

## Cation Exchange Capacity

The cation exchange capacity (CEC) of a soil refers to the amount of positively charged ions a soil can hold. When dissolved in water, the nutrients are either positively charged or negatively charged. Examples of positively charged ions (cations) include: calcium ( $\text{Ca}^{++}$ ), magnesium ( $\text{Mg}^{++}$ ), potassium ( $\text{K}^+$ ), sodium ( $\text{Na}^+$ ), and ammonium ( $\text{NH}_4^+$ ). Soils have a slight negative charge due to the presence of clay particles and organic matter. Thus, the higher the clay content and organic matter content, the higher the CEC of the soil. Soils with a high CEC will tend to hold on to nutrients better than soils with a low CEC. The CEC of a soil can be increased somewhat by increasing the soil's organic matter content. Because the CEC of a soil is relatively constant unless large amounts of organic matter are added, it is not measured or reported with a routine soil test.

Some soil testing labs will report ideal calcium to magnesium ratios for plant growth. However, most plants tolerate a very wide range of soil calcium to magnesium ratios. Adjusting the ratios of calcium and magnesium on the exchange complex by adding gypsum (calcium sulfate) or Epsom salts (magnesium sulfate) has not been shown to significantly benefit plant growth. Addition of gypsum or Epsom salts may be beneficial if calcium, magnesium or sulfur are deficient in the soil.