

Organic farming systems

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Organic dairy compost ready to be applied to a field.



Clover cover crop in a recently harvested organic wheat field. Maple Park, IL.

Fertility within the organic/biological system

Dave Campbell*

Organic farmers' fertility practices may vary, but the common goal is to improve soil health, which provides numerous advantages within the biological system. Building quantity and diversity of soil microbiology is a must for successful organic production.

Organic farmers typically use National Organic Program (NOP) approved fertilizers or other nutrient sources that contain both primary and secondary nutrients as well as trace elements. Soil amendments are most needed during the time of transition from conventional to organic agriculture while the soil is withdrawing from synthetic chemical inputs and adapting to an organic system of production.

Fertilization within the organic system is not a process of adding a single product to your fertilizer mix and hoping for a miracle. It takes time for things to change, and there is no one way to do things. Start out by having soil tests done on your farm with a consultant who has a good reputation among other successful organic farmers in your area. Don't worry about achieving "exact numbers" on the soil test report. Focus on balancing soil nutrients within the framework of dollars budgeted for fertilizer usage. Many farmers who adhere to the organic/biological system of fertility typically address calcium needs first. Products such as high-calcium lime and calcium sulfate (gypsum) are used extensively.

Keys to fertilization in an organic/biological system

- (1) Convert a continuous supply of nutrients from the soil.
- (2) Create plant-available nutrients measured through soil tests.
- (3) Minimize purchased inputs.
- (4) Ultimately achieve a point where the plant gets most of its nutritional needs from the soil, therefore requiring only small amounts of supplemental balanced crop fertilizers.

Adding compost rather than raw manure to the soil will benefit as it greatly reduces the volume of material that needs to be hauled to the field and also results in less nutrient leaching. If raw organic matter is added directly to the soil, whether it's livestock manure or a green cover crop, allow enough time for it to break down before planting a crop or some nutrients will be temporarily tied up by microorganisms starving the crop. The NOP clearly specifies how raw manure must be used in organic cropping systems:

- ◆ Municipal waste is never allowed in certified organic production.
- ◆ Application of livestock manure is encouraged. The manure applied to your cropland can be purchased from farms that don't raise their livestock organically.



A red clover cover crop provides ground cover with living roots in the soil when the crop is not in the field.

- ◆ Manure must be applied no less than 90 days before crop harvest.
- ◆ If the harvested portion of the crop (i.e., vegetable production) is in direct contact with the soil, the requirement as to when the last application of manure can be applied is 120 days before harvest.
- ◆ Manure composted according to the NOP guidelines does not have the application-timing limitations.
- ◆ Vegetable produce systems are much more sensitive to nutrient overload.
- ◆ Don't overload the soil with heavy applications of manure or raw organic matter.

Increasing soil organic matter (SOM) levels is not the only reason for returning carbon-rich materials, such as straw, to the soil. Carbon represents the main form of energy for soil microorganisms and is essential if a biologically active soil is to be maintained. The life of the soil—the bacteria, fungi and earthworms—plays a major role in nourishing the crop. It helps break down the minerals of the soil and releases tied-up phosphorous, potassium, calcium, magnesium and other nutrients. It also breaks down and recycles organic matter, and modifies soil pH. The ideal range for most crops is 6.2 to 6.8, although a few crops require a soil pH that is out of the ideal range for optimum production.

SOM that does not readily break down and is resistant to microbial activity forms compounds that make up long-term SOM, or humus. Humus provides important benefits to soil structure, often aiding in water and fertility retention. Humus is increased by recycling crop residues such as green manure crops, which are used extensively by organic farmers. A variety of clovers and alfalfa will capture substantial amounts of nitrogen, which is especially needed for growing crops such as corn and wheat the following year.

The role of earthworms in helping to incorporate organic matter and to create soil structure is so important that low numbers should be regarded as a cause for concern. A good word of advice is: **Start** feeding the life in the soil and **stop** treating the soil like dirt.

References

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* Dave Campbell operates a certified organic farm in northern Illinois and is a contributing member of the Midwest Organic Team of the New Ag Network. www.new-ag.msu.edu.



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The Midwest Organic Team is a division of the New Ag Network. The team consists of researchers, extension educators and certified organic farmers.

Team members:
 Dan Anderson, University of Illinois, Urbana-Champaign
 Roy Ballard, Purdue University
 Andrea Bucholtz, Michigan State University
 Matt Grieshop, Michigan State University
 Dan Hudson, Michigan State University
 Joy Landis, Michigan State University
 Dale Mutch, Michigan State University
 Ellen Phillips, University of Illinois
 Jim True, Purdue University
 Dave Campbell, Maple Park, IL
 Dale Rhoads, Nashville, IN
 John Simmons, North Branch, MI



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