



ULTRA GRO

Calcium is crucial to so many functions at the cellular level in agronomy. We depend on its availability and absorption for root growth, cellular strength, cellular division, stress and fruit development just to name a few. Many farmers are continually manipulating their farms to keep Calcium at optimal levels. “My soil shows decent Calcium levels, but my tissues seem to be deficient.” As Crop advisors we hear this often and have to take a look at a field's history to deduce the cause of the issue. Technological advances in testing and farming practices have given us more tools to take a closer look at how to best apply and use calcium.

Of course, being the good farmers that you are, you have taken soil tests and set a baseline for your PPM of Calcium and its base saturation. I have dealt with soil with ppm from 600 to 5600. Knowing that soil weighs 2,000,000 pounds per acre for every 6” of depth, those differences range from 4800 pounds to 44,800 total pounds of Calcium from the surface to 2 feet deep! We’ve seen great crops grown on both of those soil parameters. So what next?

As a general rule of thumb we like to see Calcium in the 60-70 percent base saturation range. If we are lucky, our Magnesium levels are below 20% and above 12%. Even better, when we see our Potassium levels at 2 times our Sodium levels our crop advisors will tell us to stick our trees in the ground and water them. But what happens when those levels aren’t ideal? And why does my neighbor seem to have great crops and his Calcium is at 80% base saturation and his Potassium is less than his Sodium? Is there more to the story? The answer from a Crop Advisor is, “Of course there is.”

In creating nutrient plans for our growers, we are only as good as the tools we have at our disposal. One of the new tests we should be able to ask for from our laboratories is a water test in addition to the acetate extraction. In the past we have taken the number on the base saturation acetate extraction as a bit of an absolute; that is, the test number is the total cation concentration of that soil. A scientist friend of mine was even more baffled when he ran a soil acid extraction test on the same soil sample 12 times, only to find a slight reduction in the base saturation numbers! That tells me the number is more dependent on what has been weathered and become available at that time. There are so many micro layers to soils, especially high clay soils, that tie up nutrients or have them buried in their layers. By asking for a soil test run with a water rinse, mimicking a fertigation event, we can see what is truly available, and what is tied up. And if you really want to get a handle on your specific situation, grab a water sample off your pump at the time of the soil sample and have them use that water for the water extraction test. I would imagine you’ll be shocked on what your trees actually have at their disposal for uptake in the soil solution.

You now ask yourself what do I do with that information? What products are at my disposal and which will make the biggest impact. In the Midwest, lime is the soil amendment of choice. Limestone is typically mined and heated to form quicklime or slaked lime: Calcium oxide or Calcium hydroxide. They're both highly caustic and will raise a low pH soil, so in acidic soils that works. Here in the west, our pH levels are typically 6.5 -8.5. Growers are very cautious to use lime. However, in smaller amounts 200-400 pounds (not tons!) at 40% Calcium we can make fairly quick adjustments to the calcium in the feeder roots. Add smaller amounts more often. Gypsum is typically applied in tons and at 23% calcium, it needs to be applied heavier than lime to make an impact. It also has sulfate so the sulfur will help keep the soil pH the same as before it was applied. But at 0.26% soluble you aren't getting much soluble Calcium for the crop. It does tend to condition soil and will help flocculate it to aid in water penetration. Calcium carbonate is becoming more popular but remember, that is that limestone so it needs to be very fine and still weathered to become available. Dolomite lime will help if you also need magnesium (12%) in your soil. Calcium Thiosulfate is a nice addition as it is 6% Calcium and 10% sulfur (both sulfate and elemental sulfur) by weight and 100% soluble. It works well through micro irrigation. Quick fixes to tissues can be made with Calcium and Nitrogen based products but be careful to not overdo it. Rank vegetative growth will bring a whole new set of problems and you may waste any extra nitrogen that is not absorbed.

It's important to note that Calcium, unlike NPK tends to rise in the tissues throughout the season. Plants have a constant demand for Calcium as cellular building blocks. But remember, Calcium is a key ingredient to concrete. Add some water, phosphate, sand, clay and viola, you have bricks in your field. Be sure to add what you need throughout the season and incorporate it into the soil mechanically or with irrigation water. Space it out in conjunction with your phosphate applications and run shorter irrigation sets when fertigating. You'll see those tissue numbers come as well as your yields, and your trees will thank you for it.

Rich Kreps, CCA, Ultra Gro