Healthy Soil for Growing Food

Soil 101 – Nitrogen (N), Phosphorus (P), and Potassium (K)

Nitrogen, phosphorus, and potassium are the three main staples, the top three macro nutrients, of any soil and any garden. They are essential for plant growth, so keeping them at the correct levels is very important. But how the hell do you get these three elements into your soil?

Let’s start with number one, nitrogen.

Nitrogen

Nitrogen is indeed the number one constituent for healthy growth in your plants. It is what basically makes up chlorophyll and it gives us that fresh green colour in our plants. It is a huge part of our atmospheric surrounds, but it cannot be utilised in this form by plants, which I’ll explain more about later in “nitrogen fixing”.

Nitrogen comes in both natural and synthetic forms, the latter being common commercial fertilisers and common shelf products like urea. The problem with these synthetic forms (besides the massive amount of oil that go into their manufacture) is the overdose amounts a lot of farmers dump on their crops.

Yes, you can have too much nitrogen. This excess simply runs off and eventually seeps into the soil where it joins the ground water and contaminates it. It will usually be marketed as a “nitrate” or “sulphate”. Often, crops that have been over fertilised with nitrogen lack stability and the rapid green growth of the plant soon outweighs its lagging root system, much like the legs of a commercial chicken. The plant eventually gives way and generally dies off, usually with a

good amount of burning appearing on the leaves as well.

If there isn't enough nitrogen in the soil, the opposite can happen. The leaves/plants won't grow. Their existing leaves will turn a patchy yellow colour and they'll soon die off randomly.

Well, that all sounds rather bleak doesn't it? How then do you get nitrogen into your soil naturally and organically? I'm glad you asked.

One lovely example is through "nitrogen fixing", through "weeds" like clover or legumes such as peas, beans etc. What these wonderful plants do is fix atmospheric nitrogen (N2) to the ground in tiny nodules on their root systems, which are actually symbiotic bacteria called rhizobia. This bacteria is behind the actual process of fixing the gas to the plant. When the plant dies, this fixed nitrogen is released into the soil as it breaks down and can be taken up by other plants.

We can take advantage of this process by planting beans, peas etc in our garden beds from the onset, After they've grown, we can simply cut them off at the base and let the root systems break down into the soil, the top half we can compost or put back onto the beds to break down, after you've harvested your peas/beans of course!

I even plant broad beans around my fruit trees in winter. This way I get a crop of beans, the tree's root system benefits from the beans' root system breaking down, and the plant itself contributes to the mulch.

I still follow the guidelines of crop rotation with my beans and peas, I try to cycle the type of pea/bean I plant on a four year rotation. So if I plant peas under one tree or in one bed, I won't plant those peas there for another four years, This reduces the risk of pest and disease build up in the ground.

Other sources of nitrogen include, compost, manure, lawn clippings, blood and bone. See the end of the article for directions.

Phosphorus

Around 75-80% of phosphorus that is mined today is used to make commercial fertiliser as it is most common in solid form. See what I mean about oil/mining being a big player in the fertiliser industry? Phosphate occurs naturally after the breaking down of plant (and animal) matter so composts can be a good source of it, as the whole phosphorus cycle is a very slow one.

Regular introduction of compost can keep phosphorus at good levels. If you have low levels of it in your garden, the effects will be obvious. Your plants will hardly flower and leaves can take on an unnatural green tinge or darken off. Phosphorus is the “building block” of your plant’s growth system, which it takes in through its root system. So it’s important to have good amounts of it in there.

Phosphorous: Compost, manure, blood and bone. See the end of the article for directions.

Potassium

Commonly referred to as potash, this is what your plants and trees need to produce abundant flowers and in turn, fruit. It is also the main nutrient that plants use to get water from the soil and keep it in their leaves and stems. Prior to flowering, many gardeners will sprinkle a small handful of potash around the drip line of their trees (or any plant that produces through flowering) to increase the amount of blossom it produces. Potassium is also commonly labelled as potassium sulphate, though the organic gardener wouldn’t touch it in this form.

Most find that they don’t need to specifically add potassium to their gardens as it occurs naturally in manures and most organic fertilisers, though in small amounts (2-5%). It’s usually enough for the soil to get its fix if added at regular intervals. Blood and bone, rock minerals, potash, and wood ash all contain potassium that will be slowly absorbed into the soil.

Plants that are deficient in potassium will yellow slightly at the leaf edges. A good percentage will simply die off.

Good sources of potassium: manure, potash, blood and bone, rock minerals.

How to Add These Nutrients to Your Garden

Compost and manure can be added to a depth of say 2” on your beds or roughly 3-4 shovel fulls per square metre. You can turn it all over if you like, I prefer to leave it in layers (like lasagna) and let the plants do the work.

For blood and bone, add one handful per square metre. For potash, mix 1 tablespoon in 9 litres of water added to the beds. (This will work great).

For rock minerals, 1-2 handfuls per square metre is what you’ll need.

By rejuvenating your soil after each season with things like compost, manures, and a good handful of blood and bone per square metre, you’ll keep your NPK levels at their best and the results will show in what you grow. These top three are the main constituents with your soil structure. There are other macro nutrients and micro nutrients that are also found in there as well, but as a rule of thumb, if you look after your NPK, everything else will fall into line. Happy gardening!