Which Soil Test?

Turfgrass fertilization recommendations often include references to soil nutrient testing as a means of determining desired levels of nutrients other than nitrogen. Typically, once a sample is extracted and submitted, most turf managers look to the interpretation of the results suggesting a nutrient is low, medium or high. However, recent research has been raising some concern over the way in which nutrient testing is conducted, the type of medium submitted (sand vs. soil) and how the results might be interpreted.

Researchers from the University of Connecticut have been investigating the relationship among chemical extractants used in soil testing, extractable soil phosphorus (P) levels, and turfgrass growth and quality in sand-based systems. The goal of this research is to more accurately assess the amount of P available to the plant in sand-based systems and determine the relationship between amount of P and turfgrass quality.

Critical extractable P (above which there is little chance of increasing soil P concentrations) were generated using Mehlich-1, modified-Morgan and Bray-1 extractants. The data was then statistically analyzed to determine how extractable levels related to observed turfgrass growth and quality.

The results indicated that the modified-Morgan extraction (a weak acid solution) correlated well with observed turfgrass quality as well as P deficiency and tissue P levels. For example, creeping bentgrass grown in plots where extractable P was less than a critical level determined by the modified-Morgan were more bluish, purplish green than leaves in plots that were greater than the critical concentration.

This study is one of several soil testing studies published or currently underway to assess the relationship between laboratory methodology and field observations. It is worth noting that most of our current thinking on soil testing in turf comes from studies conducted over 20 years ago or borrowed from production agriculture. Furthermore, the basis for the old recommendations came from studies conducted on soil, not sand-based rootzones.

From: Guillard, K and W.M. Dest. 2003. Extractable soil phosphorus concentrations and creeping bentgrass response on sand greens. Crop Sci. 43:227-281.

Are Sand Rootzones Sterile?

The turfgrass industry has seen an enormous increase the number of products offering "enhanced microbial activity." This is especially true for turfgrass managers who have turf on predominantly sand-based rootzones which have long been thought to be void of significant microbial activity.

Researchers from North Carolina State University conducted an experiment on new sand-based rootzones not amended or amended with several organic (peat moss) or inorganic (greens choice, Profile, Isolite) products. The greens were established to creeping bentgrass turf and then analyzed for various microorganism populations present.

Bacteria, fungi, actinomycetes, and aerobic spore forming (Bacillus sp.) populations, as well as nitrifier and denitrifier organisms were determined. Interestingly, within the first six months after seeding, bacteria population levels were most prevalent and similar to those found in mature sand-based rootzones. There were no differences among amendments as they exerted no appreciable effect on microbial populations. It is important to note that during the establishment of the green through the two years of the study, pesticides were applied on a regular basis which supports previous research that found that modern pesticides have little influence on overall microbial populations.

The researchers concluded that the major influence on microbial populations in sand-based rootzones is the presence of a turfgrass root system. Therefore, to the extent that an environment (soil pH, temperature, etc.) influences a root system, it follows that the microbial population will be influenced. So, if you are managing a healthy root system, there will be a plethora of microbes.

From: Bigelow, C.A., D.C. Bowman, and A.G. Wollum II. 2002. Characterization of soil microbial population dynamics in newly constructed sand-based rootzones. Crop Sci. 42:1611-1614.

Scanning the Journals

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