

A CHECK-UP WITH THE USGA
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Golf courses and ecosystems. Not a new combination, but it certainly is an issue that has been, and continues to be, widely discussed in the turfgrass industry. Although the popularity of the game of golf has grown dramatically over the past two decades, the game faces one of its greatest challenges from people who believe that golf courses and course maintenance practices have a negative impact on our environment.

Since 1983, the United States Golf Association has committed more than \$12.5 million to fund 98 research projects at 33 land-grant universities. These research programs have addressed issues such as the potential for fertilizers and pesticides used to maintain golf courses to pollute our drinking water supplies; and concerns about the effects of high nutrient levels on humans and wildlife. This work is accomplished within the context of two distinct research programs.

TURFGRASS RESEARCH PROGRAM

For years, the USGA has financially supported many turfgrass breeding programs, including those at Rutgers University, University of Rhode Island, and Penn State University. The goal has been to develop grasses for the game of golf that exhibit improved turf characteristics, stress tolerance, or pest resistance. This research work has resulted in a significant number of new turfgrass variety releases for use on golf courses, and many others that have been released to seed companies for further development. These varieties also will impact many areas of the turfgrass industry, such as home lawns, sports fields, and parks.

During the next decade, the number of new introductions to the marketplace will increase significantly. These grasses will put the golf industry in an even better position to conserve and protect our natural resources.

ENVIRONMENTAL RESEARCH PROGRAM

In the first phase of the USGA's Environmental Research Program from 1991 - 1993, 21 projects were funded. The primary focus centered on three areas: 1) pesticide and fertilizer fate; 2) alternative pest management methods; and 3) the benefits and effects of golf courses on people and wildlife.

Significant data were collected concerning what happens to pesticides and fertilizers when they are applied to golf courses, including pathways such as leaching, runoff, and volatilization. Several studies investigated residues left on the turf surface after pesticide applications, and how golfers might be exposed to these residues. Other studies attempted to find ways to control turfgrass pests without the use of pesticides, including the use of biological controls. The environmental benefits of turfgrasses and golf courses were also investigated, and some initial work was done to characterize the effects of golf course activities on wildlife.

The USGA has published a number of books, technical reports, and articles in the *Green Section Record* magazine about golf and the environment. A listing of many of these information sources is available by contacting the USGA Order Department (800-336-4446) or by the *Green Section Record* magazine.

First year data from Dr. James Baird at Oklahoma State University regarding the effect of buffer strips on nitrogen and pesticide runoff has produced some interesting results. When soil moisture conditions were low to moderate prior to the first simulated two-inch rainfall, less than 1% of the applied nitrogen was collected in the runoff. At the next

simulated rainfall event, soil moisture levels were higher after six inches of actual rainfall had fallen during the previous week. The amount of nitrogen collected from the runoff event averaged 8% (Table 1).

The presence of an 8- to 16-foot untreated buffer strip significantly reduced nitrogen runoff when soil moisture levels were low prior to the simulated rainfall event. In contrast, when soil moisture levels were high, the buffer strip had little effect in reducing nitrogen runoff. This information will be important in formulating best management practices on the golf course. This research study will be continued for two more years to evaluate the effects of various maintenance practices, application timing, product formulations, and effects of various buffer strips.

The second phase of the USGA Environmental Research Program (1995-1997) has focused on cultural practices that can help prevent applied pesticides from contaminating groundwater and surface waters. Seven projects (Table 2) have been funded to research this goal.

Particular emphasis will concentrate on runoff and volatilization losses, the effects of thatch and turfgrass soils on pesticide degradation, and pesticide and nutrient fate modeling. At the conclusion of these studies, we should have a good perspective on the potential effects of golf course pesticides and fertilizers on our environment, and on the best management practices that can be utilized in golf course management programs.

PUTTING GREEN CONSTRUCTION RESEARCH

Technological advances have changed all facets of the game of golf. Golf continues to enjoy growth in the number of people playing the game. Improved grasses are being introduced, and advances in maintenance procedures continually improve.

New products and technologies have also had a significant impact on golf greens as well. As a result of these advances, the USGA Turfgrass Research Committee has recognized the need to investigate these new ideas and technologies and to further address the environmental and economic challenges of construction and maintenance of golf course greens. With this in mind, the USGA Executive Committee has committed funds to launch this new research initiative. The Golf Course Superintendents Association of America also has earmarked funds to co-fund five of the projects involved in the program.

The goal is to identify the best combination of construction, grow-in procedures and post-construction maintenance practices to prevent long-term problems, reduce environmental impacts, and produce high-quality playing surfaces. An important component of these projects will be to address issues related to the hydrology and microbiology of greens built to USGA recommendations and to alternative methods. Environmental issues, the use of alternative water sources for golf course irrigation, and addressing how organic and inorganic soil amendments fit into construction methods based on sound scientific information will play an important role in the research projects.

Ten research projects (Table 3) have been selected for this five year research program. As the projects progress, results will be reported in a variety of peer-reviewed scientific research journals and trade magazines. All of these research initiatives will play an important role in advancing our knowledge of golf course construction and maintenance.