USDA
United States Department of Agriculture

NATURAL RESOURCES CONSERVATION SERVICE

15A

SOIL TECH NOTES

Cation Exchange Capacity

PROBLEM: "I am paying more attention to my soil tests now and see a change in something called "CEC". What is that and why do I care?"

INFORMATION RELATED TO CEC:

- Relatively **stable** test scores for this item and then a relatively sudden **increase** in this value is a good soil health thing!
- CEC or "Cation Exchange Capacity" of the soil is a general indicator of productivity potential for a soil.
- Tiny almost "magnetic-like" negatively charged sites are located on clay particles and within stable organic matter in the top part of the soil. These sites attract and hold the positively charged ions that are important for plant growth, i.e. K, Ca, NH4, Mg, Fe, Mn, Cu, and Zn. These sites collectively are considered to be the Cation Exchange Capacity.
- Negatively charged particles, such as NO3, are repelled and enter the soil water.
- Typical range of CEC in darker colored soils is 15 to 25 milli-equivalents/100 g soil.

POSSIBLE ANSWERS AND WAYS TO INCREASE CEC:

- CEC only comes from organic matter or clay. Clay content will not increase in a soil so only one solution is increasing **usable organic matter.**
- An increase in CEC points is generally always due to change in the **content** of organic matter fraction or in the **quantity** of organic matter.
- To get this increase, cover crops are most always the reason the tests improve. Point to keep in mind is that this increase is due to the **Active Fraction of OM**. This fraction is consumed by microbes and in a relatively short time of 1-3 years it will be gone. It must be constantly added to keep the CEC high.
- Adding organic matter on a **continuing basis** is needed.
- Use no tillage or minimum tillage to retain the organic matter you have. Also need to reduce or eliminate any compaction in top 12 inches so that air and water can move freely throughout which is needed for the aerobic microbes to function.