



## Miller's Miscellaneous

In this quarter's newsletter I am including some interesting information on rainfall. This year, much of the US has been wet. Many locations around the country have experienced annual rainfall amounts well before the years end.

With all the excessive rainfall came the feeling that many agronomic applications were not needed. The comments of the rain was "adding" what the soil needs, or the rain was

"cleaning" the soil was heard quite often. So I posed the question: "What exactly do you think is in that rain"? And as you may expect, no-one really knew. This set off a series of travels and questions about regional rainfall that has led to this article. Check it out and see if "You Know What Is In Rain".

In the fall we get a lot of questions about the differences between VERDE-CAL and like products. I have included a

letter of explanation from our Western Rep, Bo Phillips on the reason why thCa works better. Included here is a link to a narrated video that explains even more about thCa and other "like products".

Enjoy the newsletter and please pass it along to your customers.

See you all at a trade show soon!

## Carboxylic Acids... What are they and what's the difference?

Carboxylic acids are a form of an organic acid. All carboxylics contain one Carbon atom, one Oxygen atom, and one hydroxyl group. The combination of the atoms looks like this (COOH) . Any grouping of molecules that contain these (COOH groupings) is considered a carboxylic acid. There are many, many types of carboxylic acids, some common examples are: Citric Acid (beverages), Acetic Acid (vinegar), Humic Acid, Fulvic Acid, Salicylic Acid (acne treatments), Malic Acid (sour tasting food ingredient), Lignin Sulfinate (wood pulp by-product), Oxalic Acid (Oxy Clean and other cleaners), Formic Acid (ant bites), some carboxylic acids are mixed with alcohols to produce flower smells and fragrances for perfume and colognes.

Many carboxylic acids are produced industrially on a large scale for use in the production of polymers (plastics), pharmaceuticals, solvents, and food additives. Chances are you have ingested some in the past 48 hours and have touched at least three more within that same time frame, they are all around us.

The carboxylic acids that are important to us here today are the ones used as chelators (for better nutrient uptake) and oxidizers (to make Calcium available). Specifically, the group called (PHCA) Poly-Hydroxy Carboxylic Acid is a grouping of about

50 or so acids. Saying that your product has PHCA in it is about as useful as asking a doctor for a "pain reliever". Which type of pain reliever do you need? Aspirin, Tylenol, Advil or Motrin, Aleve, or do you need some really strong, prescription only, narcotic like Percocet, Vicodin, Oxycontin, or Morphine??? They are all different in strengths but are all still in the grouping "Pain Relievers"... Get what I'm saying?

PHCA is an acronym that we came up with that basically means (multiple), many hydroxyl groups are on a molecule. The more hydroxyl groups you have the more stable your reaction is and greater the oxidation power of the molecule. Within that group of 50 or so acids in the PHCA category there are lots that don't do anything for nutrient chelation or oxidation of Calcium. There are several that are used in large amounts for nutrient chelation in agriculture and Turf. Examples of these would be Humic Acid, Fulvic Acid, and Citric Acids. thCa (Tri-Hydroxy Carboxylic Acid) Organic Acid found in VERDE-CAL Products is specific to react (oxidize) with Earth Metals (like Calcium) and oxidize the Calcium in the soil, while also chelating surrounding nutrients in the process. Oxidizing Calcium in the soil is no easy task (it's a very large, heavy, and DOMINANT cation).

### Special Interest Articles:

- Miller's Miscellaneous
- Carboxylic Acids
- Soil Trivia
- Rainwater Quality
- Trade Show Schedule

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**Carboxylic Acids: cont.**

Not all ENHANCED lime and gypsum products are created equal! Ask the salesman for specifics, ask for testing data, check the labels and make sure a specific acid is claimed on the guaranteed analysis. Look for a

company or product you have heard about for several years. One that has been marketed in reputable trade publications. Search out a company that you trust that what is in the bag today will be in the bag next month and

was in the bag three years ago (companies changing formulas are not reliable), and most of all, **BE AWARE OF WHAT IS IN THE BAG.** If you don't know, then ask someone that does.

*"Europe was created by history. America was created by philosophy"*

*Margaret Thatcher*

To watch a video which further explains the differences between carboxylic acids, go to the following link: <http://youtu.be/DCuCeAQxkXg>

**True Trivia! Test what you know about soil!** (Answers on next page)

1. What is a soil horizon?
  - a. A factor influencing how soil is formed
  - b. A layer of soil
  - c. An organism found within the soil
  - d. A technique used to map soils
2. Which 3 layers form the soil profile?
  - a. Air, water and soil
  - b. Minerals, organic matter and living organisms
  - c. Clay, silt and sand
  - d. The topsoil, subsoil and parent material
3. How does a sandy soil feel to the touch?
  - a. Sticky
  - b. Gritty
  - c. Smooth
4. Why is organic matter (humus) an important part of the soil?
  - a. It helps to improve water infiltration
  - b. It can break down organic pollutants
  - c. It converts N in the air into nitrates used by plants
  - d. It is rich in nutrients, which is important for fertility.
5. Which of the following is NOT a common reason why soil maps are used?
  - a. To determine the land drainage capabilities of an area
  - b. To determine the suitability of soils for particular crops
  - c. To identify soils and their properties
  - d. To record how soils are used by people.
6. Approximately how many micro-organisms can be found in a teaspoonful of soil?
  - a. 4 billion
  - b. 50 billion
  - c. 500,000
  - d. 1000
7. Which of the following creatures will you not find in the soil?
  - a. Earthworm
  - b. Springtail
  - c. Mite
  - d. Lemur
8. Which of the following is NOT a threat commonly faced by soils?
  - a. Soil erosion
  - b. Percolations
  - c. Deforestation
  - d. Climate change
9. What is soil erosion?
  - a. It is the process by which soil is formed
  - b. A harmful process that involves the removal and transport of soil by wind and water
  - c. A natural method of filtering harmful pollutants
  - d. A process often referred to as the "greenhouse" effect.
10. What effect can soil have on health if eaten or inhaled?
  - a. Nothing – it is perfectly safe
  - b. It can be good for your health
  - c. It can have serious health implications such as cancer

*"It is difficult to think anything but pleasant thoughts while eating a home grown tomato."*

*Louis Grizzard*

**Answers to True Trivia:**

1. B ; 2. D ; 3. B ; 4. D ; 5. D ; 6. A ; 7. D ; 8. B ; 9. B ; 10. C

**Rainwater: Looking at pH and quality, and how it varies across the U.S.**

What a crazy year for much of the U.S. Lacking rainfall was not a concern this year as compared to many of the past years. We see many superintendents alter agronomic applications due to rainfall. For whatever reason they choose, superintendents will add an application or eliminate an application because of rainfall they receive.

When asked why... Many will add an application (after a heavy rainfall event) of a product like VERDE-CAL or VERDE-CAL K Plus because they feel that the soil has been washed or flushed of available nutrients. This makes perfect sense because these products will create availability of nutrients in the soil and return the solution to a beneficial state for roots to absorb nutrients.

While many superintendents say they add an application, many others say they reduce or eliminate an application (after a heavy rainfall event) of granular. They state that the rain has released ample amounts of nutrient in the soil, therefore there is no immediate need for a granular application of a product. This is likely to be true as well. Many times after a good rainfall, a green up will be experienced in the turf. What causes this greening in many cases is an open ended question.

It is interesting that when asked about adding/reducing applications in several parts of the country, the answers are usually centered around the two above reasons to add or eliminate/reduce an application due to rainfall.

Depending on soil types, there is a basic feeling that a soil type has either been flushed or refilled with essential nutrients. Sandier soils are thought to flush due to higher percolation rates. Loamier or heavier soils are thought to "hold" many nutrients, and therefore will release excessive nutrient after a heavy rainfall. This leads to a theory that the

soil is full of essential nutrients.

At the time of this writing, we could not find any turf managers that could "show" from testing that there is a flush or release. When searching the web, nothing could be found as well. It would be interesting to see this for sure.

What we did, was to ask superintendents from various parts of the U.S: "What do you think is in the water that falls in the form of rain"?

We took rainfall samples from six areas around the country and tested that water. What resulted from testing was mostly very different from what the superintendents thought was actually in the rain water. I asked three questions to the superintendents from the regions that we tested.

1. What do you think the pH will be?

Most stated a very low pH. 5.5 pH and/or lower.

2. What do you think the nutrient content of the water will be? Will there be significant amounts of beneficial nutrients?

Here, they got it mostly right. The answered that the nutrient content would be very low.

3. Do you think there will be anything harmful in the water? Like bicarbonate, chloride, sodium?

This was a bit of a trick question. But most said yes there would be harmful things in the water, but would be very low. Sulfur was the only exception... many thought it would be medium levels.

**Take a look at the chart on the next page to see the test results.**

*"Without struggle there is no progress."*

*Frederick Douglas*

*"In times like these, it helps to recall that there have always been times like these."*

*Paul Harvey*

**Rainwater: cont.**

Location	Salinity	Na Sodium	Cl Chlorine	S Sulfur	HCO <sub>3</sub> bicarb.	Ca (mg/L)	Mg (mg/L)	K (mg/L)	NO <sub>3</sub> (nitrate)	pH
Baltimore, MD	.08 VL	.43 VL	.62 VL	2 VL	.44 VL	4 VL	1 VL	2 VL	0 VL	5.94
Denver, CO	n/a **	.15 VL	2.0 VL	15 L	11.3 L	2.25 VL	.34 VL	9.4 L	n/a **	5.88
Chicago, IL	.03 VL	.16 VL	.06 VL	1 VL	.72 VL	3 VL	0 VL	1 VL	4 VL	6.75
Dallas, PA	.11 VL	.13 VL	.31 VL	3 VL	.75 VL	12 L	2 L	0 VL	4 VL	7.23
Ft. Myers, FL	.04 VL	.12 VL	.06 VL	1 VL	.44 VL	4 VL	0 VL	0 VL	0 VL	7.58
Myrtle Beach, SC	.01 VL	.05 VL	.03 VL	1 VL	.16 VL	2 VL	0 VL	0 VL	0 VL	6.26
San Antonio, TX	.02 VL	.20 VL	.10 VL	6 VL	6 L	0 VL	0 VL	1 VL	1.26 VL	5.90

\*\* indicates the Denver, CO test was processed by a different lab and did not have a salinity or nitrate test run.

The end result is that the water is actually very clean. In fact it may be too clean in most cases. If you were to test your irrigation water and it showed any of these results, it would be considered problematic due to being too clean. You would want to “dirty it up a bit” to allow it to benefit the plant more. Many times you do this with calcium nitrate injection. But as you can see from the results above, the rain water held both good and harmful parts. But all of those parts were very low or low. Even in the case of sulfur, even though it was there, the levels were far from harmful. pH’s caught most attention as often is the case. All the pH’s were much higher than originally thought, especially in south Florida.

Here are a few great web sites to see rainfall pH’s from around the country.

<http://water.usgs.gov/nwc/NWC/pH/html/ph.html>

[http://www.epa.gov/acidrain/effects/surface\\_water.html](http://www.epa.gov/acidrain/effects/surface_water.html)

[http://www.epa.gov/acidrain/education/site\\_students/phscale.html](http://www.epa.gov/acidrain/education/site_students/phscale.html)

<http://www.plantmanagementnetwork.org/pub/ats/trends/2006/survey/>

**Trade Show Schedule**

Event	Dates	Booth No.
Peaks & Prairies GCSA Trade Show	October 29-31, 2013	
Texas Turfgrass Conference	November 12-14, 2013	414
Carolinas GCSA Trade Show	November 18-20, 2013	2201
Ohio Turfgrass Foundation	December 3-5, 2013	J-3
Rocky Mountain Regional Turfgrass Trade Show	December 10-12, 2013	209
Virginia Turfgrass Council Trade Show	January 27-30, 2014	309
Golf Industry Show	February 5-6, 2014	2713

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

**FEED THE SOIL AND THE SOIL  
WILL FEED THE PLANT.**



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