

# NEWS FROM VERDE-CAL®

First Quarter  
2014

Products of **AQUA-AID, INC.**



## Miller's Miscellaneous

It is the first week of the new year – 2014. This new year is still a mystery to us all but I suspect it will prove to be busy and prosperous before we all know it... and soon we will be wondering, “where did it go?”. As seems to be the case with 2013.

In this issue I bring to you some ideas to help better understand why soil tests change and sometimes why the results do not change. I had some great questions posed to me at the

last education seminar I did on soils. Here are some of the answers to those questions on, “Why didn't my pH Change?” as well as other areas on the soil tests.

True Trivia returns this time with an interesting new element!

Another new article I wish to bring to everyone is our “blogs we like” section. Really interesting and well designed customer blogs that are interesting and fun to check out.

And lastly... Bicarbonate explained!

Recently I sat and explained to a group of superintendents how bicarbonate and calcium affect soil structure. A comment was made back to me. “You explained it so well and made it so easy to understand”! So here it is in print so you can better understand it as well.

Happy New Year to you all and I hope you enjoy the newsletter.

### Special Interest Articles:

- Miller's Miscellaneous.
- Blogs to Follow
- True Trivia
- Why Soil Test Change
- Bicarbonates

## Blogs That We Really Like:

When you have the chance, take a look at Paul Carter's Blog from Bear Trace at Harrison Bay in Tennessee. He and the club have done a superb job with this blog site and I watch the Eagle Cam quite often. Paul has been superintendent at Bear Trace since 2001. You may remember Paul receiving the Turf Net Superintendent of the Year award in 2011. Paul and staff have seen it all at Bear Trace, and have implemented many new changes which include a strong movement towards “being greener” in all facets of the facility, than in years past. Paul states that the staff will spend about 50% of their time maintaining turf

and the other 50% protecting and preserving the environment. He began the Blog in December of 2010. To date they have had close to 60,000 page views by people all over the world. I urge you to give it a look and perhaps it may bring some ideas for your Blog at your own facility.

Thanks again Paul for doing such a great job!

[www.bthbgcm.blogspot.com](http://www.bthbgcm.blogspot.com)

[www.hbspeaglecam.blogspot.com](http://www.hbspeaglecam.blogspot.com)

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**“How wonderful it is that nobody need wait a single moment before starting to improve the world.”**

Anne Frank

**“Too often we enjoy the comfort of opinion without the discomfort of thought.”**

John F. Kennedy

## True Trivia:

This somewhat “newer” chemical element has the following characteristics:  
Can you figure out what element it is?

- Unknown boiling point
- Man made
- Atomic weight of 262
- Absolutely no practical use outside of science in the laboratory
- Most likely no one has ever heard of this element!  
However, it has been on the periodic chart for decades in plain sight.
- Currently a dispute between Russia and the US over the true creation and use of this element
- It is radioactive as well!

## What element is this?

## Why Didn't my Soil Test Change?

At a recent education seminar I was giving a talk to a group of Golf Course Superintendents and LCO's on soil testing and creating change in the soil through the use of various products, including VERDE-CAL products. During the question part of the seminar I was asked, “what is the best way to determine change in a soil test and how to evaluate whether a product worked or not”? A great question and here is a proper answer! When I am asked to help with tough soil or water issues, and tests are taken before, during and after use of any product, it is very important to rule out as many outside influences as possible. Think of how a lab would test and evaluate a chemical or something similar. They try to put the test in as controlled an environment as possible to rule out as many outside influences as possible so the results are not skewed. They also create smaller replicated plots, along with a control. By doing

this, the product being tested can be fairly judged and graded. It is no different with soil testing a green or fairway or yard! You must break down the area into smaller plots and utilize a control plot if possible. The problem is that we are taught and told to take “random” samples of the given area. Then we apply a product, wait a given amount of time and come back and take another random sample from the test area. Problem with this is that the test area can be a couple hundred square feet, or it can be several acres in size. Because of the size, it is impossible to know that your second sample contains the same “general area” and soil types as with the sample you started with. If you are not dealing with the same exact plot as the one you first tested, then your tests cannot be expected to give accurate results, or more importantly, results you can rely on.

Example: In my attempt to answer this question, I showed a before and after soil test. The first test showed the following feedback:

This was taken from a fairway with clay/loam type soil.

pH -	5.5	
CEC -	2.1	
Calcium Base Saturation -	51%	L
Magnesium Base Sat -	10%	L
Potash Base Saturation -	4%	OK
Sodium Base Saturation -	2%	H
Hydrogen Base Sat -	33%	H

**The calcium deficit on this fairway test was 240 lbs. of calcium low per acre, based on the 2.1 CEC. Subsequently, the recommendation was to apply 500 lbs. of VERDE-CAL per acre. Or, one ton of lime per acre. Wait a month and retest.**

## Why no Change cont.:

The follow up soil test (one month later) looked like this:

pH -	5.4	
CEC -	4.2	
Calcium Base Saturation -	59%	L
Magnesium Base Sat -	11%	L
Potash Base Saturation -	4%	OK
Sodium Base Saturation -	2%	H
Hydrogen Base Saturation -	24%	H

I was told that there was no change and in fact the test was worse than the prior test. The customer looked only at pH, and did not take into effect any other factors in this "after" soil test. BUT... is there a change? For better, or worse? It depends on how you evaluate the test. Read on...

Here are some facts about the follow up test: first of all, the CEC has increased substantially from a 2.1 to a 4.2. So the soil types and area tested are not the same. The calcium deficit on this test is close to 280# per acre. This is due to the higher CEC. The overall pH came down one tenth of a point while the calcium base saturation went up 8% (when compared to the first test). The pH is still going to be low because the CEC is higher and therefore more nutrient is needed to do the same job as the test done before.

### Does this make sense?

You can justify that there was change, in fact, it is much more difficult to increase numbers with a higher CEC than a low CEC. Look at it like a drinking glass... In the illustration here, the glass on the left represents a lower CEC soil. It will have less holding capacity vs. that of a higher CEC soil, the glass on the right. When the same amount of water is added to the higher CEC glass... it is only 1/3 full. Therefore more product will be needed to make any substantial changes. More applications, time, and budget dollars will be needed to make acceptable changes to the higher CEC soil.

Instead, what would have been more accurate and helpful would have been to rule out some of the outside influences in this testing process. Such as, rather than random test the same acreage, a small area perhaps the size of a small table would be more accurate and practical. Pick an area about 5' x 5' in area. Random test that smaller area. Mark the area well so you know you are sampling the same exact location next time. This may still not be totally perfect, but your chances for very similar soil types are far better vs. another random pattern over a very larger area. Make sure the product is spread at the correct rates over the test area. Place some plywood over an area directly adjacent so you have a control plot with known soil texture. Now you can begin to very accurately soil test and represent actual changes and further evaluate if a product is working or not.

Sure this takes a little prior planning and additional testing. If you really care about the outcome, it will be well worth it.

To compare the test numbers at the start of this article would be unfair for any product that



The glass on the left represents the 2.1 CEC test and a smaller tank to fill up. The glass on the right represents the 4.2 CEC test and a much larger tank to fill.

was used. The soil plots simply were not the same and the numbers cannot be expected to reflect true results from any application.

Think of it just like a scientist would do in a lab setting. Try to rule out as many outside influences as possible to get the most accurate results.

*"Be courteous to all, but intimate with few, and let those few be well tried before you give them confidence."*

*Theodore Roosevelt*

*"It doesn't take a majority to make a rebellion; it takes only a few determined leaders and a sound cause."*

*H. L. Mencken*

**Bicarbonate and the fate of Calcium and other cations in the soil!**

“One life is all we have and we live it as we believe in living it. But to sacrifice what you are and to live without belief, that is a fate more terrible than dying.”

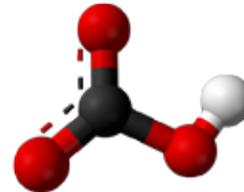
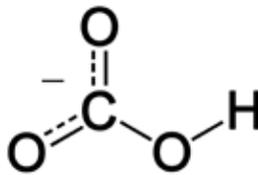
Mahatma Gandhi

Being one's that speak about soil issues, water issues, and nutrient needs, we get a lot of questions regarding the fate of nutrients and how water containing bicarbonate and other problems can affect soil structure. We have great information available from past newsletters on our web site: <http://www.verde-cal.com/west/news.html>. Take a look at these past issues for further help. Also in the margins of this article there are great links.

Many times superintendents experiencing problematic water will focus their attention towards eradicating sodium. Many times it is thought that sodium is causing all the problems. Sodium will cause problems in the soil when it is allowed to build up to levels higher than 2% of Base Saturation on the soil test and levels higher than 18 ppm on a paste test. Excessive sodium levels cause: compaction, poor water/oxygen balance, poor

nutrient availability, chlorosis, wear patterns and the list goes on from there. But how does that sodium end up in your soil profile? Where did it come from? Why did it occur especially when you may be applying products to counteract it?

Take a moment and look at your soil tests over the past few years. With Bicarbonate levels in the irrigation water, you may tend to see an increase of calcium levels. This is very common and usually seen when a property is forced to move from good water to water containing bicarbonate. If you have this situation and your calcium levels have increased slowly over time and sodium is an issue as well, but other essential nutrients like Magnesium and potassium have dropped to low levels... then here is some science that can help you better understand what is happening.

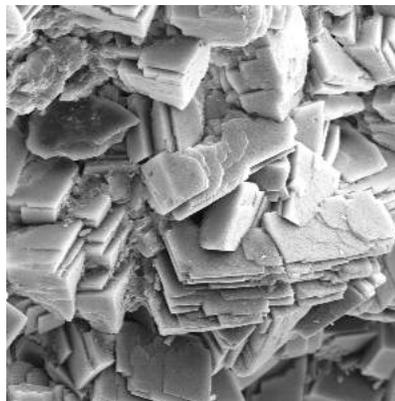
**What is bicarbonate?**

**Bicarbonate is represented as:  $\text{HCO}_3^-$**

**“If you do what you've always done, you'll get what you've always gotten.”**

**Anthony Robbins**

I always think of a bi-carbonate as a triangle. In shape it can be triangular or angular, and knowing this, is the beginning of better understanding the fate of bicarbonate in your soil structure. Bicarbonate has a strong affinity to nutrients, and especially available calcium. In your soil, calcium is the most abundant cation, all-be-it mostly insoluble. However, when that calcium does become soluble, in small amounts it will do a few things in the soil. First, it can be taken up by the plant. Second, it could interact with the soil colloids. Third, it could leach. Fourth, it can bond with bicarbonate now causing calcium carbonate crystals. Or think of it as many angular calcium salt crystals as mentioned above. And here is what that can look like under a microscope.



What is very important here is to understand that this structure is crystalline in form and angular! Where does this normally happen on your green, tee, fairway or home lawn? Right near the top of the surface! The end result of this “stacking”, or “inter-locking” of calcium carbonate is sodium increasing and a “sealing off” of the top surface is experienced. This bonding with calcium is due to the bicarbonate being negative and the calcium being positively charged. Once  $\text{CaCO}_3$  is formed (calcium carbonate), pH will gradually increase as will sodium. This will be at the expense of magnesium and potassium and hydrogen. All nutrients become very unavailable and turf will begin to look off color and growth and recovery will slow.

## Bicarbonates cont.:

Here is another great way to better understand this. We all eat lunch and dinner! Next time you are sitting at the table take the salt shaker out and pour a small pile of it on a plate or on the table. Because of the crystalline, or angular characteristics of the salt... in this case sodium chloride salt, you can balance the salt shaker on the pile of crystals, even if the salt shaker has corners on the base. Try to do this with the sugar, and you cannot do it. Why? Because the sugar crystal structure is not nearly as angular as the salt.

Imagine now if this were occurring on your golf green or fairway? That stacking can cause a lot of problems.

### So how do you cure this problem?

First of all, you must remember that this problem occurred over a period of time, and it may take a good program approach to cure it.

To begin to fix this calcium salt

layer, you must utilize a strong acid product. Why an acid? Because you have to dissolve, or put into solution what has become insoluble. You do this with an acid based product.



Our AcidipHy is a great choice for this. A good tank mix idea is to use:

AcidipHy  
+ OARS  
+ a good

chelated calcium product. We recommend Redi-Cal, but really any good high % calcium product could work nearly as well. AcidipHy works well because it is labeled according to your bicarbonate ppm's. The higher the ppm's of bicarbonate, the higher the rate of AcidipHy. It also contains three acids plus manganese. Many other like products only contain one type of acid. Tank mix this combination and spray the area with at least 2.5 gallons of water or more per 1000 sq ft. After the application, water in well enough to remove all products from the leaf tissue and better yet, move into the thatch or lower. Later that night, flush well with plenty of irrigation.

The next day you should see an improvement visually. This tells you that the calcium has been flushed, and the sodium has been lowered and nutrients have been released and can be utilized by the plant.

Now you need to follow this application with an application of our VERDE-CAL G or VERDE-CAL K Plus depending on your specific soil needs. For high sodium, VERDE-CAL G will be needed to bring the sodium down and regain balance. If you are more concerned with nutrients being removed from the tank mix flush, we suggest K Plus to be applied immediately after to re-plenish important nutrients. A program approach is best for the tank spray and the follow up VERDE-CAL product. By doing this simple program, you can accomplish so much with two simple steps. Interval of these applications depends on how bad the situation is. Also, rainfall will help as well to dilute the bicarbonate salts. You can contact us any time for more information of this program as well as the products mentioned. When we compared this program to other similar programs we found that there was a cost savings, and other product applications were reduced or eliminated. To date we have had no complaints with this program and we think it will help you too.

For more information about AcidipHy, visit <http://www.aquaaid.com/pdfs/Literature/ACIDlit.pdf>.

For more information about Redi-Cal, visit <http://www.aquaaid.com/pdfs/Literature/REDlit.pdf>.

For more information about OARS, visit <http://www.aquaaid.com/pdfs/Literature/OARSleach.pdf>.

# FEED THE SOIL AND THE SOIL WILL FEED THE PLANT.

If you need more literature, please request some to be mailed to you by contacting the following:

maryanne@aquaaid.com  
scott@aquaaid.com

Specify how much you need and where to mail it to.

## True Trivia - Answer:

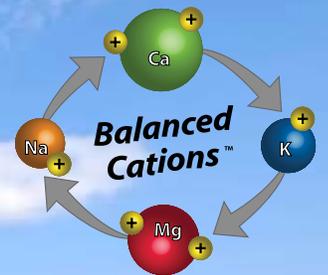
Answer: Lawrencium (Lr). Lr is radioactive and artificially produced and is considered to be a young (since its discovery) element when compared to all the others on the periodic chart. Lr was created by four American scientists in 1961. In 1967 at a Russian Lab, Russian scientists claim to have "re-created" Lr into what they call Ruthofordium. But today it is only referred to as Lawrencium.

See us at the



golf industry show

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