

SOIL TESTING Can Grow Your Business

But soil tests are not all created equal

In today's competitive environment, companies are looking for ways of differentiating themselves. Concurrently, greater awareness among industry professionals regarding diagnostic services is moving companies into new areas of activity.

Soil testing is an excellent diagnostic tool, both for growing a business and creating points of differentiation. For many companies specializing in plant health care, nothing takes place until the soil test results are completed.

But not all soil tests are created equal. To answer some key questions about soil testing, *Arbor Age* recently spoke with Keith Maurer and Dr. Hans Helmprecht of Prescription Soil Analysis, LLC.

AA: Can you tell us a little bit about the different types of soil testing:

Maurer: Over the last 75 years, the basic soil test has been refined in a number of different ways. Some of the revisions were based on better methods, others because more parameters were being tested. The real question in selecting soil testing services is, "what are you testing for?"

Helmprecht: There are dozens of different soil tests, but they tend to fall into three basic categories: strong acid, weak acid and water-based testing. Because of the testing method, the same soil will provide quite different information.

AA: How is the information different?

Helmprecht: The strong acid test is good for identifying what major nutrients are present in the soil. The strong acid solubilizes all of the nutrients, both soluble and in-soluble. Plants can only use

Photo courtesy of Prescription Soil Analysis, LLC.



Soil sample

soluble nutrients. The strong acid dissolves more nutrients than are really available to the plant, and therefore portrays a much larger amount of nutrients than the plant can actually access. This test is typically less expensive.

Maurer: The strong acid test is designed for agriculture. Farmers need to know that if they add a certain additional amount of nitrogen, for example, they should get a certain percentage increase in crop yield. This is the purpose for which soil testing was originally developed. However, this type of testing has shortcomings for arboricultural applications.

AA: How so?

Helmprecht: Weak acid testing procedures are probably more suitable for non-farm applications,

Chart courtesy of Prescription Soil Analysis, LLC.

Type of Test	Name	Extract	Typically Used For
Strong Acid	Melich I, II & III Bray I	Hydrochloric, Sulphuric, Nitric acids, etc.	Plant Growth and Crops
Weak Acid	Spurway Albrecht, Reams	Spurway Morgan	Plant Health through Soil Remediation
Water Test	Water	Water	Not Recommended

including arborists and landscapers. The weak acid test has a couple of advantages. First, the weak acid test only tests for soluble nutrients (nutrients that are available to the plant). Soils, particularly if they are high in organic matter and biologically active, are dynamic systems. Nutrients like nitrogen are continuously being altered by biological activity during the Nitrogen Cycle. But knowing the amount of boron, copper and other nutrients that are immediately available is very important. Sufficient zinc, for example, helps tree bark to stretch so that cracks don't develop.

Weak acid tests can replicate the weak acid secreted into the soil by the plant roots. Therefore, this test analyzes nutrient availability, a much more useful tool for adjusting nutrient levels and unlocking unavailable nutrients — making them available to the plant.

Maurer: Whereas the strong acid test is used more for optimizing plant production, the weak acid test is used more frequently for soil remediation — fixing the soil so that plants can be healthy.

Helmrecht: I do want to clarify that strong acid test recommendations cannot be compared with weak acid tests. The testing lab should provide recommended ranges of nutrients based on the type of test they are conducting along with recommended adjustments. The same is true of weak acid tests and their recommended nutrient ranges. But because the tests are different, the optimum ranges are also different. Actually, it is impossible to get any two different types of tests and compare them to each other. Depending on the type of weak acid test, they may not be comparable either.

AA: What about the water-based test?

Helmrecht: The water-based test does not dissolve enough nutrients to give a true indication of nutrient levels. It is less helpful than either of the other two tests.

AA: What is included in a soil test?

Helmrecht: The more data — within reason — that a professional has available on which to make recommendations, the better. Sometimes the one or two items not tested are the components that can make the largest difference in correcting the problem. Even small amounts of secondary and micronutrients can alter plant health. It is critical to

know soil type. Knowing something about soil biology is also very important. The weak acid test often includes more tested items.

Maurer: As important as what is being tested is what is reported back to the professional. Is there really some sort of action plan with specific recommendations? If there are biological indicators, is there a recommendation to address this issue, likely either with compost or compost tea. Are there recommendations for secondary and micronutrients, as well as primary nutrients? If compaction is an issue, is there a recommendation for products or actions to loosen the soil, like air spading or liquid aeration products?

Doing the soil test is useless unless the recommendations are comprehensive and the client has some estimate in advance of the types of remediation that may be recommended and their cost. Extensive remediation may require a staged program to spread cost out over a period of time.

AA: How does one go about selecting a testing service?

Maurer: It depends on what you are trying to accomplish. Most state, cooperative extension and university testing services perform strong acid tests. These labs originated to serve the agricultural community. However, for certain types of applications, they may recommend other tests. For example, the University of Minnesota lists 17 different types of soil tests that they offer depending upon the circumstances and the client's needs. Several private labs also do strong acid testing and cater largely to agribusiness.

Helmrecht: Weak acid tests tend to be done by private labs. There are several different variations, all based on the Morgan Extract. Dr. M.F. Morgan, a professor at the University of Connecticut, developed a "universal" extraction method during the

1930s. It is considered universal because all major nutrients and many micronutrients can be measured with one extract instead of performing multiple procedures. Known providers of Morgan Extract testing methods are International Ag Labs, Mid-West Labs and Cornell University's Ag Department. Michigan State then developed the Spurway weak extractant method used by the University of Minnesota, Cornell University's Horticultural Department and by us (Prescription Soil Analysis, LLC).

As far as what test(s) to order, let me reiterate; it depends on your goals. Strong acids test for everything whether or not it is available to the plant. It may become available at some time or it may not. If you are growing corn, you can put on an available form of nitrogen that can make the corn (a grass plant) grow right away.

For turf, trees and shrubs, professionals are more interested in health than growth. People don't want their landscapes growing out of control. They want to balance the nutrient levels to provide optimal growing conditions with the least amount of investment. In today's more chemical-adverse environment, balancing nutrient levels correctly may reduce disease, insect and weed issues — thereby requiring fewer chemical control products.

Maurer: It should also be noted that soil testing, as important as it is, does not provide the complete diagnostic profile. Tissue analysis, sap analysis, comprehensive soil biology analysis and even water-quality analysis — for areas close to salt water or when watering sources may have undesirable ingredients — are all valuable forms of testing. In combination, various tests can all contribute to a professional's more complete understanding of poor plant health and possible avenues of remediation. **AA!**

For more information about soil testing, visit www.PrescriptionSoilAnalysis.com or call 866-609-4172, ext. 2