Sodium

- Salt-affected soils may inhibit seed germination, retard plant growth, and cause irrigation difficulties.
- Salt-affected soils may contain an excess of water-soluble salts (saline soils), exchangeable sodium (sodic soils) or both an excess of salts and exchangeable sodium (saline-sodic soils). Periodic soil testing and treatment, combined with proper management procedures, can improve the conditions in salt-affected soils that contribute to poor plant growth.
- Sodium is associated with alkalinity or high pH. Alkalinity is undesirable because it causes many of the necessary soil contained nutrient minerals to be unavailable for plant uptake and use.
- Sodium causes soil particles to breakdown. This physical breakdown of the soil structure prevents water penetration and proper aeration. The results are the plant roots do not get enough water or enough oxygen, and the accumulated salts do not get leached down and out of the root zone.
- At the same time, much of the applied water runs off because it cannot penetrate the soil. The addition of Solucal-S can solve these problems by providing soluble calcium to rebuild or maintain the soil structure for good water penetration and aeration, while removing the sodium and the associated alkalinity and excess salts.
- As soil water becomes saltier (increasing osmotic pressure), it is harder for the plant roots to absorb. Additional energy is required to "strain" the salt out of the water and keep it out of the plant. The extra required energy is not available for normal development, and results in slower overall growth and increased stress. When salt becomes excessive, growth stops and the plant suffers from physiological or osmotically induced water stress (drought), just as if not enough water were being applied.

Bicarbonate

Bicarbonate is one of the leading causes of poor Mid-Western and Western soils and poor quality irrigation water. Bicarbonates are an HCO3- ion that attracts calcium ions forming a Ca(HCO3) 2 molecule. Large amounts of bicarbonate ions in irrigation water will precipitate calcium. When the high bicarbonate irrigation water reaches the soil, the calcium can be removed from the soil particle. Sodium can then take the calcium's place at a rate of two sodium ions to each calcium ion. In this way a calcium-dominant soil can become a sodium-dominant soil by the use of high bicarbonate irrigation water.

- High levels of bicarbonates in irrigation water can lead to Sodium issues.
- Bicarbonates in the soil can tie up Calcium, making it unavailable to the soil, which can increase Sodium concentrations and typically stem from bicarbonates in the irrigation water.
- High bicarbonates on low CEC soils might be a lesser issue due to good drainage. Soils with high bicarbonates and low sodium may still tie up Calcium.

Solucal-S

As the Solucal-S solubilizes in the soil, it will increase the soil's aggregation. This happens when the soluble calcium reacts with the soil's particle surfaces, causing them to release unwanted salts such as sodium, while acting as a chemical adhesive to build soil structure. This produces several related benefits:

- Regular applications of Solucal-S will help to maintain an open soil profile to promote continuous leaching of excess sodium and bicarbonate.
- Calcium is preferred over Sodium on a soil particle's exchange site and will displace sodium if calcium is available in sufficient amounts in the soil. The Sodium then becomes soluble and eventually leaches from the root zone.
- Solucal-S will help to neutralize the effect of poor water. The high amount of soluble calcium helps to re-flocculate the soil and improve permeability, which allows water to enter easier and flush toxic constituents. The calcium also helps to clean up the exchange sites via its attraction to the negative charge and its overwhelming presence. The flushing of the soil momentarily slightly lowers the pH which also releases some of the tied up Calcium which helps to snowball the whole process for a time.