Changing Landscape Management Behavior

Society is facing an interesting paradox regarding landscape management that might influence important education decisions. For the most part, industry economics suggest that people are increasingly more interested in paying for a high quality landscape or doing it themselves. On the other side, it seems that there has never been more concern for resource management and the environmental impact of landscaping practices than there is today. Desire and concern drives Best Management Practices (BMP) that preserve environmental quality and provide a pleasing landscape. BMP's are more knowledge intensive and it would be interesting to know what is the best way to educate people on these issues.

The Florida Cooperative Extension Service (FCES) instituted an Environmental Landscape Management (ELM) program to educate citizens on BMP's. There was a considerable amount of resources and focus invested in this program and the Extension faculty was interested in knowing what was the most effective delivery strategy. There were four groups of individuals in the study who were surveyed for their adoption of 39 landscape management practices from fertilization and watering, to soil testing and pest management. One group was the Master Gardener (MG) trainees who received both educational seminars and written publications on topics. A second group received only seminars, a third group only publications and fourth group did not participate in any education.

As you might imagine, the group that did not participate showed no improvement and even digressed with some of their practices, indicating that some education is good. Both the seminar only and publication only groups showed minor improvements in the measured areas, however, the MG trainees who received both seminar and publications on the information showed significant positive changes in their landscape management practices. It was suggested that seminars enable faculty to lay groundwork for the printed information and to motivate people to take action. A final note from a similar study indicated that people are likely to adopt environmentally friendly practices when they reduce their workload, incur no extra cost, conform to neighborhood norms, and prevent environmental damage.

(From: Israel, G.D., J.O. Easton and G.W. Knox. 1999. Adoption of landscape management practices by Florida residents. HortTech. 2:262-266.)

Roots of Summer Stress Tolerance

The summer of 1999 has demonstrated, once again, how the turfgrass industry is limited under periods of severe stress as a result of the genetic nature of our plant material. Cool season grasses, such as Kentucky bluegrass simply do not have the genetic capacity to sustain active growth under periods of high temperature and moisture stress conditions.

Researchers at Rutgers University have been exploring the genetic diversity of Kentucky bluegrass varieties for the last several years. Recently, research has been attempting to identify the specific mechanisms by which some bluegrass varieties are more able to tolerate summer stress conditions.

A field experiment was conducted in 1995 and 1996 to evaluate five stress tolerant and five intolerant varieties for canopy temperature, root and shoot growth as well as soil moisture depletion. Plots were maintained at 1.5" height of cut and fertilized to supply 4 lbs. of N per 1000 square feet.

The most fascinating result was the clear difference between stress tolerant and intolerant varieties when canopy temperature and stomate resistance was monitored. It was long suggested that *decreased* transpiration was an important strategy for summer stress survival. However, this research suggests that stress tolerant varieties are able to maintain water movement through the leaves while under stress, thereby providing transpirational cooling which likely sustains active growth during stressful periods. This transpirational measurement was supported by the soil moisture depletion observed at the 6" to 12" depth by the stress tolerant varieties. Interestingly, while there was no difference in root mass at the 6-12" depth, the tolerant varieties were extracting more moisture while intolerant varieties did not.

This work provides key observations that under conditions where a moisture reserve can be maintained deeper in the profile, there are summer stress tolerant bluegrass varieties are able to extract moisture, maintain transpirational cooling and sustain active growth. This information will be useful for breeders attempting to develop more stress tolerant varieties.

(From: Bonos, S.A. and J.A. Murphy. 1999. Growth responses and performance of Kentucky bluegrass under summer stress. Crop Sci. 39:770-774.)

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Scanning the Journals

A review of current journal articles

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Golf Course Impacts on Water Quality

New golf courses continue to be constructed while significant concerns persist regarding sustainable land development and the potential impact golf courses on water quality. As a result of these concerns, local, state and federal government agencies have begun to require some form of water quality monitoring for nitrate-nitrogen and pesticides applied to golf courses for permitting and water quality maintenance purposes. Monitoring has become commonplace around the world and consequently a substantial database of water quality monitoring on golf courses is available to draw conclusions on the larger impact on water quality.

An environmental monitoring company received funding from the Golf Course Superintendents Association of America to identify water quality monitoring studies conducted on golf courses. Nineteen studies of 40 different golf courses across the country were included in this report that met stringent quality control measures for sample handling and laboratory analysis. This represents an important evolution in environmental research as many previously reported studies were conducted under highly controlled experimental conditions.

While the study presented some complicated data management challenges as a result of the lack of good geographical distribution (no sites in the mid-continent US), large amount of non-detectable samples and various prior land uses. Nevertheless, the overall conclusion was that widespread and or repeated water quality impacts by golf courses are not occurring. In addition, none of the authors of the individual studies that were reviewed concluded that significant toxicological effects were occurring. Still, regarding nitrate-nitrogen, while the maximum contaminant levels (MCL's) was not exceeded in surface water, 3.6% of groundwater samples exceeded MCL's. The percentage of pesticides detected in surface water and groundwater was 0.29 and 0.07% respectively. In addition, in several cases diazinon, not available for use on golf courses, was included in the percentages.

Interestingly, there were more and higher groundwater detects than surface water which is suggested to be related to the coastal plain courses in the study with flat sandy soils (similar to those found on LI). Finally, there was a slight statistical indication that detected pesticides tended to be of the more persistent and mobile type. Consequently, the importance of proper use of inputs and management, with some key information about pesticide and fertilizer chemical properties provides substantial water quality protection.

(From: Cohen, S.Z., A. Svrjcek, T. Durborow and N. Lajan Barnes. 1999. Water quality impacts by golf courses. J. Environ. Quality 28:798-809.)