

Soil Health

Wednesday afternoon 2:00 pm

Where: Gallery Overlook (upper level) Room A & B

MI Recertification credits: 2 (COMM CORE, PRIV CORE)

CCA Credits: SW(2.0)

Moderator: Zachary Hayden, Horticulture Dept., MSU

- | | |
|---------|---|
| 2:00 pm | Understanding What Your Soil Test Says <ul style="list-style-type: none">• Thomas Bjorkman, Horticulture Section, School of Integrative Plant Sciences, Cornell Univ. |
| 2:30 pm | Reduced Tillage Systems for Vegetables <ul style="list-style-type: none">• Mark Hutton, Extension Vegetable Specialist, Univ. of Maine Cooperative Extension, Monmouth, ME |
| 3:00 pm | Optimizing Strip Tillage Systems for Vegetables <ul style="list-style-type: none">• Anusuya Rangarajan, Senior Extension Associate, Integrative Plant Sciences, Cornell Univ. |
| 3:30 pm | Cover Crops for Building Soil and Other Benefits <ul style="list-style-type: none">• Anne Verhallen, Ministry of Agriculture, Food and Rural Affairs, Ontario, Canada |
| 4:00 pm | Session Ends |

Understanding What Your Soil Test Says

Thomas Björkman
Section of Horticulture, Cornell University
Geneva, NY
Email: tnb1@cornell.edu , Website: covercrop.net

New soil tests provide valuable information about a soil's health in ways that let grower change management practices to remove limiting conditions.

Older soil tests provided total organic matter, and perhaps nitrate concentration. Total organic matter of a very coarse indicator of soil health that changes slowly in response to changes in management. Nitrate changes very quickly, and is not a good indicator of the soil's ability to supply nitrogen for the season.

Newer soil tests provide measures of active organic matter that tells about the soils ability to feed its microorganisms, and the values change fast enough that growers can use them to determine whether improved practices are helping. Measures of organic nitrogen and microbial activity are good indicators of seasonal nitrogen supply and are tied closely to management practices.

The 2016 version of the manual, *Comprehensive Assessment of Soil Health – The Cornell Framework*, describes the assays currently offered. There have been changes since the initial tests in 2008 that are faster and less expensive. Other labs offer assays that get at similar aspects.

In the Cornell Comprehensive Assessment of Soil Health, there are four measures

- Active Carbon
- Soil Respiration
- Soil Protein Index
- Wet Aggregate Stability

Active Carbon assesses how much food is available for soil microorganisms to eat. This is a small subset of the total organic matter in the soil. Inactive carbon consists, for example, of well digested and lignified material such as peat or compost. Large pieces, such as chunks of corn stalks, are also not easily consumed by the soil microbes. The active carbon is largely material that was part of living plants in the last 2 to 10 years. The active carbon is maintained by continuously feeding the soil with plant matter.

Soil Respiration is a measure of soil-microbe activity. The respiration value can vary a lot over the course of a year or rotation, but is generally high if the soil microbes have been fed continuously throughout the year.

Soil Protein Index is a measure of the nitrogen that is available for mineralization. This nitrogen can be a significant contributor to crop nitrogen needs. It also supports the growth of the microbial population during the growing season. If there is not enough, soil respiration will not increase in the microbes won't be able to take advantage of the active carbon.

Wet Aggregate Stability measures how well soil aggregates are held together by organic glues, most of which were formed by rhizosphere microbes. The index is high if processes that form and stabilize soil aggregates are proceeding faster than those, like tillage, that destabilize aggregates. Microbes in the rhizosphere depend on carbon compounds secreted from the roots, not just active carbon in the soil.

The new soil tests often prescribe two management practices to improve soil health: reducing tillage and increasing soil-building through cover crops.