SOIL CONDITIONERS & AMENDMENTS

A Reference Guide

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The first step in growing a fabulous garden is to test your soil.

Soil testing is important for a productive fruit or vegetable plot and should not be over-looked even if you are just growing flowers and herbaceous perennials.

Make sure you test for pH and the following key growing elements:

- Nitrogen (N)
- Phosphorus (P)
- Potassium (K)

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**Low Nitrogen (N)**

Nitrogen is a building block for many important biological processes in plants.

It builds proteins, enzymes (which are made of protein), builds cell walls and is used in photosynthesis.

Nitrogen is responsible for the lush green growth in plants.

Low nitrogen may be seen as yellowing of leaves or stunted growth in plants growing in the area.

Correct low nitrogen by applying one or more of the following:

- *Bat guano*
- *Blood, fish and bone meal*
- *Chicken manure*
- *Compost*
- *Cottonseed meal*
- *Feather meal*
- *Fish meal*
- *Seabird guano*
- *Worm castings*

Spread according to manufacturer's instructions. Too much nitrogen can result in plant burning, which causes them to die.

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Low Phosphorus (P)

Phosphorus is key in energy transfer, converting other nutrients to be used in growth processes.

It is also important in root growth, fruit production and blooms or flowering.

If your plants are small, produce few or no flowers or have weak root systems you may have a phosphorus deficiency.

Correct low phosphorus by applying one or more of the following:

Blood, fish and bone meal
Bonemeal
Compost
Fish liquid fertilizers
Fish meal
Indonesian bat guano
Jamaican bat guano
Rock phosphate
Seabird guano
Worm castings

Spread according to manufacturer's instructions.
Low Potassium (K)

Potassium is critical for health and vigor.

It plays a key role in disease resistance and plant metabolism.

Potassium can help with temperature stress from frost and increase the strength of cell walls.

Too much potassium can lead to high pH or more alkaline soil. The addition of wood ash can do this if too much is applied.

Correct low potassium by applying one of the following:

- Compost
- Greensand
- Kelp extract
- Langbeinite
- Potash
- Sulfate of potash
- Wood ash (use sparingly)
- Worm castings

Spread according to manufacturer's instructions.

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Trace Elements

Additional minerals or elements can improve plant growth, disease and pest resistance and boost the nutritional content of fruit and vegetables.

Trace elements or minerals perform functions with enzymes and plant metabolism.

Trace elements include (but are not limited to) magnesium, calcium, iodine, sulfur, iron, boron, zinc, manganese and selenium.

Trace elements or minerals can be provided by adding:

- Alfalfa meal
- Azomite
- Blood, fish and bone meal
- Chicken manure
- Dolomite
- Epsom salts
- Greensand
- Gypsum
- Humate
- Kelp
- Manure
- Rockdust
- Worm castings

Spread according to manufacturer's instructions.

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Increase Humus

Increasing soil humus improves soil structure by providing better moisture and water retention.

Humus can help build soil microorganism numbers and types which help increase nutrient availability and uptake by plants.

It encourages earthworm activity and root growth in plants too.

Generally speaking, soils should be improved to 4-5% organic matter. This level of content allows the mineralization or release of nitrogen from the organic matter to be adequate for most plants without additional the need for additional fertilizers.

Sources of humus include:

*Biodynamic preparations*

*Compost*

*Humates*

*Humic acids*

*Manures*

*Worm castings*

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Increase Biodiversity

Increasing soil bacteria, fungi and protozoa help to increase nutrient availability and uptake by plants.

A soil diverse in microorganisms can help plants establish faster and reduce transplant shock. Plants will have greater root structures, higher water uptake and have greater nutrient density.

Sources of biodiversity include:

*Biodynamic preparations*

*Compost*

*Compost teas*

*Humates*

*Humic acids*

*Manures*

*Mycorrhizal fungi*

*Worm castings*
Reduce Compaction

Heavy soils such as clay need opening up to increase aeration and drainage.

Reduce compaction in the soil or break up clay soils by adding one or more of the following:

- Biochar
- Compost
- Greensand
- Manures
- Mycorrhizal fungi
- Worm castings
**Application Rates**

Most commercial products provide guidelines on applying soil conditioners and amendments.

Where the soil amendments may be high in salts, the rate is limited due to salt burn of roots. This causes death of plants because they cannot grow without good root structure.

Typically soil amendments are added between 5 and 50 lbs per 1000 sq. ft. of soil.

Some common application rates are detailed below:

*Chicken Manure*
1 cu. ft. per 200 sq. ft.

*Compost*
10 lbs per 100 sq. ft.

*Kelp Meal*
5-20 lbs per 1000 sq. ft.

*Rockdust*
50-150 lbs. per 1,000 sq. ft.

Manures must be well rotted or composted before use. Fresh manures burn plants because they are high in ammonia or ammonium salts. Fresh manures may be applied to the soil in autumn for spring planting in the same area.

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