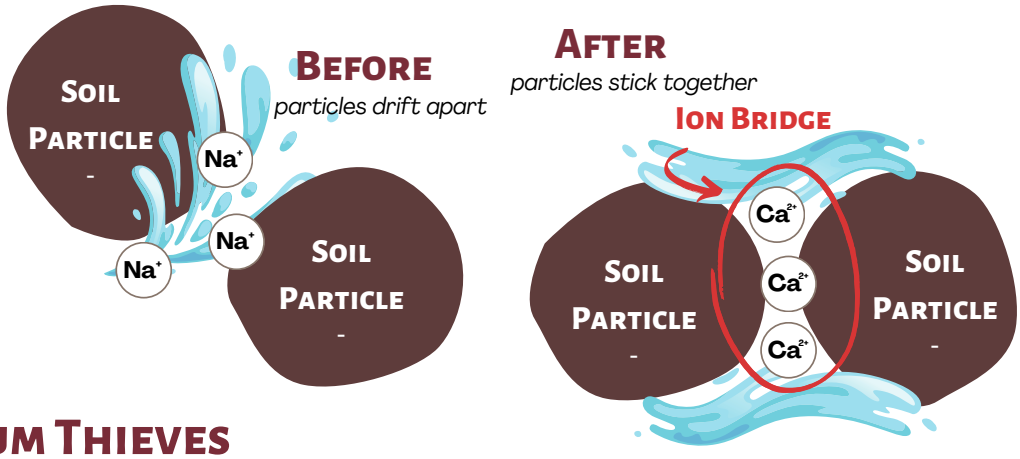
Calcine®

Salinity Problems

All waters and parent soil contain some salts. However, use of marginal irrigation water containing excessive levels of sodium (Na+), carbonate (CO3), and bicarbonate (HCO3 –) ions can pose problems for the turfgrass and crop manager. Overall, major soluble problems increase.

Calcium's Role in Soil Structure

Calcium plays a key role in soil structure. Calcium (and other polyvalent cations such as magnesium) is strongly attracted to negative sites on soil surfaces, where they form "ion bridges" that hold soil particles tightly together, restrict swelling, and prevent dispersion ("deflocculation").



Calcium Thieves

High carbonate (CO3=), and bicarbonate (HCO3–) levels in water decrease the availability of calcium and magnesium in the soil solution. Both carbonate and bicarbonate, with their negative charges, are strongly attracted to the positive charges of calcium and magnesium and form insoluble precipitates of calcium carbonate (CaCO3) and magnesium carbonate (MgCO3) when the soil solution concentrates during soil drying. High carbonate and bicarbonate levels in soil water prevent calcium from competing for soil exchange sites – allowing sodium ions to dominate.

Sodium Threat

Excess exchangeable sodium in the soil solution (Sodium Threat) has the potential to increase the sodium percentage on exchange sites of clay particles which can lead to sodic soil conditions. When the “Calcium Thieves” strip calcium from soil sites, the abundant sodium cations occupy the open soil sites and cause dispersion of soil particles. This dispersion results in the breakdown of soil aggregates and causes soil to become hard and compact when dry and become increasingly impervious to water penetration. Dispersed clay particles can block pores and inhibit water percolation. Excess exchangeable sodium in the soil solution is increased if calcium is precipitated by carbonate and bicarbonate ions present in the soil solution. Soil scientists now recognize that the prevention or reclamation of sodic soils must be initiated by the replacement of excess sodium by another cation (calcium) and then leached. Sodium can be replaced by adding calcium in the form of gypsum or lime and/or adding acidifying products (Calcine®) that will react with calcium carbonate salts.

For more information visit *www.calcine.us*