



The Growing Edge

Improving Agriculture Through Science & Nature
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for HUMA GRO Clients

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Understanding Plants and Soils

When asked a question on remediation of salty soils, Lyndon Smith, the president of BioHumaNetics, Inc., wrote this reply. With his permission, I am using it in this issue because this will help those of you who had salt issues to better understand how to manage this problem. He mentions the products that we use and why they work.

Please save this issue, because I will be referring to this article again in December.

Salt Management

As always you ask the more difficult questions. Because this salt buffering is happening on the microscopic level, we truthfully do not know what is exactly happening. Despite this lack of information, we can see the results and can make some educated assumptions as to why.

The salt remediation process begins with BLEND added to the soil with the following reactions:

First, BLEND's unique ingredients will activate certain beneficial bacteria which will sequester or consume the sodium into their bodies through metabolic processes. Once in these living organisms, the sodium will no longer be toxic to nor available for uptake by the plants.

Second, BLEND stimulates the beneficial bacteria that live in and around the root rhizosphere. When these populations are active and vigorous, they will not allow the sodium to damage the root hairs as they grow. They act as a buffer against toxicity

Third, BLEND carries 19% organic acids which is principally made up of the aromatic acid group (phenolic compounds). These small organic compounds have a tremendous complexing (as opposed to chelating) capability. These short chain organic molecules will act as a transporter or carrier for nutrients to the biology and to the roots. Because they are of such a low molecular weight, they move freely in and through the entire soil solution, taking and releasing various ions in the process. The following two theories exist (I personally believe that both may be at work here):

pounds break the sodium free from its current combinations (with Ca, Mg, Clay, and heavy metals) and complex it to the organic acid molecule. It thus becomes an organic compound which will not be toxic to the plant.

In recent nutrient uptake research, we have come to think that perhaps the other nutrients in the soil (Ca, Mg, Si, etc...) are being broken free from their sodium compounds and carried into the plant for nutrient uptake. This leaves the sodium alone to be carried away from the root zone by the water and even leached deeper into the ground. The sodium thus never gets a chance to be assimilated into the plant because it has no carrier.

This salt remediation process is aided dramatically with the addition of KLEENSTART which does the following two things:

First, KLEENSTART, has many of the same compounds as its base as does BLEND. This includes the organic acids and the metabolites extracted from bacteria and algae. These components improve the BLEND reaction for all the same reasons we explained above.

Second, KLEENSTART has several surfactant type materials as added ingredients. These aid in the breaking down of sodium compounds and once freed up, work to move or carry the sodium away from the root zone.

APPLICATION & TIMING:

The very best program we have found for overcoming salt, or better said, sodium toxicity, is to apply BLEND at the 1-2 quarts per acre rate with an equal amount of KLEENSTART. For greatest results, these applications should start as early in the season as possible, focusing treatment to be in the planting bed at least 15 days prior to planting. To see even more optimum long term results, repeat this application process every 15 to 20 days during the growing cycle.

RESULTS:

The results of what we see with this type of soil treatment is that, in a very high sodium soil environment, the plant will not take up toxic levels of sodium into its roots and

For many years we have thought that these aromatic com-

Continued on Page 2



Harvesting

Rudy's Corner



Looking at the challenges farming has faced this year, I think all of us could ask the same question: "What happened and what can we do to not let it happen again?" Everybody likes to point a finger at Mother Nature blaming everything on the weather. Let me give you a bit of advice: blaming the weather, which is something totally out of our control, is about as pointless as going elephant hunting with a BB gun. The weather is what it is and you cannot change it. But understanding what happens when a plant is under weather stress, can give you knowledge to deal with it.

Under wet, cold conditions the hormones that are needed for root growth are not produced by the plant. The plant needs an ambient temperature of 70° to 80° to produce the auxin needed for the roots. This is not the weather that we had this spring. Too much rain and temperatures in the 50s and 60s did nothing to promote root growth.

Even when the roots started to grow, plant nutrients, both applied and in reserve in the soil, could not be solubilized and plant available. The key to this solubilizing process is organic acids. These compounds are produced to some degree by the plant but mostly by bacteria that become associated onto the root system. Again, environmental issues can prevent the bacteria in the soil from associating with the roots.

By the time the soil temperatures were optimum for bacterial activity, approximately one third of our growing season was gone.

There are some growers who consistently use products high in organic acids and bacterial inoculants when they plant. This year will be the payoff year; although crop yields may not be as high as last year, it will be a good year.

Salt Management *Continued from page 1*

that the root rhizosphere remain healthy. When tissue samples are taken, the Na levels are significantly diminished. In untreated controls, the root systems are weak (small), the tissues show high Na and the leaves turn yellow.

ADDITIONAL CONSIDERATIONS:

It is good to remember that sodium will affect the plant all season long, but it is usually only deadly in its first growth stage. Therefore, in addition to BLEND and KLEENSTART, applications of VITOL and/or BREAKOUT can help a young plant "grow through" a salt toxicity.

Apparently a plant has trouble distinguishing between sodium and potassium. Applying higher amounts of

Super K through the soil or foliage during the entire growing season will also assist in improved plant health.

Cultivation practices such as physically moving the salt with the irrigation to hills made on top of the rows or excess watering to push the salt away from the roots can also make a difference.

These are the best ideas we know of at this time. Our products can truly make a significant change in the soil environment and, over time, diminish salt challenges. If the salt is coming in with the irrigation water, they should consider some pretreatment with BIO ENERGIZER/LASE to make the water better.



Harvesting

Potato Production

It seems that the main cost concern in grower's minds this year was the high price of fertilizers. Everything from nitrogen, phosphorous, and potassium to the micro-nutrients have gone up more than substantially. We all know that these nutrients are critical to crop development but we are still only getting about 30% of nutrient utilization. Lets look at what can be done to increase this utilization percentage.

Solubilizing Nutrients: Just because you put fertilizer in the soil does not mean the roots can use it. Without being solubilized into a form that the root can absorb at the rhizosphere, the value of your investment is zero. Organic acids are critical in this process. The problem is the best way to create these organic acids is to either apply them with the fertilizer or use a bacterial inoculant that will produce them after they associate onto the plant's roots. This is where BioHumaNetics has an advantage in their formulations that will definitely assist your crop. Blend, used both preplant and at planting, contains 19% organic acids which will help in not only solubilizing nutrients but also stimulate the growth of the bacteria to aid in root development. Even SuperPhos, as highly concentrated as it is, has 6% organic acids in the formulation. Using SuperPhos, 0-50-0, as a replacement for 10-34-0 or to supplement the 10-34-0 will enable your plants to get phosphorus early in seedling development.

Foliar Applications: during the growing season, potato crops normally run low on nitrogen, phosphorus, and calcium. Solution 32 or 28 is often used for nitrogen, 10-34-0 is the phosphorus choice and CN9 or CN18 is the calcium selection. I can assure you none of these products have any organic acids in them. If they did, repeated applications would probably not be needed.

I would suggest looking at HumaGro's product X-Tend as a way to get the most for your fertilizer dollar. X-Tend has 29% organic acids in its formulation making anything you add it to much more available. Also, for those of you who fertigate, the complexing action of X-Tend will keep your fertilizer in the root zone longer by reduction of leaching.

HumaGro Calcium (7-0-0-10%Ca) is a much more effective way of getting calcium into the tuber. It can be applied by itself or with other HumaGro products in-

cluding those containing phosphorus. The combination of product acidity and the complexing effect of the organic acids make this possible. However, I would not suggest putting CN9 and 10-34-0 together unless you want a real mess.

Although some of these products can replace standard fertilizers, their main use is to make the standards work better. It is important to look at them as a way to increase nutrient utilization and, in turn, crop yield and quality.

Results: The following pictures are of yellow potatoes grown in a high organic matter soil. The BHN program of a good "pop up" (1-19-0) and foliar program is so much better than not using it. The end result shows what these products can do for you.



Full BHN program.



Grower standard



Harvesting

Vegetable Production

This year I had the opportunity to work on beet seed to increase both branching and seed size range. To have a valuable crop, beet seed must be small, medium, and large, but not too large. This is quite a challenge however, if you can increase the amount of lateral branching, you will get a more diverse seed sizing.

The trick is to get more stems to emerge from the beet top from the very beginning. To do this, we use a combination of HumaGro products that are designed to promote stem development and emergence. Also, this is in combination with a PGPR (plant growth promoting rhizobacteria) inoculant that will associate on the roots to aid in nutrient uptake and root growth. At this time, we have not harvested any of the plots but I will have information before next planting season.

The same type of program was used on the pea seed pictured here.

This is the second time we have grown pea seed and it looks as good as the first, if not better. Again we see very good pod set but, more importantly, there are 8 to 10 full seeds per pod. The final yield results will be in the December newsletter but it looks like they will be pretty good.



Seed peas have full pods of 8 to 10 seeds each.

Small Fruits

This year has been quite an adventure in the berry business. The value of blueberries went down some and raspberries went up a bunch. Those who look at the markets feel as though next year will also be good for raspberries. So before you put away the band sprayer or shut down the drip system, you might want to consider one last application.

Lase, a HumaGro product, is an excellent way to set up your root system for next year. An application of two quarts per acre, either banded or drip, will start the process of cleansing the root zone of toxins that have built up over the growing season. Along

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with the cleansing effect, beneficial soil bacteria and fungi will be stimulated to associate on the root system. This will help protect them from pathogens that may try to infect during the dormant season. The process is called competitive exclusion. Basically, you increase the population of "good guys" to the point where the "bad guys" can't get to the roots.

Follow up with a Blend application in early spring and you will be off to a great start. I will remind you about the blend again the next issue.



Harvesting