. The scale goes from 1.0 to 14.0, with 7.0 being neutral. The lower the numbers go from 7.0, the more acidic the soil. The higher they go above 7.0, the more alkaline. The reason soil pH matters is that nutrients in the soil are only available to plants if the soil pH is within a certain range. Many plants like a pH in the low acid to neutral range (6.2 - 6.8), but that's not true for all plants. Rhododendrons, heathers and blueberries favor very acid soils and lilacs and clematis will thrive in alkaline or even chalky soil. The only sure fire way to know where your soil's pH falls is to have it tested. Keep in mind that it takes time to alter soil pH and your soil will tend to revert to its old pH over time, necessitating repeated treatment.

Texture

Soil texture is a little trickier to amend than soil fertility. Texture refers to the size of the soil particles. Sandy soils have very large particles. Water, air and plant roots can move freely in sandy soils, sometimes too much so. At the other end of the spectrum is clay. Clay particles are so small they pack together tightly and leave little room for water, air or roots. If you've ever tried to garden in baked clay you know it also leaves little room for a shovel blade.

An easy test for soil texture is to make a ball of damp garden soil. If it breaks apart when you

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tap it, it's sandy. If you can press it between your thumb and finger and make a ribbon, it's clay. Most soils are somewhere in-between. What you are ideally going for is called a sandy loam. It should be light and allow for air and water movement, but have some tilth, a kind of fine bread crumb like texture, which usually occurs when there is plenty of organic matter in the soil. Don't try to change your soil texture by adding sand to clay or vice versa. That is a recipe for cement. Some amendment recommendations for clay do include a portion of very fine sand, but there are better ways to change your soil texture.

Organic Matter

Like soil pH, organic matter gets a great deal of press. Organic matter is dead plant or animal material. There is always some organic matter in your soil, but usually not enough for a plant's needs. Decaying organic matter, or humus, will help give your soil tilth. It helps sandy soil by retaining water that would otherwise wash away and it corrects clay soil by making it looser, so that air, water and roots can penetrate. In all soils, it encourages beneficial microbial activity and it provides some nutritional benefits. Humus is nature's way of feeding the circle of life.

How Do You Know if You Have Bad Soil?

The only definitive way to know for sure is to have it tested. Your Cooperative Extension probably provides this service for a nominal fee.

A quick guesstimate of your soil's health can be made by looking at your plants' health. If they are thriving, don't fix what isn't broken. If your plants are languishing, yellowing or otherwise looking sickly or you feel like you are forever feeding them, it would be worth testing your soil.

Making Good Soil

If your pH is off, you will get a recommendation for adding either lime, to raise the alkalinity, or sulfur, to lower the pH. This is easy enough to do and should be done in stages, so as not to shock the plants. Generally it is recommended that you not add more than 5 pounds of lime or sulfur per 100 sq. ft. of existing garden. If you were wise enough to test your soil before putting in a garden or lawn, go ahead and dump in the whole recommended amount.

Adding Nutrients

If you find you need to add nutrients to your soil, you'll have the choice of organic or inorganic. Inorganic fertilizer has some pluses in its favor. It is usually cheaper than organic fertilizer and it acts more quickly. However, it does nothing for the soil and in some cases actually damages the soil with its higher salt content. So inorganic fertilizers don't actually amend the soil, they simply feed the plant. It is kind of like a human being trying to survive on vitamin supplements and no substantial food. There have also been some recent studies that claim plants build up a resistance to inorganic fertilizers and require more and more of them to get the same results. That organic fertilizers are slower acting is actually a good thing. They release their nutrients over a period of time. There are many good complete organic fertilizers on the market. A complete fertilizer is one that contains all three primary nutrients, nitrogen, phosphorus and potassium. You can also get supplemental nutrition from products like manure and fish emulsion for nitrogen, bone meal for phosphorus and wood ashes for potassium. If you've had your soil tested, you'll know what you need to add.

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Adding Organic Matter

Back to organic matter, this is the only amendment that aids both the fertility and the texture of the soil. Whether it's animal manure or plant humus, you will be feeding the soil and the whole ecosystem that exists there. The soil in turn will feed your plants. There are many types of organic matter.

- Compost makes an excellent amendment and if you are composting your garden waste, it's free.
- Manure should be composted and decomposed until it turns dark, crumbly and odorless. Fresh manure has too much ammonia in it and can burn your plants and offend your neighbors.
- Peat moss is cheap and works well to loosen the soil. It is also very dusty. Wet it first to make it easier to work with.
- You can even work grass clipping and other debris directly into the garden bed to decompose slowly. Be sure whatever you put down is free of seed.

Cover crops or green manure are crops grown on unused soil with the intent of tilling them in and letting them decompose in the garden. The roots keep the soil loosened as they grow and the plants suppress weeds. Cover crops from the legume family, like clover and vetch, also add nitrogen to the soil.

Bottom Line

Adjusting your soil's pH, fertility and texture to your plants liking is the final say in making good soil. Your plants will determine what your soil's pH should be. Organic matter will improve the soil in the long run. All soil will benefit from the addition of organic matter. How well your soil incorporates the organic matter will determine how much supplemental feeding will be necessary.