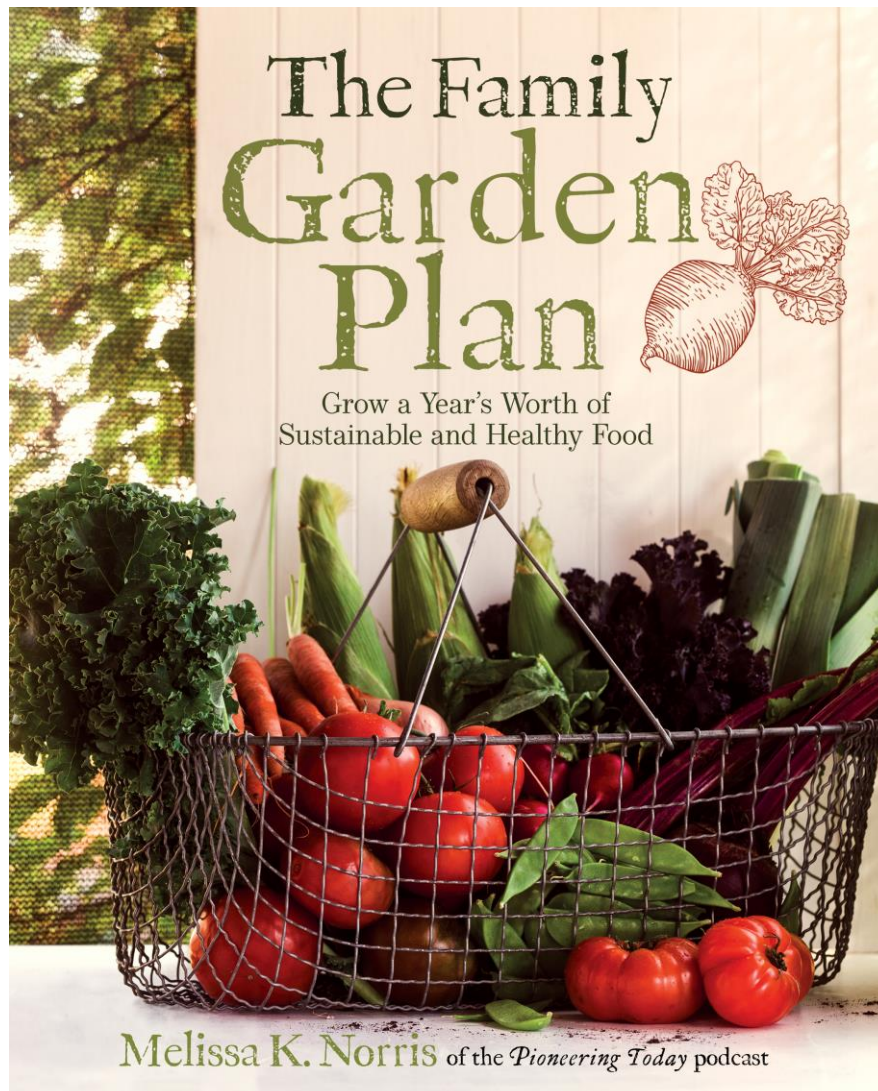


Welcome to this Organic Soil Amendment Guide

You're getting a sneak peek at one of the exclusive bonuses that is normally reserved only for those who pre-order and purchase my new book, [*The Family Garden Plan: Grow a Year's Worth of Sustainable and Healthy Food.*](#)

I hope you'll find this guide extremely useful and practical as you get your garden soil in tip top shape.

If you're looking for someone to walk you through each step of gardening with a step-by-step guide and easy to use charts and worksheets to take the guesswork out of gardening, then go here to pre-order and see the amazing bonuses you get (this guide is just a snippet) with your copy of [*The Family Garden Plan: Grow a Year's Worth of Sustainable and Healthy Food.*](#)



Organic Soil Amendments

How to amend your soil with organic methods. Of course, the most accurate and best way is to get a soil test, **but in general compost works for all the deficiencies.**

One thing to remember though, **that too high of levels or too low can both be harmful to your soil and your plants.** Kind of like goldilocks, we want it just right, which is why a soil test will be your best bet.

These are the major macro and micronutrient levels tested and to be aware of when it comes to your soil. You'll find throughout this guide each level, why it's important to your plants, signs if that level is low, and organic ways to treat your soil for that specific nutrient.

1. PH Level- not a nutrient but important for your garden (optimal range 6.0 to 7.0 for vegetable gardens)
2. Nitrogen (nitrate-N)
3. Potassium (K)
4. Calcium (Ca)
5. Magnesium (Mg)
6. Boron (B)
7. Sulfur (S as SO₄)
8. Organic Matter
9. Zinc
10. Manganese
11. Copper
12. Iron

Your PH level should only be amended by 1 point over a year period. Our PH level tested at 7.09 so I would not want to bring it any lower than a 6.09 over a one year period.

The best organic method for bringing alkaline soil lower (more acidic) is elemental sulfur. **You want to make sure it says certified organic or from elemental sulfur** as there are soil acidifiers out there that use aluminum sulfide and I don't want to put aluminum into the soil I'm growing my vegetables from.

It can take up to one year for the sulfur to react with the soil and fully amend the levels.

The recommendation for our garden was to add 1.5 pounds of sulfur per 100 square feet (again this depends upon what ph level your soil is, not a general recommendation for amount).

Truthfully, I think the best time to amend your soil for ph is in the fall. However, if you missed the fall, spring time still works. I'm doing mine 4 weeks before our regular main summer planting time.

On [the resource page](#) I'll have linked to the elemental sulfur (and other organic soil amendments) I used. I did not find it available in any of our local nurseries or big box garden stores.

How to apply elemental sulfur

- It can take up to one year for the soil to react with the sulfur and show the ph level changes on tests.
- Sprinkle the sulfur over your garden soil. Try not to breathe it in and wash your hands after applying.
- Work it into the top 3 inches of the soil.

Nitrogen

A) Why Your Plants Need Nitrogen

Nitrogen is important for the growth of your plants including chlorophyll and photosynthesis.

B) Top Signs of Nitrogen Deficiency

Yellow and pale leaves on the older sets of the plant. Despite good weather and conditions the plant doesn't seem to be growing well or thriving.

C) Top signs of Too Much Nitrogen

Plants don't flower or produce fruit but have a lot of lush dark green growth. Burning on the end of leaves and/or turning yellow on older leaves (which can be hard to distinguish between a nitrogen deficiency)

D) Reasons Nitrogen Levels are Low

Nitrogen is leached out by rain water, if you have heavy rains or a lot of rain (hello Pacific Northwest), and or excess run off, this can cause low nitrogen. Low organic matter can also lead to low nitrogen.

When to Amend for Nitrogen Levels

It's best to add nitrogen in a general application once a year. Usually in the spring but if using fresh (or hot) manure, like chicken or horse, then you'll want to apply it in the fall

with straw or other organic matter to give it the full winter to compost down, otherwise it can be too hot and kill your plants with excess nitrogen.

E) Top Organic Soil Amendments for Nitrogen Levels

If your soil is NOT low in Phosphorus and Potassium, then you want to use a fertilizer with NPK proportions of 20:0:0 (info from my soil test by Simply Soil Testing)

- Blood Meal
- Feather Meal
- Organic Urea
- Milorganite
- Composted chicken or horse manure (taking care it is not TOO hot)

Phosphorus

A) Why Your Plants Need Phosphorus

Phosphorus is an important nutrient for the root development of plants. It also helps keep your plants: hardy and healthy, have rapid and stable growth, and have maximum harvest yields.

B) Top Signs of Phosphorus Deficiency

A phosphorus deficiency can be somewhat challenging to figure out. The most common signs of a phosphorus deficiency include:

- 1) Look for purple leaves, stems, and veins. The underside of tomato leaves often turn purple, too.
- 2) If your plants have stunted growth, especially during the early growing stages.
- 3) Often, your plants will produce little to no flowers/fruit and have weak root systems.

C) Possible Causes for a Phosphorus Deficiency

Some common reasons why plants struggle to absorb phosphorus include: 1)

Low Soil Temperatures

- 2) Bad Soil Aeration: compact soil reduces the soil oxygen supply as well as decreasing the amount of room the plant's roots can stretch underground in pursuit of nutrients.
- 3) Excessive Soil Moisture

D) Top Organic Soil Amendments for Phosphorus Deficiency

Compost: Compost naturally contains phosphorus. It gets boosts from materials such as: wood ash, citrus rinds, manure, and fish waste. Before trying anything else, try just adding compost, since over-doing phosphorus amendments can cause more harm than good.

Bone Meal: (3% N, 20% P, 0% K and 20-30% calcium)

- This is an excellent quick-fix solution for phosphorus deficiency.
- Application and amount for adequately fertile soil: Till or rake in 3 pounds per 100 square feet for soil low in phosphorus;
- Add 2 pounds per 100 square feet for soil with average fertility.
- Lasts (release time) is 6 to 12 months.
- Bone meal is usually more expensive than rock phosphate.

Rock Phosphate:(0% N, 33% P, 0% K, plus 30% calcium and many trace minerals) •

This is a long-term, slow-releasing option for phosphorus deficiency.

- You can add Rock Phosphate directly to the soil or you can lightly sprinkle it on your compost pile.
- Rock Phosphate is the finely ground mineral skeletal remains of prehistoric animals.
- Application and amount for adequately fertile soil: Apply 6 pounds per 100 square feet for soil low in phosphorus.
- For average soil add 2 to 2½ pounds per 100 square feet.
- Release time is about 3 to 5 years.
- Rock phosphate is best added to acidic soil of pH 6.4 or less; also contains calcium, iron and 9 other trace elements

Potassium

A) Why Your Plants Need Potassium

Potassium is very important to plant growth, general health, and development. One of the most important functions is by regulating the plant's metabolism; plants grow faster if they have sufficient potassium levels. It also helps the plant's roots become better at collecting, storing, and using water.

B) Top Signs of Potassium Deficiency

The most common signs of a Potassium deficiency include:

- 1) Your plant leaves will have yellow edges, brown spots, and either yellow or brown veins.
- 2) Your plant leaves will often curl.
- 3) Overall, your plants will seem sickly and not produce as much fruit/produce.

C) Possible Causes for a Potassium Deficiency

The most common reason for potassium deficiency in soil is simply that the soil is lacking proper organic matter. Sandy soils suffer the most from potassium deficiencies, due to water moving through rapidly and leaching the nutrients away from the roots. In addition, high levels of salt, calcium, and/or magnesium can alter your plant's ability to draw in proper amounts of potassium from the soil.

D) Top Organic Soil Amendments for Potassium Deficiency

Compost: Compost naturally is a wonderful source of potassium. Banana peels, wood ash, aged manure, and other food scraps naturally contain sources of potassium for your compost and soil.

Greensand (or glauconite): (0% N, 1.5% P, 6-7% K, plus 50% silica, 18-23% iron oxide and 22 trace minerals)

- Greensand is a mined sea deposit.
- The greener it is, the more potassium it contains.
- Greensand is an excellent long-term solution to potassium deficiencies.
- Broadcast in fall; apply 5 to 10 pounds per 100 square feet if soil is low in potassium; use 3 pounds per 100 square feet in average soils.
- Greensand releases potassium very slowly over a 5-10 year period.
- Greensand helps bind particles of sandy soil and loosens clay soils.

Granite Dust: (0% N, 0% P, 3-5% K, plus 67% silica and trace minerals)

- Granite Dust is another long-term, slow-releasing solution to potassium problems.
- This is simply finely ground granite rock.
- Application and amount for adequately fertile soil: Broadcast 10 pounds per 100 square feet to soil low in potassium; apply 5 pounds for soil with average fertility.

Kelp meal: (1% N, 0% P, 1.2% K, plus up to 33% trace minerals)

- This is your best quick-fix solution for potassium deficiencies.
- Adds potassium and also calcium, sodium, sulfur, and organic matter.
- Application and amount for adequately fertile soil: Add 1 to 2 pounds per 100 square feet and till or turn it into the soil.

Calcium

A) Why Your Plants Need Calcium

Calcium is important for the healthy formation of roots, stems, and new growth on your plants. It also deals with neutralizing waste and toxic materials in your plants.

B) Top Signs of Calcium Deficiency

Some common signs for calcium deficiency include:

- 1) The fruits of the plants (especially tomatoes) get blossom-end rot.
- 2) New growth on the plant is stunted, with distorted leaves and yellow patches near the leaf veins.
- 3) The plants can get brown edges on the leaves.

C) Possible Causes for a Calcium Deficiency

This can be a common issue for soil. Some reasons for calcium deficiency include: too acidic or too alkaline soil, not enough moisture, soil temperature is too cold, and the balance of materials in the soil itself (clay, sand, etc.).

D) Top Organic Soil Amendments for Calcium Deficiency **Eggshells:**

- Add plenty of eggshells to your compost to boost calcium levels for the soil. You can also just plant eggshells along with plants, especially tomatoes, to add calcium to the soil. Grind up the eggshells very finely.
- Application and amount for adequately fertile soil: Apply 2 pounds per 100 square feet.

Limestone:

- If your soil is acidic, adding limestone (either calcium carbonate lime or dolomitic lime) can increase the alkalinity as well as calcium levels of the soil. • If you already have high magnesium levels, do not add dolomitic limestone.
- Application and amount (of either limestone) for adequately fertile soil: Add 6 pounds per 100 square feet if the soil is claylike; add 4 pounds if the soil is loamy; add 2 pounds if the soil is sandy.

Magnesium

A) Why Your Plants Need Magnesium

Magnesium is crucial for photosynthesis to occur; it is a part of the chlorophyll process which gives plants green leaves. It is also important because it helps the plant use and absorb the other nutrients.

B) Top Signs of Magnesium Deficiency

It can be challenging to learn the signs of Magnesium deficiencies because the symptoms are similar to, and also overlap, the symptoms of other deficiencies. Soil tests are the best idea for this, but here are some common signs:

- 1) Magnesium deficiency first appears on the older leaves.
- 2) First, the older leaves turn yellow between the veins and on the edges of the leaves. Next, they will turn purple, red, or brown. The veins stay green while the rest of the leaf changes color. After that, the leaves will drop from the plant.

C) Possible Causes for a Magnesium Deficiency

- 1) Magnesium levels are often closely connected to pH levels: it struggles in soil with a pH level less than 6.0.
- 2) Heavy rains can also lead to magnesium deficiency in the soil.
- 3) If your soil has high amounts of potassium, plants might absorb that instead of magnesium, which results in a magnesium deficiency.

D) Top Organic Soil Amendments for Magnesium Deficiency **Epsom**

salts:

- Epsom salts add magnesium to the soil without changing the pH levels.
- Application and amount for adequately fertile soil: Use 1 tablespoon of Epsom salt in a gallon of water as a foliar spray; 1 pound per 1,000 square feet.
- Epsom salt is highly soluble and is not persistent and will not build up in the soil.

Dolomitic Lime:

- Dolomitic lime will add magnesium (and calcium) to your soil as well as raising your pH levels.
- Application and amount (of either limestone) for adequately fertile soil: Add 6 pounds per 100 square feet if the soil is claylike; add 4 pounds if the soil is loamy; add 2 pounds if the soil is sandy.

Boron

A) Why Your Plants Need Boron

Boron is important for plant health because it is necessary for cell development and cell structure. Without boron, your plants might not develop fruit/flowers.

B) Top Signs of Boron Deficiency

1. New leaves will turn yellow and the tips will wither and die.
2. You will get decreased fruit/flower yields, and the fruit that does form will be distorted in appearance.
3. The growth of the plants will become abnormal: often short and bushy (because the growing tips are dying).

C) Possible Causes for a Boron Deficiency

Boron deficiency is most common in sandy soils with very little organic matter and water leaching problems. There must be a good balance of proper organic matter, good soil texture, and water to keep boron levels at the appropriate level.

D) Top Organic Soil Amendments for Boron Deficiency

Compost: this is the best and safest way to add boron to your soil. Add things like: seaweed, oak leaves, peat moss, sawdust, and other acidic organic material to your compost for best results.

Sulfur

A) Why Your Plants Need Sulfur

Sulfur helps with root development, seed production, improved taste, and for developing the vitamins, protein, etc. in the plants.

B) Top Signs of Sulfur Deficiency

Chlorosis is the top sign of sulfur deficiency: more and more leaves turn yellow. It starts on the younger leaves and then spreads to the older leaves. This looks a lot like nitrogen deficiencies, however, nitrogen deficiencies start yellowing on older leaves and then spreads to younger ones. Often, your plant suffers from *both* sulfur and nitrogen deficiencies at the same time.

Other minor signs include: slowed growth (especially in the leaf) and thin stems.

C) Possible Causes for a Sulfur Deficiency

- 1) It is very difficult for sandy soils to retain sulfur. There are also poor sulfur levels in soil that is too silty.
- 2) Soils that are over-fertilized with phosphorus can suffer from sulfur deficiency.

3) Highly acidic soils are also vulnerable to sulfur deficiency.

4) Soils at higher elevations can suffer from low sulfur levels.

D) Top Organic Soil Amendments for Sulfur Deficiency

Natural Water Sources and Compost: natural water sources contains small amounts of sulfur that is needed to plants. In addition, organic matter both contains and holds into place sulfur needed for plants. Aged manure is particularly good for sulfur as is food scraps in the compost bin.

Elemental Sulfur:

- A natural occurring mineral.
- This is an effective treatment for sulfur deficiency, but only if sulfur is the only nutrient lacking from the soil.
- A soil amendment to lower soil pH.
- Application and amount for adequately fertile soil: Broadcast 1 pound per 100 square feet to lower the pH by one point.
- Apply sulfur to the soil in fall; mix the sulfur into the top 3 inches of soil.

Epsom Salt:

- Application and amount for adequately fertile soil: Use 1 tablespoon of Epsom salt in a gallon of water as a foliar spray; 1 pound per 1,000 square feet.
- Epsom salt is highly soluble and is not persistent and will not build up in the soil.
- It is a highly soluble form of both magnesium and sulfur.

Zinc

A) Why Your Plants Need Zinc

Zinc is important for the creation of amino acids in plants, as well as for the development of new leaves, producing chlorophyll, and seed formation.

B) Top Signs of Zinc Deficiency

- 1) Chlorosis develops at the base of the leaf near the stem. The leaf discoloration is yellow and the veins remain green.
- 2) The chlorosis starts on the lower leaves first, and then slowly moves up the plant.
- 3) Plants are often stunted in growth.

C) Possible Causes for a Zinc Deficiency

Zinc problems happen in both acidic and alkaline soils.

Cool soil temperatures in early spring can lower zinc levels in the soil.

The biggest cause seems to be sandy soil with low organic matter content.

D) Top Organic Soil Amendments for Zinc Deficiency **Manure and compost:** The best way to add zinc to the soil.

Phosphate Rock:

- This is a long-term, slow-releasing option for zinc deficiency.
- You can add Rock Phosphate directly to the soil or you can lightly sprinkle it on your compost pile.
- Rock Phosphate is the finely ground mineral skeletal remains of prehistoric animals.
- Release time is about 3 to 5 years.
- Rock phosphate is best added to acidic soil of pH 6.4 or less; also contains calcium, iron and 9 other trace elements

Manganese

A) Why Your Plants Need Manganese

Manganese helps with many processes in the plant, including: the formation of chloroplast, photosynthesis, and nitrogen metabolism.

B) Top Signs of Manganese Deficiency

- The signs of manganese deficiency look similar to that of magnesium deficiency because both help with photosynthesis in the plant. Manganese deficiency signs, however, first start on young leaves.
- Chlorosis will occur: the leaves will turn yellow, then white, while the veins remain green.
- The entire plant is often stunted in growth and has decreased flowers/fruits.

C) Possible Causes for a Manganese Deficiency

Soils with neutral to high pH levels can have manganese deficiency problems. Alkaline soil can halt the availability of manganese nutrients.

D) Top Organic Soil Amendments for Manganese Deficiency

Elemental Sulfur:

- A natural occurring mineral.
- A soil amendment to lower soil pH. One of very few ways to fix manganese is by lowering the soil pH levels.
- Apply sulfur to the soil in fall; mix the sulfur into the top 3 inches of soil.

Compost

Copper

A) Why Your Plants Need Copper

Copper activates plant respiration and is essential in many enzyme systems. It is also important for photosynthesis and for the plant metabolism of carbohydrates and proteins.

B) Top Signs of Copper Deficiency

- 1) The biggest sign of copper deficiency is something called withertip. The leaves on stem tips look wilted and water does not revive them. The leaf tips also turn bluish-green in color.
- 2) The plants often do not flower and the growth is stunted.

C) Possible Causes for a Copper Deficiency

The two main causes for copper deficiency include soil with high pH levels and the high amounts of organic matter in the soil. High alkaline soil (above 7.5) and peaty soils are often deficient in copper.

D) Top Organic Soil Amendments for Copper Deficiency

A combination of **compost and liquid seaweed** can help with copper deficiency. The compost takes a while to boost the copper levels, while the liquid seaweed keeps up the plants health until the copper from the compost is absorbed.

Iron

A) Why Your Plants Need Iron

Iron plays an important role in the production of chlorophyll and for photosynthesis. It also helps carry important elements through a plant's circulatory system.

B) Top Signs of Iron Deficiency

- 1) Chlorosis occurs, however, yellowing of leaves indicates many nutrient deficiencies so it's not the best indicator for iron deficiency.
- 2) New shoots will stop growing and top growth often dies.

C) Possible Causes for a Iron Deficiency

- Many soils simply do not have enough iron in it for the plants to absorb.
- Alkaline/high pH soils are the most common reason why the soil can be iron deficient.
- If the soil has too much calcium, it often causes iron deficiency in plants.

D) Top Organic Soil Amendments for Iron Deficiency

E)

Compost: iron is present in decomposing plant matter as well as dead leaves, making compost very beneficial for iron deficiency. **Aged manure** (especially chicken manure) is also beneficial to your compost pile for iron issues.

Greensand (or glauconite): (0% N, 1.5% P, 6-7% K, plus 50% silica, 18-23% iron oxide and 22 trace minerals)

- Greensand is a mined sea deposit.
- Broadcast in fall; apply 5 to 10 pounds per 100 square feet if soil is low in potassium; use 3 pounds per 100 square feet in average soils.
- It contains marine potash, silica, iron, magnesium, and lime, plus up to 30 other trace minerals
- Greensand helps bind particles of sandy soil and loosens clay soils.

Sources:

<https://www.motherearthnews.com/organic-gardening/natural-soil-amendmentszmaz88ndzgoe> <https://countrysidenetwork.com/daily/growing/soil-compost/how-to-add-calcium-to-soil/>
<http://homeguides.sfgate.com/way-put-calcium-garden-soil-74759.html>
<http://homeguides.sfgate.com/effect-magnesium-deficiency-plant-92253.html>
<http://homeguides.sfgate.com/add-magnesium-soil-21551.html>
<https://www.motherearthnews.com/organic-gardening/soil-nutrients-zmaz94jjzraw>
<https://woodleaffarm.com/enlivening-soil/> <http://www.cropnutrition.com/efu-phosphorus> <https://www.gardeningknowhow.com/>
<http://homeguides.sfgate.com/add-iron-garden-soil-95549.html>
<https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1415.pdf>
<https://www.extension.umn.edu/agriculture/nutrientmanagement/micronutrients/copper-for-crop-production/index.html>
<http://nmsp.cals.cornell.edu/publications/factsheets/factsheet49.pdf>

<https://www.pthorticulture.com/en/training-center/role-of-manganese-in-plantculture/>

<https://www.extension.umn.edu/agriculture/nutrientmanagement/micronutrients/zinc-for-crop-production/> <https://www.maximumyield.com/how-to-detect-and-treat-sulfur-deficiencies-in-plants/2/3611> <https://ag.umass.edu/vegetable/fact-sheets/boron-deficiency> <http://homeguides.sfgate.com/signs-symptoms-low-potash-plants-83788.html> https://harvesttotable.com/test_ferti/ http://extension.umd.edu/sites/extension.umd.edu/files/images/programs/hgic/Publications/HG42_Soil_Amendments_and_Fertilizers.pdf