

# The Turf Analysis

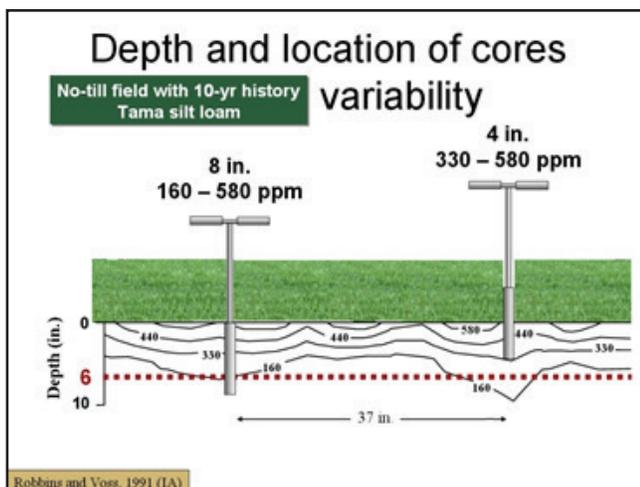
Winter 2013

Agronomic Information from *Spectrum Analytic Inc.*

## Why Are My Soil Test Levels Different This Year When Compared to Past Years?

Every year we receive telephone calls from lawn care companies, nurseries and home owners wondering why their soil test levels are different from what they have been in the past (we only get calls if the results are lower, not higher). One of the big things that can help in understanding why soil test levels may be different is from looking at past soil sample records. First thing that we must realize is that the soil not only changes on the surface that we see but the soil is also changing below the soil surface on all lawns regardless of landscape type or use. In some areas you may have one inch of topsoil, in other areas you may have several inches. In this topsoil is going to be a mixture of sand, silt and clay which make up the soil colloids. To the negatively charged sites on the soil the positive cations (K, Ca, and Mg) are going to be attracted and held. The following picture shows the different levels of potassium that were found in a study at different soil depths.

This picture illustrates several points. First thing you will notice is that the various fertility levels do not run parallel to the surface contour. At the soil surface there is a small area that contains 580 ppm and then there are the



## Merry Christmas!

As we close another year, we want to take this opportunity to say “Thank you” for your business in 2013. The Green Industry segment of our business continues to grow and we thank you for the confidence you have placed in our lab with your soil sample business.

Snowfall and much below normal temperatures have arrived a little earlier than normal in many areas of the United States. This could make fall work drag on a little longer than normal if the snow melts and we return to more reasonable conditions.

Interest continues to grow on soil health issues; last year’s newsletter contained an article about the Solvita test. If you have interest in this test you can look in our newsletter archives for more information or call us at the lab for more information.

We get many questions at the lab as to why soil test levels can vary from one sample to another; we have included an article this year that should help to explain this better. We continue to get questions on liming turf and ornamentals and so we put together an article to help explain a little better what is going on with lime.

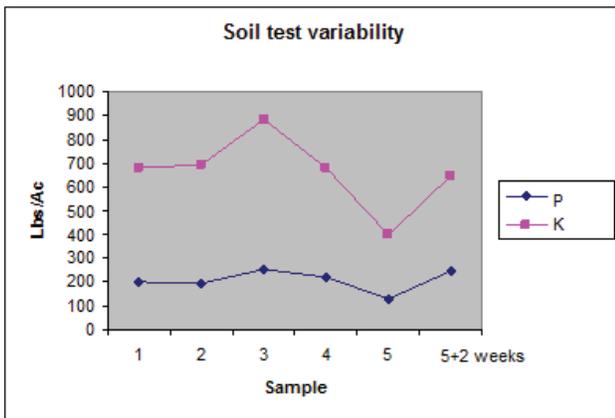
Everyone at Spectrum Analytic wish you and your employees and families a Blessed and Merry Christmas. We hope that everyone enjoys the holidays together with friends and family and that everyone has safe travels. In the upcoming year we will be facing new challenges once again, take these challenges and convert them into an opportunity. May 2014 be a successful year for you and all your business ventures.

Spectrum Analytic participates in the National Proficiency Testing Program administered by the Soil and Plant Analysis Council. Spectrum Analytic also participates in several state quality control programs certified by the U.S.D.A. Spectrum Analytic uses soil testing methods published by the NCR-13 Committee of the U.S.D.A. Agricultural Research Service.

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varying depths of the 440 and 330 ppm. Next, look how the 160 ppm depth ranges from approximately 3 inches to 10 inches. Another point that is well illustrated in this picture is the soil test levels between the 8 inch and 4 inch sample. Notice how the 8 inch soil probe will contain levels from 160-580 ppm while the 4 inch depth contains levels from 330-580. When the composite sample is mixed the 4 inch sample will have a higher reading than the true 8 inch sample because the probe never made it to the lower concentration level of the 160 ppm depth.

Ok, so you say this can never happen to me. This fall we had a person call with this exact situation occur. The example below is that of an agricultural field; however, this



scenario occurs on small landscapes also. Soil type and soil test levels for all nutrients varies with depth and it does discriminate on land management type.

The chart below shows soil test P and K levels in lbs/acre (to change to ppm = lbs/ac ÷ 2) from soil test records starting from 1998. The area receives a high amount of manure each year so the client collects a soil sample every

two years. Samples 1-4 were taken by the same person; however, sample 5 was pulled by a new person. The owner noticed the large drop in potassium levels and the small drop in the phosphorous level. The samples were rerun by the lab and repeated. The dealer decided to send the person out that took the previous soil samples (1-4). Sample 6 represents the second set of samples. It needs to be noted that these were taken approximately 10 days after the sample 5 samples. In the end it turns out that the original sample 5 was pulled from approximately an 8-10 inch depth instead of the regular 6 2/3 inch depth. Simply looking back at previous soil test data, the owner noticed that in the 5th sample the K and P levels had dropped considerably from the previous 4 samples. This alerted him that something different was going on. Then after rerunning the samples and having the results repeat the owner spoke with the person that pulled the sample 5 and found there were many more samples pulled the same way. That is why he was seeing a decrease in many of the K soil test levels that were coming back.

So what does all this boil down to? If you are going to take a soil sample, be sure to keep the sampling consistent and collect a representative sample of the soil profile. If the soil is too wet, wait for it to dry a little. Anytime water is running out of the soil probe, you are not getting a representative soil sample. We do have different tips for the Oakfield soil probe, they are rated as dry soil, normal soil, wet soil and rocky soil tips. Although I do not have first-hand experience with the different tips, people using the different tips have told us they noticed a difference. These tips can be ordered from our website or by calling the lab.

It has been said many times, that the greatest error in soil testing is in the taking of the soil sample, so be sure to sample at the same time, same depth, and keep good records.

### 2014 Soil Test Probe Prices

Kleen Hole Spade Soil Probe.....	\$ 139.80
Oakfield 36" K Solid Tube w/footstep.....	\$ 119.39
Oakfield 36" LS Soil Probe w/footstep.....	\$ 115.87
Oakfield 19" HA Soil Probe .....	\$ 56.54
36" Stainless Steel Soil Probe w/step.....	\$ 70.00
21" Stainless Steel Soil Probe.....	\$ 50.00

Shipping & handling charges apply.

## Landscape Liming - Continued from page 4

recommendation, either calcitic or dolomitic lime can be applied to satisfy the liming requirement.

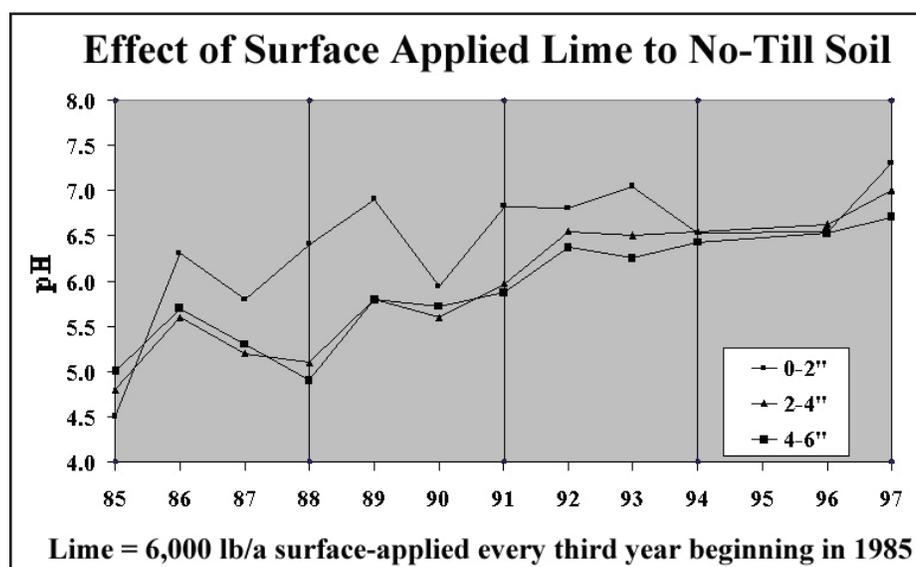
Some years ago, Penn State University published a research project on lime movement in a no-till field. Although this is an agricultural field, it still will serve the same purpose for getting the point across. In this study, various rates and application times were investigated. The illustration shown here is for applications of 6,000 lb/a (138 lbs/1000 ft<sup>3</sup>) surface applied every third year, with soil tests taken annually. The initial pH of the 4-6" was

the area. If the soil pH is too acidic, you will have a difficult time correcting it once turf or trees are established, so take the opportunity to mix the needed lime prior to establishment.

2. Many times we know that people want to plant turf under trees. It is important to recognize that most turf requires a higher soil pH than some trees, such as oak. In these cases the decision has to be made whether the soil pH should be corrected for the tree or the turf.

3. Soil test regularly to maintain the proper soil pH. Some types of nitrogen products will lower the soil pH. There are some guidelines available to apply maintenance amounts of lime to correct for the acidifying affect of the nitrogen. Remember that these are only guidelines. If the surface soil pH is driven much above pH 7.0, you also risk causing uptake problems with phosphorus and some micronutrients in that soil volume.

So, what do you do if the area is established with trees and turf but has this layered pH problem? You could simply apply and then till the recommended amount of lime and fix the situation in a single



5.1 and the top 2" was 4.5.

As the chart shows, the initial lime application in 1985 affected the soil pH as deep as 6". However, the main benefit was found in only the top 2". We do not know whether this soil was sand, loam or clay, and we do not know what the CEC was, so we cannot draw conclusions related to these factors. The results do show, however, that the lower 2/3 of the 6 inch profile took up to 10 years to come to the same pH as the top 2" under this program.

We know that tree roots live in more than the top 6" of soil, and certainly more than the top 2" of soil, and that the pH of the deeper soil strata can affect some plants. Therefore, the pH of these deeper strata is important and should be managed for best plant performance. So, what conclusions should we draw from this information?

1. If you are planning a landscape, you should know the pH of the soil both horizontally and vertically in

the area. If the soil pH is too acidic, you will have a difficult time correcting it once turf or trees are established, so take the opportunity to mix the needed lime prior to establishment.

2. Many times we know that people want to plant turf under trees. It is important to recognize that most turf requires a higher soil pH than some trees, such as oak. In these cases the decision has to be made whether the soil pH should be corrected for the tree or the turf.

3. Soil test regularly to maintain the proper soil pH. Some types of nitrogen products will lower the soil pH. There are some guidelines available to apply maintenance amounts of lime to correct for the acidifying affect of the nitrogen. Remember that these are only guidelines. If the surface soil pH is driven much above pH 7.0, you also risk causing uptake problems with phosphorus and some micronutrients in that soil volume.

So, what do you do if the area is established with trees and turf but has this layered pH problem? You could simply apply and then till the recommended amount of lime and fix the situation in a single season but this is normally not a feasible approach. You could over-lime the surface soil with the full lime rate if you are not worried about the negative consequences, or if they do not apply to the area. You could also split the recommended lime rate into two or three applications over 12 to 18 months. While this last option will limit the possible problems caused by over-liming the top layer, you will lose the benefits of having the proper soil pH in the lower soil layers until all of the lime is applied and has taken full effect.

Each homeowner, landscaper and arborist will have to make their own choices. This is why planning is so important before choosing plants. Do not pick a plant just because it looks good; make sure that you pick one that will survive in the environment that it is being planted into. This could eliminate unhappy clients and dead or unhealthy plants in the future.

## Landscape Liming

This topic never seems to never get enough attention and although the basic concepts have not changed and there is very little new research, we thought we would revisit liming.

Lime recommendations are designed to neutralize a “volume” of acid in an assumed depth of soil, many times this is on a per acre basis. When dealing with turf Spectrum assumes a depth of 3.5 inches of soil. This is where the highest amount of roots are concentrated, and in most cases the soil is not being disturbed to redistribute the soil which may bring acidic soil up from deeper in the soil profile. Many labs use an assumed depth of between 6” and 8” and will make adjustments to lime applications if they are made aware of the plants to be grown. For trees, gardens, flower beds etc which have a deeper rooting area or where the soil is disturbed due to spading or roto tilling we use the depth of 6.67”. This soil depth multiplied by 43,560 feet calculates to a volume weighing approximately 2,000,000 lb. In some cases where there is a soil with a higher amount of sand the weight would be a little less, and if there is a high amount of clay the weight may be slightly more. But these are not large enough of differences to warrant adjusting the calculations.

The active ingredients in lime are calcium carbonate ( $\text{CaCO}_3$ ) and magnesium carbonate ( $\text{MgCO}_3$ ). Both Ca and Mg have very low mobility in soil and any element combined in the carbonate form is both slowly soluble and pretty immobile. Therefore, lime rather slowly (12 to 18 months) affects a very limited amount of soil unless it is physically mixed with the soil profile. Without this physical mixing, lime will not affect soil to more than a few inches deep in loam or clay type soil. The depth to which surface

applied lime has an effect is deeper on low CEC sands, and shallower on high CEC clay.

A common question is why does the “D” does or the “C” appear after liming recommendation? When “D” appears we are recommending that a dolomitic limestone be applied. A dolomitic limestone is a lime that contains a higher amount of magnesium than calcitic lime. Magnesium is the center of the chlorophyll molecule. For more information see our Magnesium Basics paper in our library on our website. The magnesium in the dolomitic lime will generally be the least expensive and easily accessible source of magnesium. When “C” follows the liming recommendation a calcitic lime is being recommended. The main reason for using calcitic lime is to lessen the buildup of magnesium. Both limes contain some amount of magnesium, but the calcitic limestone will have the lesser amount. Most plants do not have a high uptake rate of magnesium, and most of the time the magnesium that is being taken up by the plant is also being returned to the soil (i.e. grass clippings). Continuous use of dolomitic limestone will cause the magnesium soil test level to build to the high and very high levels. When this occurs, plant analysis has shown us that there can be a suppression of potassium uptake by plants. When we get a suppression of potassium uptake, this will affect the plants ability to regulate the guard cells which it closes to conserve internal moisture. The result is a plant that will wilt during drought periods. Since we are not drawing down soil test magnesium levels, the only thing that can be done to combat this is to build the soil potassium levels higher. This is an expensive alternative and in some cases not an environmentally sound program. In the case where there is no letter designation after the lime

### UPS Authorized Return Service (ARS)

Looking for a no-hassle, fast and easy way to ship your samples to Spectrum Analytic? Try ARS. labels. The program is simple:

- Spectrum Analytic provides pre-addressed ARS. labels to apply to your sample boxes.
- Drop package at any UPS pickup point without any paper work required.
- Package is then sent to Spectrum Analytic.
- Customer is billed by Spectrum Analytic at a flat rate for each package.

We can customize your ARS labels to the poundage you normally send. If your most of your boxes weigh 20 pounds, simply request that weight when ordering. Whatever weight you need, we can supply it. Contact Spectrum Analytic today for specific details of the UPS ARS Program.