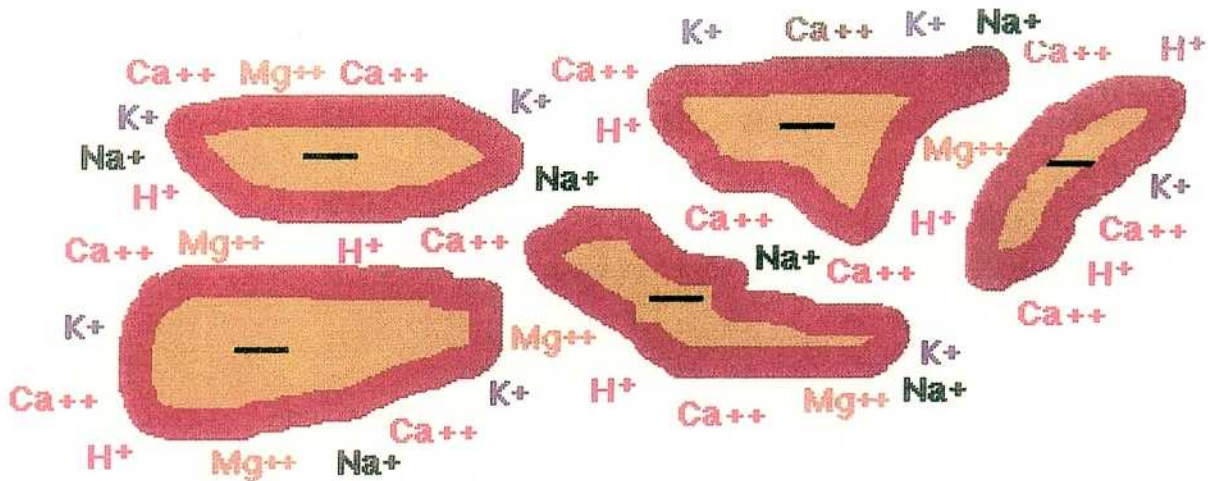


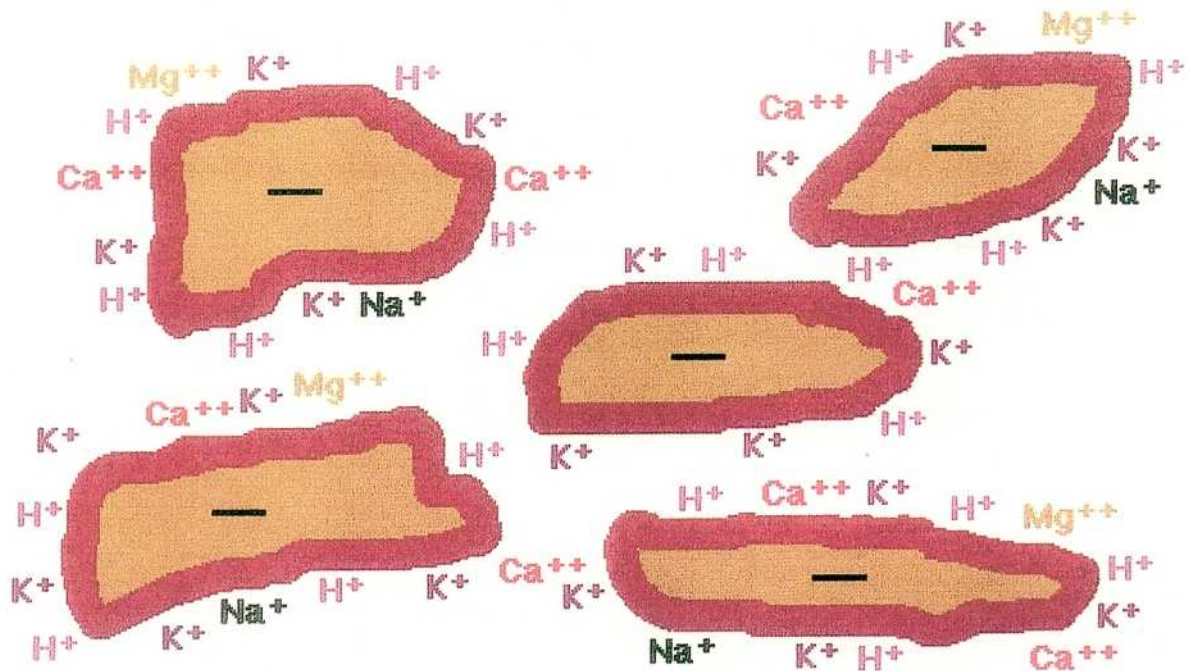
# BASE CATION SATURATION RATIO: OPTIMUM BALANCE



<b>CALCIUM</b>	<b>65 - 75 %</b>
<b>MAGNESIUM</b>	<b>10 - 15 %</b>
<b>POTASSIUM</b>	<b>3 - 5 %</b>
<b>SODIUM</b>	<b>0 - 5 %</b>
<b>HYDROGEN</b>	<b>0 - 10 %</b>

Well balanced soils have a Ca : Mg ratio near 6:1, which allows the clay present to be well flocculated, resulting in maximum pore space. This results in better drainage in clay soils, better water retention in sandy soils, and best aeration. Root growth, nutrient availability, and biological activity are all enhanced by the increased aeration and pore space. All the soil reactions work well; and given adequate amounts of major and micro nutrients the nitrogen, phosphorus, and sulfur cycles work to the plant's advantage. Availability of nutrients such as potassium is enhanced while excesses of minerals tend to be buffered. Soil pH will adjust towards a level appropriate to the soil and water of the locale. Roots expend minimal energy searching for major minerals, and plants can delegate efforts to healthy growth and fruiting.

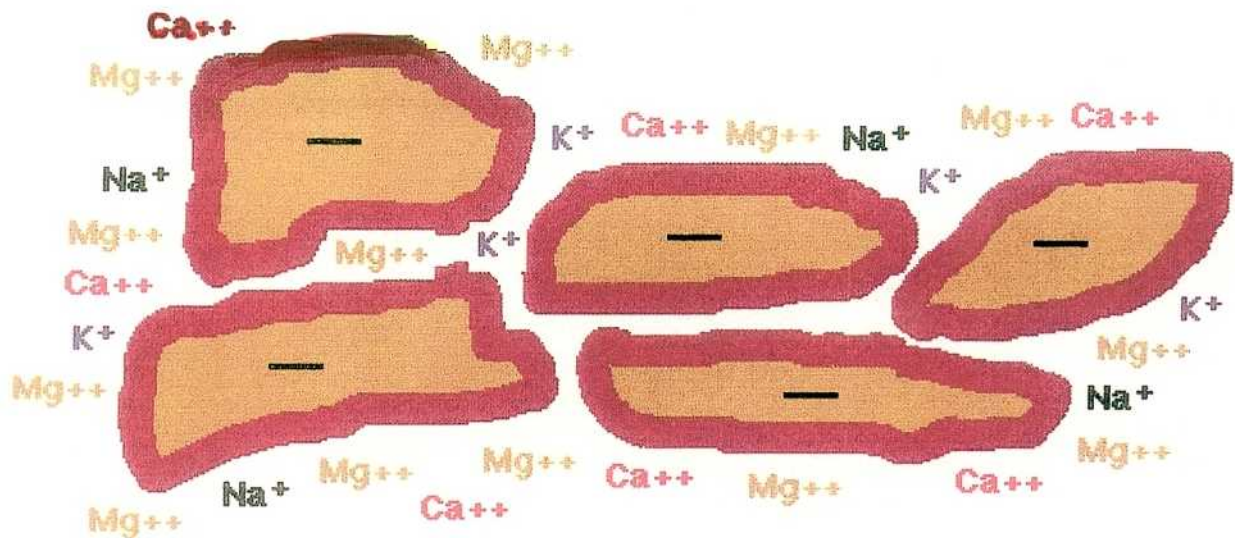
## HIGH POTASSIUM SOILS



<b>CALCIUM</b>	<b>50 - 60 %</b>
<b>MAGNESIUM</b>	<b>8 - 15 %</b>
<b>POTASSIUM</b>	<b>5 - 12 %</b>
<b>SODIUM</b>	<b>0 - 5 %</b>
<b>HYDROGEN</b>	<b>5 - 30 %</b>

These soils are often highly acidic, occurring in the higher rainfall areas of the region. The abundant potassium generally supplies fruit well with potash, although several years of crop removal can result in K deficiencies. Excess K encourages ripening and sugar formation, but can affect quality of fruit. The imbalance with Ca and Mg can result in trees and vines having to expend energy to find needed nutrients for best quality and disease resistance. These soils sometimes need dolomitic limestone to supply both calcium & magnesium, otherwise calcitic limestone is used.

## HIGH MAGNESIUM SOILS



<b>CALCIUM</b>	<b>45 - 55%</b>
<b>MAGNESIUM</b>	<b>45 - 55%</b>
<b>POTASSIUM</b>	<b>3 - 5%</b>
<b>SODIUM</b>	<b>0 - 5%</b>
<b>HYDROGEN</b>	<b>0 - 10 %</b>

These soils are often very heavy textured with poor drainage and blocky structure. They occur on bottom land and adjacent to outcrops of serpentine rock. The presence of free carbonates and pH levels near neutral or above often result in erroneous classification as 'limestone soils'. High Mg interferes with K uptake and root growth, also resulting in anaerobic conditions during wet periods - further interfering with biological activity and nutrient uptake. Large amounts of calcium and potash are required for best quality and production. Either limestone or gypsum is used to supply calcium; potash is usually applied in bands or localized near trees and vines for best efficiency.