Municipal Biosolids Programs Can Improve Soil Health

by Mark Janiec, *CCA-ON*

The addition of municipal biosolids to farmland can improve soil health by providing significant amounts of nitrogen, phosphorous, organic matter and micronutrients including sulphur, copper and zinc, at little to no cost. The added fertility and organic matter, as well as including soil sampling and growing cover crops as part of the biosolids land application program, can lay the foundation to improved soil health.

Soil Health Defined

What is a healthy agricultural soil? One definition is: the optimum balance of soil physical, chemical and biological properties. Another is "Essentially it refers to a soil's ability to support crop growth without becoming degraded or otherwise harming the environment (OMAFRA, 2016)." Soil health can be enhanced through the addition of municipal biosolids or organic amendment materials that contribute to soil fertility and organic matter, providing some balance to what is removed in a cropping system.

Start with a Soil Analysis

Why not start with a soil analysis? Optimum soil fertility, pH and organic matter in a cropping system can have a direct impact on soil health. A soil analysis is an inexpensive and valuable tool in assessing these soil health parameters. Without knowing what you have, it's difficult to know what you need.

A soil sample and analysis to measure soil pH, phosphorous and metals is mandatory before municipal biosolids can be applied to land, and is required as part of a NASM Plan. The biosolids contractor will provide this analysis for you and quite often it is completed by a third party for quality assurance.

The optimum soil pH for most field crops is pH 6.5. To receive municipal biosolids, the pH of the soil must be at least 6.0, which helps ensure that any metals added to the soil from the biosolids are bound tightly in the soil matrix. If the soil pH is less than 6.0, then agricultural lime must be added to adjust and raise the soil pH. The soil must be retested and analysed to confirm this pH level is achieved prior to the addition of municipal biosolids.

Soil metals are also analysed to ensure that levels do not exceed provincial regulatory limits and to ensure additional metals added in the biosolids are safe for the soil.

Also, soil phosphorous levels must be less than 60 ppm which is a level where crops are considered to be non-responsive to additional phosphorous. Organic matter analysis is not typically required as part of a NASM Plan, however analysis would be recommended to record current back ground levels for reference and for future comparison.

Cover Crops After Biosolids Application

Post wheat harvest is an excellent time for biosolids application and provides a great opportunity to add additional crop residues, biomass and organic matter to your soil by growing a cover crop.

Early-late summer and early fall works best to give the cover crop time to establish and will help to retain all those nutrients supplied by the biosolids. There is also the added benefit of soil erosion protection, especially going into the winter months.

A detailed "spreading map" that shows the accuracy of the material being applied to the field can be provided. Have your contractor supply you with a spreading map which is readily available now that precision ag equipment is more the norm. Having this specialized equipment can ensure uniform application and avoid misses in the field, which will be readily apparent in the following cover crop or spring planted crop.

Summary

The use of municipal biosolids as well as other organic amendments can be a low cost source of fertility and organic matter. Soil health can be improved by the addition of organic matter, nutrients and micronutrients. It's key to know the background soil fertility levels and adjusting additional nutrients as required, according to the soil analysis. Cover crops can be used to add additional organic matter to the soil as well as capture fall applied nutrients for release in the spring.

Ontario Ministry of Agriculture, Food and Rural Affairs. "Soil Health in Ontario." *Best Management Practices* AF151 (2016): 1-15. Print

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This industry driven program helps ensure that Ontario crop producers are well served by those providing their crop production advice. This article was written by one of those CCA's.