2001: A Turfgrass Odyssey

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The age of information technology has reshaped the way people, societies and countries do business. Fortunately or unfortunately, depending upon your technological savvy, these innovations apply to turfgrass managers as well. Frequently, individuals mistake the latest gadgets, machinery or toys as the answer to all or most of their turf problems. Unless sound agronomic principles are followed on a daily basis the new and improved technology or tools are useless.

However, what happens when some of the technology being developed today aids in providing sound agronomic management techniques? Such is the case with several new advances.

Researchers at Oklahoma State University are perfecting a vehicle-mounted optical sensing unit that reduces nutrient losses to surface and ground water. The sensing units detect turf areas that are nitrogen deficient or excessive. Optical sensors on the front of the vehicle individually control spray nozzles at the rear of the unit. The nitrogen status of each square foot of turf is measured and sprayed with up to 15 different rates of fertilizer. This technology could drastically improve turfgrass management techniques by accurately placing nutrients only where needed. This could lead to substantial economic savings for fertilizers, reduced nutrient losses to leaching and runoff, more uniform turf appearance and improved stress tolerance.

Faculty in the Department of Horticulture at the University of Arkansas, Fayetteville have been working on digital photography and image analysis to help in determining turf color, the diagnosis of turfgrass diseases and calculating the percent turfgrass cover. The use of digital photography will be of value for multi-site turfgrass cultivar evaluations. Researchers can utilize the digital camera and related software to obtain the same data as compared to the traditional method of subjective analysis.

Determining turf color has become easier with the use of digital photography. Turf plots can be photographed and analyzed with appropriate software to determine the exact color in relation to the industry standards: color chips. Again, turfgrass cultivar evaluations will benefit the most from this development. Scientists from around the nation can establish a set of color guidelines based on the results of the digital images and information generated from the data, not from a set of evaluators' personal preferences.

The use of digital image analysis equipment and software is being used to accurately determine the amount of blighted turf in test plots. Determining the exact amount of diseased turf in a defined area is virtually impossible with the naked eye. Obviously, this technique is only helpful when looking at turfgrass diseases that produce noticeable differences from healthy turf. Disease prediction models could utilize the data generated from the digital photographs to aid in management decisions for fungicide applications.

Another benefit from the use of digital photography is determining the percent of turf cover in a given area. Evaluating turfgrasses for establishment purposes is often difficult to assess based on the existing labor-intensive methods. Digital image analysis can quickly and accurately determine the progress of establishing a given plot.

Additional research is being conducted at the University of Arkansas with the digital image analysis tools to monitor nutrient levels in turf. This technology will use the color analysis software to detect different amounts of chlorophyll in the turf. The benefits of this research could be similar to the Oklahoma State research, reduced fertilizer inputs in turfgrass management programs.

Southern Illinois University and USDA – Natural Resources Conservation Service scientists recently showcased another interesting tool that utilizes ground-penetrating radar to investigate the subsurface features of putting greens. This machine can be used to determine compacted areas, drainage lines, wet areas, subsurface layers and rootzone mixture thickness.

The researchers know this technology is not the final answer when it comes to determining if a green needs to be renovated, but it can aid in troubleshooting any problem areas that constantly give the superintendent headaches, without having to rip up the entire green.

All of these research findings and developments are very promising. Yet, it is going to take more time and studies to define the technology as well as the equipment. The impact of these devices may not have dramatic effect on the way turf is being managed right now. However, the next generation of turfgrass managers may be armed with these devices and tools and make management decisions with just a click of a mouse.

Welcome to the next turfgrass odyssey.