

## **Mattson Farms Farming Philosophy**

Many years ago Mattson Farms adapted the philosophy “Manage only what you can control”. Farmers have long known that they can NOT control the weather no matter how hard you pray. However, we can control how the weather affects us and getting the most out of what Mother Nature brings our way. Soil health is at the forefront of this philosophy.

There are 3 major indicators we track to see if we are improving our soil health and environment: Soil Organic Matter, Soil pH, and Cation Exchange Capacity “CEC” (some additional definitions and references have been provided). Nearly every input, crop, and practice we implement must answer to at least one of those 3 indicators. While some decisions are easier than others, at the very least, any decision we make must not degrade any of those 3 indicators.

We farm in a very unforgiving part of the world. Limited rainfall, extreme temperature swings, and unrelenting winds makes our job more difficult than it probably should be. Over the last 15+ years we have changed our farming practices to limit the ill affects of Mother Nature and to also get the most out of what she has to offer. It first started with “no-till”, then evolved to the introduction of pulse crops and using them in a cropping rotation. Now the new emphasis is taking a closer look at the microbial activity in the soil and getting the most out of what is already naturally available. We are doing this by using biological products that help feed and promote increasing the populations of these microorganisms. By using these “biological” products, we are in return reducing the use and sometimes eliminating commercial products (seed treatments, fertilizer, and fungicides) that hinder the growth of these “good bugs”.

Given the climate which we operate in, changing any of the 3 indicators takes years, if not generations. However, within the last 2-3 years we seem to be turning the corner. The organic matter on of your fields has more than doubled (since 2001). While other parts of the state are dealing with “acidic” problems due to low pH while our pH levels have remained at acceptable levels and our CEC numbers have also continued to slowly increase. So why does this matter?? This matters again, because of the extreme environment we operate in. We are able to reduce the ill effects of drought, wind erosion, and increase our effectiveness of pest management all while still leaving the door open for the year Mother Nature actually cooperates. We are using less fertilizer, less water, and less commercial pesticides to achieve the same production goals. This is all good for the environment and for future generations that will continue operating this land. If that isn’t the definition of sustainable agriculture I don’t know what is??

## **Soil Definitions**

**Organic Matter:** Soil organic matter (SOM) is the organic component of soil, consisting of three primary parts including small (fresh) plant residues and small living soil organisms, decomposing (active) organic matter, and stable organic matter (humus).

**Soil pH:** Soil pH affects the soil's physical, chemical, and biological properties and processes, as well as plant growth. The nutrition, growth, and yields of most crops decrease where pH is low and increase as pH rises to an optimum level.

[http://soilquality.org/indicators/soil\\_ph.html](http://soilquality.org/indicators/soil_ph.html)

<https://www.cropnutrition.com/nutrient-management/soil-ph>

**Cation Exchange Capacity:** is a measure of how many cations can be retained on soil particle surfaces.[1] Negative charges on the surfaces of soil particles bind positively-charged atoms or molecules (cations), but allow these to exchange with other positively charged particles in the surrounding soil water.[2] This is one of the ways that solid materials in soil alter the chemistry of the soil. CEC affects many aspects of soil chemistry, and is used as a measure of soil fertility, as it indicates the capacity of the soil to retain several nutrients (e.g.  $K^+$ ,  $NH_4^+$ ,  $Ca^{2+}$ ) in plant-available form. It also indicates the capacity to retain pollutant cations (e.g.  $Pb^{2+}$ ).

Soil particles are negatively charged and attract positively charged molecules. These molecules can be nutrients, water, herbicides and other soil amendments. A soil particle's ability to react with these molecules is called the cation exchange capacity. If the CEC number is low, not many molecules are able to bind (react) to the particle surface. If the number is high, a larger number of molecules can bind to the particle's surface. Michigan soils have a wide range of CEC values with sand-based soils having numbers below 10, clay and silt soils having values of 15 to 25 and organic soils approaching 100. To further confuse the picture, since Michigan is a glaciated state, values can change significantly within many fields.