

Reducing Chemical Use on Golf Course Turf: Redefining IPM

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Cover photo: View of the 2nd hole of the Green Course at Bethpage State Park, Farmingdale, NY. Taken by Jennifer Grant at an educational field day.

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Executive Summary

There is growing public concern over the use of pesticides and fertilizer on golf courses. At the same time, there is increased demand for immaculate course conditioning from the golfing public. Yet, scientific research, as well as practical field experience on managing golf course turf with fewer pesticides is scarce.

A long-term field research project was initiated at the Bethpage State Park Green Course to investigate cultural and pest management systems designed to be less reliant on pesticides. New research findings, as well as superintendents' experiences, are continually incorporated into the project and evaluated on a typical public golf course. Through this project we have developed environmentally compatible golf turf management programs that are less reliant on chemical pesticides and serve as the core of this handbook.

The project evolved over several years when it was determined that a “zero-pesticide” program in this environment was not feasible for producing acceptable putting green surfaces. The study now compares a “biologically based reduced risk” program with progressive IPM and conventional pest management. An important aspect of the project was the development of alternative cultural management programs such as mowing, fertilization and cultivation practices that results in a more stress tolerant putting surface system.

The Environmental Impact Quotient (EIQ) was introduced during the study to compare the environmental risk of the various pest management systems. The EIQ ranks pesticides using a composite evaluation of toxicity and exposure factors to aide in the selection of products with the least environmental impact. Using EIQ Field Use Ratings as a measure, the environmental impact of IPM and biologically based reduced risk management was 50-95% less than the conventional management. In addition, during the nine years of the project, the quality of the IPM managed areas has equaled that of conventional pest management systems. In addition, annual satisfaction surveys have shown that golfers do not perceive a difference in quality of the IPM managed putting greens.

The Green Course putting surface turf population has adapted to minimal pesticide inputs. This is primarily through reduced annual bluegrass populations—historically more susceptible to pest problems. This finding suggests turf populations can be “weaned-off” pesticides and maintain a playable surface.

The project has helped to reinforce the basic tenants of IPM: Use an interdisciplinary approach to understand the problem; use a series of preventative steps to minimize problems; and use pesticides only when pest pressure and environmental conditions are conducive to severe reductions in playing quality, and then chose the least toxic pesticide option.

This guide is organized to present the fundamental practices underlying the success at Bethpage so they can be customized for success at other courses. Chapters include:

1. Redefining IPM on golf courses
2. Cultural Management Practices
3. Stress Management
4. Pest Management
 - a. Diseases
 - b. Insects
 - c. Weeds

New concepts and tools are provided to forecast potential pest problems, correctly identify signs and symptoms, and to promote the cultural or environmental conditions that affect pest problems. The focus is on encouraging practices that improve growing conditions, and practices that aide in pest prevention. Intervention using pesticides is sanctioned in this guide when conditions such as weather, current infestation levels and site history coincide to predict loss of turfgrass cover or playability. The EIQ is promoted as a critical tool for pesticide selection to be used in addition to the manager's knowledge of effectiveness and cost.

This handbook also provides a new perspective on levels of visual and functional quality. The turfgrass surface should be evaluated based on playability as well as visual quality. In fact, player surveys conducted at Bethpage and on a national basis clearly show that a majority of golfers support programs to reduce pesticide use and value playability over visual appeal. This guide helps golf courses reset their expectations with the environment as a primary consideration.

The Bethpage study was initially funded by the United States Golf Association (USGA), subsequently by the Northeastern IPM Center (USDA-CSREES), and currently by the NYS Office of Parks, Recreation and Historic Preservation (OPRHP). OPRHP and Bethpage State Park in particular have been extremely supportive of this project, and have contributed immeasurable in-kind services. In addition to these organizations, the Golf Course Superintendents Association of America (GCSAA) and their Environmental Institute for Golf (EIFG) dedicate resources to funding scientific research and providing education on best management practices for golf. Amongst all these groups promoting environmental stewardship, New York State's commitment to reducing pesticide use on 29 state operated golf courses may represent the largest environmental leadership initiative in the industry, and paves the way for improving the environmental compatibility of golf.