TIPS FROM THE PROS

How To Get The Most From Diagnostic Tools

By Tom Mascaro

When working with Mother Nature, even your best decision may be haunted by a little doubt. The way to reduce this doubt is to have as much information as possible. That is why diagnostic tools are so important to the professional turf manager.

By using these tools as an aid to decision making, you replace uncertainty with factual information. When facts are added to visual and sensory determinations, they help confirm conclusions on how to solve problems.

Diagnostic tools should be available quickly when needed. They may not fit into a briefcase, but they will fit easily into a pickup truck or turf vehicle. Professional turfgrass managers should learn how to use them and be able to apply the facts that they provide to decision making.

Each tool serves a specific purpose. Following is a brief description of some of the tools available and the information they provide.

Soil Profile Samplers. These instruments extract a cross section of soil a few inches deep for visual analysis without materially disturbing the turf surface. The narrow sampling tool is forced vertically into the soil. After it is withdrawn, the device is opened to expose an undisturbed profile of the soil.

Visual diagnostic analysis of the sample provides information on the depth of thatch, the thickness of the mat layer (partly decomposed thatch), consistency of the soil (texture), compaction, different soil layers, and the nature of the subsoil. The sample can be dissected to closely inspect the depth of living and dead roots.

After inspection, the sample can be returned to the soil intact. Soil profiles can also be photographed or preserved in epoxy for comparative purposes, or to show problems to others involved in turf management decisions.

Soil Probes. These are usually hollow tubes that remove cylindrical samples of soil one inch or less in diameter, much like a core removed by an aerifier. Soil probes are useful for taking quick samples for inspection and to determine soil moisture depth. They are also handy for obtaining soil for laboratory analysis.

Soil Moisture Meters. Moisture sensors utilize various techniques to indicate the amount of moisture in the soil at any given time. Some are hand-held field tools, while others utilize buried probes which are connected to meters for reading. In either case, these devices measure moisture at the depth of the probe. It is always important to take readings from different levels.

John Mascaro explains how soil moisture meter works to superintendent.

Moisture sensors can be used to locate problem areas during periods of heat and drought stress. When grass takes on a blue-gray color and footprints remain visible, it is under drought stress. A moisture sensor will confirm a visual analysis and pinpoint the depth of the problem. For instance, dry spots can be detected before they cause a serious loss of turf.

Moisture sensors can also indicate problems that are not visible. Although water may have been applied, it may have not reached the root zone. It is more important to have adequate water six inches deep than to have only a wet surface. Conversely, water held by the soil too long can result in diseases and other problems, especially at high temperatures. Monitoring soil moisture, especially in troublesome turf areas, can provide the facts needed to make decisions.

Water conservation has become an important part of turfgrass management. The sports turf manager needs to have a grasp on soil moisture and factors which influence it to maintain quality, uniform turf with limited water.

Soil Thermometers. Monitoring soil and air temperature provides useful information during periods of high temperature stress and when scheduling seeding or weed control. Standard or digital thermometers can be useful tools for the turf manager.

Soil temperatures can warn the turf manager of impending danger especially when a turf area has a heavy layer of thatch. Under the right temperature and moisture conditions, bacterial activity in the thatch layer accelerates, resulting in even higher temperatures. It's the same process that takes place in a compost pile. The grass plants can be killed unless syringing is done immediately.

Compacted soils also have higher temperatures than well-textured soils, since they hold less cooling moisture. On the other hand, puddles that develop in uneven turf surfaces can scald turf. Monitoring suspicious depressions with a digital thermometer can help you determine corrective action.

We know that cool-season grasses and certain weeds germinate or grow better at certain temperatures. This information can be used to time seeding, overseeding and applications of preemergence herbicides.

Finally, air and soil temperatures can vary greatly depending upon location. Temperatures for valleys, shaded sites or pocketed areas invariably are different from those presented in weather reports. A turf manager needs to know what is happening in a variety of different locations, not just one. Soil thermometers provide that information.

Soil pH Meter. Acidity and alkalinity play an extremely important part in turfgrass management. A scale, known as the "pH scale," is used universally to express varying degrees of soil acidity and alkalinity. Field pH meters are diagnostic tools which allow the turf manager to monitor soil pH quickly and conveniently.

In order to understand how acid and alkaline conditions affect turf growth, one must first understand the pH scale. A reading of seven indicates that the soil is neutral, neither acid or alkaline. A reading below seven means the soil is acid, whereas a reading above seven indicates the soil is alkaline.

The pH scale is totally unlike other measurements, such as temperature or distance. A difference of one point in pH is actually a factor of ten. In other words, a soil with a pH of six is ten times more acid than one with a pH of seven. A pH of five is 100 times more acid than seven and a pH of four is 1,000 times more acid. The same is true for alkaline readings above seven.

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Chalkboard
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Turfgrasses grow best at pH readings of between 6.5 (slightly acid) and 7.5 (slightly alkaline). And reading higher or lower than this range can have a profound effect on how leaf and root growth take place. Applications of certain fertilizers and other chemicals or amendments can change the soil pH.

Turfgrass diseases are definitely affected by pH. It also has a proven effect upon the availability of nutrients in the soil. Minor elements, such as aluminum and iron, will become deficient when soils are too acid or alkaline. Beneficial microorganisms cannot reproduce.

Intensively used turfgrass areas are subject to pH change for a number of reasons. For instance, thatch, can become very acid or alkaline, since it is constantly being washed by frequent rain and irrigation. The pH of rain or irrigation water also alters the pH of the soil.

Correcting an acid pH in soils can be accomplished with light applications of dolomitic limestone and monitoring with a field pH meter. Various acidifying materials, such as gypsum and sulphur, can be applied to make soils more acid. The pH meter will let you know when soil reaction reaches the desired range.

Soil Penetrometers. These are instruments which measure the degree of compaction of soils. Some penetrometers, used mainly for scientific studies, are very complicated. Simpler versions utilize either a spring-loaded needle or a gravity drop. The consistency of readings is considered better for the gravity drop penetrometers. However, all types provide useful information.

Periodic monitoring of turfgrass areas helps the manager determine when and where to aerify. Grass roots do not grow in the soil; they grow in the spaces between the soil particles. A compacted soil is dense, with limited space for roots to grow. Penetrometers measure the bulk density of the soil. When the bulk density reaches 60 to 70 percent, it's time to aerify.

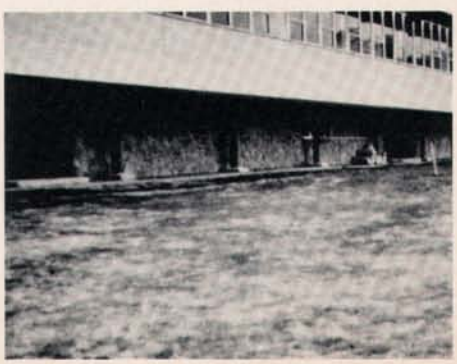
Dense, compacted soils not only affect turfgrass growth, they are hard and do not cushion the impact of players or balls striking the surface. Compacted sports fields and playgrounds become dangerous. Compacted greens and fairways will not hold a properly played shot. It is more difficult to tee up or strike a ball on tees that are compacted.

Soil profile sampler.

Players of all sports depend upon a consistent response from turf. When they do not receive it, the quality and safety of the sport is reduced.

Monitoring sports fields and playgrounds for soil compaction should be mandatory for two important reasons, besides having a good turf cover. The first reason is to minimize serious injuries to children and athletes. The second reason is to have document backup for insurance purposes. Recording and dating soil compaction levels can become valuable evidence in lawsuits.

As the profession of turfgrass management grows more demanding, diagnostic instruments become valuable and necessary aids in helping diagnose problems early. Visual analysis alone, or "eyeballing" as the old-timers used to say, may be too late to save expensive turf. There is less and less room for doubt in turf management today.



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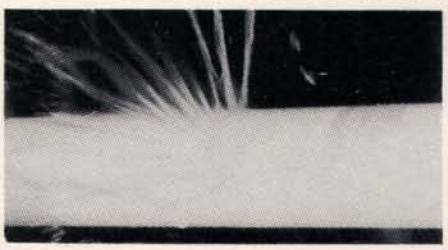

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