CALCIUM AND GIANT PUMPKINS

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Over the years, working with AGP growers, Calcium may be one of the least understood nutrients. There are many articles on Calcium and many opinions. I'm going to try and shed some new light on the subject and answer some questions. Calcium is the dominating cation (positively charged element) in soils with pH's > 7.

In acid soils, Calcium carbonate (lime) is added to reduce Hydrogen ion activity, increase % Base Saturation and increase soil pH.
In alkaline soils (pH>7), Calcium carbonate accumulates in the soil as soil pH increases. Look at your soil report; for every 1% lime, there is 40,000 pounds Calcium carbonate per acre foot of soil or 909 pounds of lime per 1000 square foot in your pumpkin patch.

LIME + SOIL = CONCRETE

You never add lime to soils with pH's > 7.0. In acid soils, when you add lime and thoroughly incorporate, it takes 7 years for it to completely dissolve.

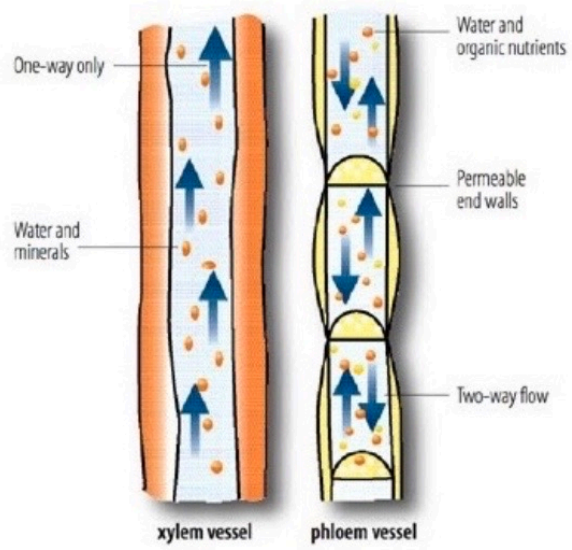
Most AGP growers that Western Laboratories tests have pH's > 7. It appears to bust the 2000 pound range, pH 7.2- 7.8 is the ideal ranges. Pumpkins like jumbo onions like alkaline soils. If you want to raise cocktail onions, grow them on acid soils. The same may be true for Giant Pumpkins.

Many article state that pH 6.5 is the best pH. pH 6.5 is when nutrients are most available. It doesn't mean that all crops do best at pH 6.5. Azaleas , Rhododendron, Blueberries and Cranberries all do best in acid soils. You read that potatoes do best in soils with pH's 5.5-6.5 and yet the vast

majority of potatoes for bakers and french fries are grown in the alkaline Western United States.

LETS TALK GIANT PUMPKINS

There are two veins like structures in plants. Xylem and Phloem. Xylem is dead tissue that conducts water and nutrients up within the plant. Phloem is living tissue that translocated water, nutrients, sugars and other carbon containing compounds throughout the plant.



The problem is that Calcium moves in the Xylem but only 4 to 6 inches in the Phloem. This means the Calcium in the leaves will move towards the petiole, but not into the pumpkin. To get Calcium into the pumpkin, only soil applied Calcium can meet the pumpkins demand. What's interesting is Xylem is directly connected from the roots into the stem of the pumpkin. If your pumpkin is prone to blossom end rot, some answers could be the following.

Nutrients are transported across the root membranes by two mechanisms:

Passive Transport

Active Transport

Passive Transport is where nutrients enter the roots requiring no sponsor or energy from the plant. Nitrates, Sulfates, Potassium and simple chelated micronutrients are examples of nutrients entering roots so long as the plant is transpiring. Active Transport enter roots through Protein barriers that are ion (nutrient) specific. Calcium along with many other nutrients have specific Protein Barriers that will only sponsor them into the plant roots. These barriers require energy provided by ATP-Adenosine

triphosphate. Remember each barrier is ion specific. Calcium (Ca) will only transport across the plasma membrane thru it's Ca Protein barrier. The uptake of Calcium (Ca) only occurs where there are hair foots in the top foot of most soils and only in the presence of oxygen.

PLANTS BREATH OXYGEN THRU THE ROOTS

Pumpkin growers tend to over-irrigate. 70% of production is water management. You must learn how to irrigate using Et- evapotranspiration. From the 3rd week of June until the 5th of August your average water loss is approx. 0.25 inches per day or 1.75 inches water loss per week. By irrigating too heavy and/or too often, the roots can't metabolize suffering from water induced deficiencies. This also sets up for harmful pathogenic organisms that are waiting for an opportunity to attack the roots, causing stem rot, fusarium wilt, verticillium wilt and other problems. Know thy water.

If your soils are sandy, loamy sand or sandy loam and your soil report Calcium is below 1800 ppm, add 10 pounds gypsum/1000 square foot (Calcium Sulfate). If your soils are loam, silt loam, silty clay loam or clay loam and the Calcium is greater than 1800 ppm AND there is no free lime, add 5 pounds of Gypsum/1000 square foot. $CaSO_4$ is slow release and will completely dissolve (if incorporated) within the growing season.
If there is free lime, your soil report will have recommendations for Elemental Sulfur in pounds per thousand square feet.

When transplanting, add 1 teaspoon Gypsum in the hole and thoroughly mix with the soil . This is also a good time to add a teaspoon of 11-52, mix thoroughly (don't worry about adding Calcium with Phosphorus at this time). Water before transplanting.

When burying vines , add 1 teaspoon of Gypsum, 1t. 11-52 and 1t. Epsom Salts with your secret ingredients. Thoroughly mix with soil to avoid direct contact with the new roots.

Foliar applied Calcium will meet deficiencies in the plant leaves. Calcium chloride or Calcium nitrate are good foliar spray compounds.

HOPE THIS HELPS