"Give It What It Needs"

'Understanding Soil Test Results' by Jim Hermann

Athletic field maintenance has always been and always will be a product of cause and effect. Within the sports turf environment there are both positive and negative influences. Proper turf management is the product of a thorough understanding of these influences along with an ability to visually evaluate turf quality and make educated decisions using all information available. Soil testing is one means of acquiring information and should be used as a foundation for program development.

The most basic requirement of proper turf management is maintaining optimum soil fertility. Understanding soil test results gives the turf manager the basic information necessary to establish a yearly fertility program. The objective of an effective fertility program is to achieve and maintain optimum available nutrient levels while taking into consideration turf growth habits.

Information necessary to the turf manager for the purpose of proper soil evaluation is supplied in the form of a basic soil test. This test should include soil acidity (pH), nutrient levels (P, K, Mg, Ca), salt concentration (EC) and organic content. Different soil testing labs may or may not include all of these components in their basic soil test. However, the more information you have available to you the more capable you will be in determining your individual turf strategy. Additional information I have found to be beneficial to me is CEC (cation exchange capacity) and base saturation of K, Mg, and Ca.

Soil pH is simply a measure of soil acidity. I have seen pH levels range from 4.8 - 7.5. I would imagine the range could be broader. The important point to remember is that turf utilizes nutrients most effectively at a neutral pH of approx. 6.5 - 6.8

Test results will include lime recommendations based on the soil pH. When considering lime products it is important to be aware that there is high calcium lime and there is also high magnesium lime. The proper product again is determined by the results of the test. Don't allow someone to sell you high magnesium lime when you need high calcium lime. There can be a considerable cost difference between these two products. Screen quality is also a major consideration when choosing a lime product. Lime is nothing more than pulverized rock. The finer the rock is pulverized, the faster the response will be. The higher the screen quality, the finer the material is. A higher screen quality is more desirable than a low screen quality.

Pelletized lime is typically considered the most effective and efficient material. This material is a pulverized lime, which is then compressed into pellets for ease of distribution through a broadcast spreader.

Most soil testing labs report nutrient (P, K, Mg, Ca) availability in a similar fashion. Availability is listed at four or five relative levels ranging from the worst to the best-case scenario such as poor, medium, good, high, very high or below optimum, (very low, low, medium) optimum, above optimum. Along with this rating the availability is listed in lbs./acre What is important is the level of availability. Be it poor, medium, good etc. Recommendations are generally made to bring fertility levels into the optimum range. Assuming that clippings are recycled the turf generally returns most, if not all the nutrients it has taken from the soil. For this reason once optimum fertility levels are reached it becomes the decision of turf manager whether or not maintenance applications of a nutrient are necessary to maintain existing levels. Over time with continued soil testing on an annual or bi-annual basis, trends and nutrient usage can be projected for a given field, thus giving the turf manager increased confidence in his fertility program.

Once proper pH is established and optimum levels of phosphorous and potassium are reached and equilibrium is established, nitrogen is generally the only nutrient necessary to maintain healthy turf. When dealing with straight nitrogen products the turf manager can be much more selective in the source of nitrogen used. He/she is not so dependant on standard formulations. The fertilizer cost per acre drops substantially when you go from a complete balanced fertilizer formulation to a straight nitrogen formulation.

Soil test results will typically give recommendations on the yearly amount of nitrogen necessary for turf. I have found these recommendations to be very general in nature. It is the job of the turf manager to take these recommendations and modify them to fit the individual needs of each particular field. An example of this would be to increase the amount of nitrogen applied in the

early fall to a soccer field as compared to a more conservative application on a baseball outfield. The stress inflicted on a soccer field deserves more consideration than do three people standing in a baseball outfield. The baseball outfield deserves more consideration than does the common ground between the fields. By modifying recommendations to fit individual situations, the efficiency of your program can be maximized while overall cost can be minimized or reallocated.

In addition to nutrient availability, potassium, magnesium and calcium are sometimes listed as a base saturation percentage. I have been given different recommendations from different labs in reference to optimum levels but they basically say the same thing only in a different way.

One lab recommends that calcium should be a 5 to 1 ratio with magnesium while potassium should be below 7%. Another lab recommends that calcium be around 65% and magnesium be around 12% while potassium should be 2 to 5%. When you think about it that is just about a 5 to 1 ratio calcium to magnesium and I'm not going to question a couple of percent with potassium. When potassium, calcium and magnesium are in their proper proportions the soil pH will generally be close to optimum.

All these percentages and numbers really don't mean anything individually. Because they are percentages, which are relative values, when one goes up typically the other goes down and vice versa.

This part of the soil puzzle continues to get more involved beyond the simplistic explanations I have given and my personal understanding is limited to what I have written, so lets move on.

Soil is a blend of sand, silt and clay in varying proportions. It is a complex medium of physical, chemical and biological properties. Organic content is one measure of soil fertility. Here in Hunterdon County the soils I have had tested typically range from around 1.5% to 3.5%. Again, only speaking from a very basic level of understanding, the organic content of the soil is responsible for the breakdown and availability of nutrients to the turf. It is the portion of the soil that suffers when high salt content is a problem. It is the biological properties of the soil they are addressing when they recommend bio-stimulants. There's a subject that's tuff to understand. Reading an article on biostimulants is like reading the ingredients on the side of a loaf of store-bought white bread. I don't know what all they contain, but I do know that some of it is already contained in the organic content of your soil.

The consideration for existing organic content of a soil is most important during the establishment period of a new stand of turf. If there is enough organic matter available in the soil for turf establishment, there is typically enough for maintenance of the turf. A new seeding will utilize existing reserves of organic matter during initial establishment. Once turf is established it has the miraculous ability to replenish its reserve of organic matter through the continuous growth, decomposition, and decay of root system. Organic content along with clay content has a lot to do with the water holding capacity of the soil. This trickles down (get it, trickles down?) to the soil texture and drainage quality. Incorporation of organic matter into a heavy clay soil has the potential to relieve or minimize compactive tendencies. This can be of great value on athletic fields.

Modification or manipulation of the organic content in your soil is sometimes overstated when considering products and developing a topdressing strategy for your fields. The key to a successful topdressing strategy is in finding a product that is compatible with the existing soil, and properly incorporating that product into the top three inches by tilling or by core aeration. These procedures will be discussed more in depth in an upcoming article.

Please note: The benefits derived from increasing the level of organics in your soil are not a license to indiscriminately topdress with ungodly amounts of organic topdressing. The problems caused by the incorrect application of topdressing far and above exceed the potential benefits.

CEC (**c**ation **e**xchange **c**apacity): Simply stated, the CEC value is a measure of the soil's ability to hold cation nutrients, primarily K, Ca and Mg. Kind of like the facets of a diamond. The more facets, the more potential sites for nutrients to be held. In general, the higher the sand content of your soil the lower the CEC will be. The higher the clay and or organic content of your soil, the higher the CEC will be. Most soils I have had tested range from 5 on the moderate side to 18 on the high side. CEC is not a factor that can be considered "Good" or "Bad" but is more a value, which describes the soil's properties. A soil with a lower CEC has less holding power. A higher CEC on the other hand depicts a soil with more holding power. The soil-testing laboratory utilizes this information when making fertility recommendations.

Because CEC is a function of the clay and organic content of the soil, and clay is generally the dominant of the two, CEC can also be a good indicator of other soil characteristics such as drainage and ease of compaction.

Last but not least is salt content or EC (electrical conductivity). Different labs report results in different units of measure. These units can be millimhos/cm (mmhos/cm), decisiemens/meter (DS/m), or parts per million (ppm). These units can be converted as follows- 1 mmhos/cm. = 1 DS/m = 640 ppm

Rutgers lab assigns a status to the level of salt content. The status levels are as follows:

0 – 0.2 mmhos/cm = Low salt concentrations - may be too low for turf growth
0.2 – 0.5 mmhos/cm = Medium salt concentrations - a satisfactory range for turf growth.
0.5 – 0.8 mmhos/cm = High salt concentrations - slightly higher than desirable
Above 1.5 mmhos/cm = excessive salt concentrations – plants dwarfed, failure in established turf becomes evident.

Determining and maintaining optimum fertility levels in the soil is only the start of providing a healthy environment for turf development. There are a total of 17 nutrients necessary for the healthy development of turf. We have discussed only a few. The remaining nutrients are typically needed in smaller amounts and are generally readily available. These nutrients become a much greater consideration in sand based fields due to the relatively low nutrient holding power of these soils.

When problems in turf health and vigor arise and remain undiagnosed, based on information provided by your soil test it may become necessary to investigate the availability of micronutrients by further soil testing. The turf manager may also elect to do a tissue analysis of the turf in question, and compare the results to a tissue analysis on healthy turf. Soil and tissue testing are available through a number of commercial test laboratories as well as:

Rutgers Soil Testing Laboratory
P.O. Box 902,
Milltown, NJ 08850. .....
Telephone: (732)932-9295 **;)**

'Effective Communication Skills'

A Key Component for Athletic Field Managers

By George Van Haasteren, CGM
Sports Field Management Systems

From time to time, I hear from athletic field managers across the country on how difficult it is for them to get their point across to the people above them. Another concern from grounds managers is that they feel that they constantly have to justify their position or their department. For the most part athletic field managers are a rare group who are totally dedicated to their profession. They know how to grow turf, identify weeds, diseases and areas that need repair to reduce injuries and liability. The difficulty lies in when everyone around them "seems" to know their job better than they do. This may be the result of not knowing how to present their ideas and thoughts through memos, reports or careful budget preparation.

We may know more than those who we report to when it comes to caring for the fields we maintain but it matters little if we have difficulty in communicating our ideas or thoughts to those we report to. That is why it is equally important for the manager or supervisor to equally be proficient in having effective communication skills.

I believe that in order to have those above you understand and support you, you need to be equally as good or if not better as they are when it comes to your writing and speaking skills, budgeting, computer skills, labor laws, diversity, gender issues etc.. To do so, I recommend the following ways that will aid in being a truly successful athletic field manager:

Attend workshops, seminars or classes. Don't just attend something that pertains to the technical aspect of grounds management. Look for something that you know that you need to improve on as a manager or supervisor and that you will benefit from.

If you have difficulties working with your computer skills, take a course or courses that will assist you. *Continued on page 10.. 'Skills'*

Did You Know? Soil Compaction can cause nitrogen to be unavailable to the turf, thus wasting time and money.