

Soil Health: Alderney Room

Soil Amendments: Where to Get & How to Apply

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Executive Summary

Roxanne and Rupert have put together an excellent slide show which really assists with the complex content of this workshop. Each principal nutrient is profiled in a simple yet detailed analysis of its necessity and use in organic farming. Since both are very engaged in organic certification there are many useful additions to the conversation about what is sensible, useful and sensitive in the organic farm system. This workshop is an excellent introduction to the components which are required and must be carefully controlled. The subtle science of soil is a surprisingly sensitive subject!

Detailed Notes

- Farm generated fertility
 - ❖ From your own land you can build it with green manure, animal manure.
 - ❖ Difficult/debatably impossible, farms harvesting to off-farm customers are dependent on off-farm sources
 - ❖ Organic standards specifically limited to a list of “permitted substances” from natural sources that are minimally processed.
- Test the soil for the desired crop to determine necessary inputs
 - ❖ Keep in mind changing properties of soil
 - ❖ Release of nutrients such as nitrogen (N) over time
- Nutrient availability is gradual, especially in an organic farm system
- Manure
 - ❖ Varies in percentage of N (dry weight)
 - ❖ For example dependent on the type of bedding used for animals.
 - ❖ Preferably not *raw* manure due to possible contamination, rather composted manure, which can be produced on farm up to organic standards with the correct record keeping. After application of raw manure a number of days must pass after application for food safety regulations.

- Compost
 - ❖ Must kill weed seeds (Example: temperature)
 - ❖ Decomposition action kills/breaks down conventional by-products
 - ❖ Is better able to hold nutrients
 - ❖ “Real” compost doesn’t smell bad. You won’t mind touching it if it has been composted correctly.
 - ❖ Sheep manure maintains its own fertility. It takes 7 years to be composted, but has lots of microbes for soil stimulus and thus makes an excellent soil amendment (though not very high in N)
 - ❖ “Fabricated” compost (example: chicken manure) is high in N, with a quick nutrient release, yet has *no* microbial activity. It should be added along with organic matter. It is useful as a “quick fix” and is allowable in an organic farm system in controlled amounts.
- There are organic standards for what constitutes compost; otherwise it is classified as “aged manure” which is subject to different regulations. Since compost is actively changing all the time it must meet standards.
- Sources on N vary in inputs and large-scale they can be expensive.
 - ❖ Sample: crab meal in differing grinds can contribute likewise differing availability of N. Caution: crab meal can be high in salts (test it & soil)
 - ❖ Sample: alfalfa meal is useful as a greenhouse soil amendment. It needs to be proven not genetically modified for use in an organic farm system. Since has sticky characteristics, in Rupert’s opinion it is a useful addition to a transplant soil mix, yet its N is not as readily available as other amendments.
 - ❖ Okara: a by-product of soy processing, can be up to 7% N (dry weight) but is received wet usually so the price is usually high.
- Possible nutrient amendments
 - ❖ In organic farms systems a deficiency must be proven by a test before many nutrients can be added.

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Holiday Inn Halifax Harbourview**

- ❖ If nutrient action isn't understood properly, difficulties may arise. Proceed with caution.
- ❖ Phosphorus (P): Can overload the soil. Can be tied up in organic matter, where tests cannot perceive it. Some sources (rock phosphate, a dry, granular, black substance) are slowly released. These would be less desirable in uses such as in transplant soil mix. It takes time to mineralize sources. As rock phosphate ages it mellows and changes structure as it is composted. Some farmers add it to manure pile or in gutter of cows' stall to jumpstart the mineralization to encourage availability for plants. If applied directly to fields there is a gradual response with high biological activity, and with high levels of organic matter. Soft rock phosphate is much more available, for example in CalPhos. Can be useful in transplant soil mix as it is quickly mineralized. You can also pulverize it in a food processor if needed.
- ❖ Potassium (K): Often sourced in the form of green sand, used for transplant soil mix. Wood ash is an easy source, which you can get from your own woodstove or purchase. It is expensive to test wood ash, but it is important because ink has heavy metals. In an organic system you cannot burn glossy paper or coloured ink. Check the standards for levels of Cadmium if potassium is from an outside source. K is easily leached out of soil, and needs to be in correct ratio with Magnesium so be careful. You can add potassium sulphate if soil is demonstrated deficient. Dried seaweed meal is high in K (example: kelp meal as a livestock supplement).
- ❖ Seaweed: The price has risen for seaweed meals, so it might not be economically practical for large-scale operations. Look for recipes for transplant mix. It may be high in salts, although being rained on helps. Eelgrass persists in organic systems and may make great mulch. Kelp and rockweed decompose quicker. Note: it is legal to harvest seaweed

(not to sell) anywhere in NS that is not a protected zone. Commercial harvesting is zoned.

- ❖ Calcium (Ca): Sourced from dolomitic lime, or calcitic lime which you could use in stead as long as your magnesium levels are satisfactory. Seashell meals may be a good source.
- ❖ Magnesium: Sourced from dolomitic lime or Epsom salts (which provide an immediately available nutrient).
- ❖ Sulphur (S): Permitted substances are those such as gypsum, which is composed mainly of Ca and S. There is no neutralizing value though. It is also a quick fix for Ca deficiency.
- Micronutrients
 - ❖ Absolutely necessary in correct quantities.
 - ❖ Must be tested and demonstrate deficiency before amending in an organic farm system.
 - ❖ Conventional methods often are inappropriate for organic farm systems.
- Testing: Stick to one lab to help with consistency. Differing results from different labs can happen with certain nutrients. Over time, look for a shift in each nutrient. Provincial labs are better than ever and consistently reliable, says Rupert. Don't take testing for granted.
- Regulations: Check for restrictions before adding *any* amendment. Any amendment must have content confirmed from manufacturer for certification purposes. Check for content of cross-border purchases because of differing standards for controlled substances, even if certified organic (example: chelium nitrate is not allowed in Canada). Caution: certain amendments may have elements added and can be detrimental.
 - ❖ Organic Materials Review Institute (OMRI) is a US organisation. Approval does not equate across border. With Organic Crop Improvement Agency (OCIA) it is easier to check national standards.
- Do not apply manure to frozen soil: run off can occur, although usually raw manure is the problem. Rules about "aged manure" may be frustrating to some

organic farmers. The best time to apply is in April before the ground is totally thawed so that tractor use is easier, however it is easy to break regulations so often it may be easier to use off-farm amendments because of paperwork availability.

- Rates of amendment: How much?
 - ❖ Depends on bulk density (weight by volume), and crop requirements.
 - ❖ Is it a synthetic source? It may help in finding % N availability.
 - ❖ Farm sources have varying % N availability.
 - ❖ Mineralization takes time. Certain crops feed lightly or heavily. Past field activity is important to consider. There are formulas to apply to determine how much to add (research needed).
- Boron can be toxic! There is a fine line between deficiency and toxicity.
 - ❖ Certain crops require it (example: brassicas).
 - ❖ Solubor: foliar application by spraying.
- Recommended: Rodale Institute published *Farmer's Fertilizer Guide*
 - ❖ It has examples, rates, and applications. Go to company website for more information.
- Interrelationships of nutrients: seek guidance or research for the delicate balance of soil.
- Test: field vs. greenhouse
 - ❖ Difficult to determine fertility.
 - ❖ Different conditions have different needs. Example: Loaded with nutrients with a lot of watering (greenhouse).
- When sourcing amendments or any input, specify *organic*. Check with your certification body for approval of any input before purchasing.