FACT SHEET

CALCULATION OF C.E.C.

SOIL TEST EXAMPLE

K	Mg	Ca	pH	BpH
111	5	590	5.7	6.5
C.E.C.	%K	%Mg	%Ca	%H
9.7	2.9	4.3	30.6	62.2

TO DETERMINE C.E.C.

$$\frac{1bk}{780} + \frac{1bMg}{240} + \frac{1bCa}{400} + 12(7\text{-}BpH)$$

$$.2846 + .4166 + 2.95 = 3.651$$

$$3.651 + 12(7\text{-}6.5) = 3.651 + 6$$
$$C.E.C. = 9.651$$

TO DETERMINE % SATURATION OF CATIONS

$$\frac{1bk}{780} \div C.E.C. \times 100 = \%k$$

$$\frac{111}{390} \div 9.7 \times 100 = 2.9\%$$

We require a base saturation in excess of 80% for optimum plant growth, less than 40 will create difficulty in growing plants. Base saturation is related to soil pH and fertility.

BASE SATURATION OF THIS SOIL IS

3.651/9.651 = 37.8%

CATION EXCHANGE

Cation exchange takes place on the surface of the clay minerals in the soil. To

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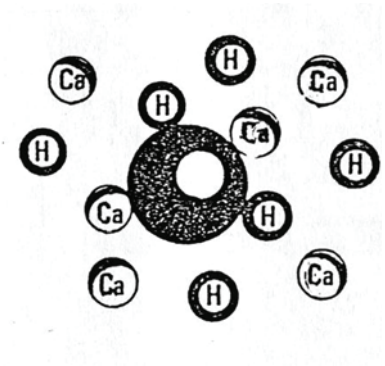
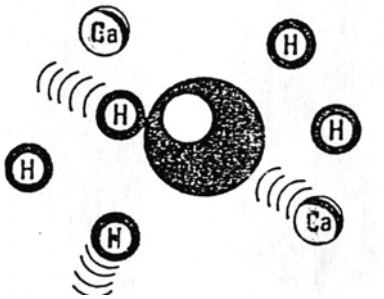
understand it, you have to start with the idea that the clay will attract a certain number of positive bonds. And that it always satisfies those bonds or holds on to 100% of the cations it attracts. Which cations are being held at any given moment, however, is a matter of conditions. Let's just look at the competition between hydrogen ions and calcium ions.

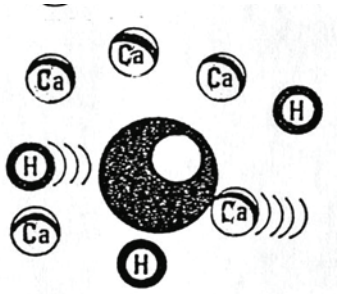
Start with an equal number of both calcium and hydrogen ions on the clay surface. Plus an equal number competing for a place on the surface.



As natural processes such as decomposition of organic matter, rain weathering, and so forth occur, more hydrogen ions are made available to the soil. The force of their greater numbers lets some of them change places with calcium ions. Cation Exchange has taken place.



Add calcium to the soil in the form of lime, and now the calcium ions have the upper hand. Their greater numbers let them force their way to clay mineral surface, forcing hydrogen ions of the clay mineral. Cation exchange has taken place again.



These exchanges occur over and over again as the soil conditions and the amounts and kinds of cations in the soil constantly change.