Reduced Risk Management of Golf Course Putting Greens

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Introduction

This project was designed to provide information on the feasibility and performance of golf putting greens managed with few or no chemical pesticides. Golf turf managers faced with operating their facilities under constraints on the use of chemical technology need information on how to maintain acceptable, playable golf course turf. At the same time, those advocating pesticide restrictions need to be aware of the "costs" of implementing the policies and the resulting impacts on golf turf performance.

Project Design

The project is being conducted on the Green Course, one of 5 golf courses at the Bethpage State Park, Long Island, NY—site of the 2002 and 2009 US Opens. The Green Course accommodates approximately 50,000 rounds annually. The experiment is designed as a 3 x 2 factorial, with 3 pest management—*Unrestricted* (conventional), *IPM* and *Reduced Risk* (formerly *Non-Chemical*) and 2 cultural (*Standard* and *Alternative*) treatments. The alternative cultural practices were selected to reduce turfgrass stress. They include frequent light topdressing, hydrojecting, verticutting and spiking; higher mowing height; less frequent clean-up passes; and preemptive hand watering of known dry spots. Each green serves as a replicate, so that all 18 greens are used to accommodate 3 replications of 6 management systems. Total management systems as practiced by turf managers are explored, rather than focusing on individual technologies and isolated practices. 2005 was the fifth year of a long-term project funded by the United States Golf Association and Northeast IPM (USDA).

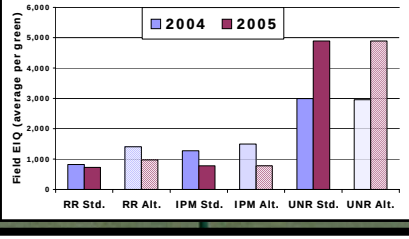
"Non-chemical" greens have low quality, replaced with "Reduced Risk" pest management

We were unable to maintain acceptable quality on the non-chemical greens during the stressful months of July and August. After the first year, 3 of these greens (the alternative cultural management treatment), were renovated with velvet bentgrass sod to reduce the potential for disease problems. After 2.5 years, the 3 poa/creeping bentgrass greens (the standard cultural management treatment), were switched to alternative cultural management. After 3 seasons, all non-chemical greens were switched to a "reduced risk" pest management approach that allows use of reduced risk pesticides. These changes were made to increase the likelihood of maintaining acceptable playing quality.

Evaluation

Systems are being evaluated for aesthetic and functional performance, pest occurrence, turfgrass species population dynamics, tissue and soil nutrient content, organic matter dynamics, rooting, labor requirements, pesticide usage and environmental impact, and golfer satisfaction.

Figure 1. Environmental Impact of Pesiticides

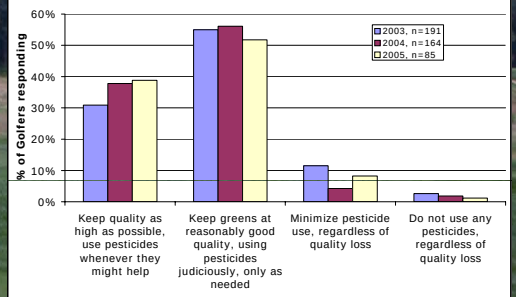


Pesticide Use and Impact

- Dollar spot was the primary pest in all years and was the target of most pesticide applications.
- The number of pesticide applications (excluding reduced-risk products) on the IPM greens was 27-60% less than on the unrestricted pest management greens, over the 5 years. However, reductions are better measured by environmental impact (see figure 1).
- The environmental impact of pesticide applications, as measured by the EIQ[1], was significantly highest in the unrestricted pest management treatments. The reduced-risk poa/creeping bentgrass greens had the lowest EIQ.
- On the IPM and reduced risk greens, herbicide use has been minimal on the greens proper, but collars have been treated occasionally.
- Insect pests were black cutworms and annual bluegrass weevils, but they were never major problems on the greens.

[1] Kovach, J., C. Petzoldt, J. Degni, and J. Tette. 1992. A Method to Measure the Environmental Impact of Pesticides. New York Agricultural Experiment Station Bulletin #139. Cornell University, Ithaca, NY, 8pp. Updated version available at http://nysipm.cornell.edu/publications/eiq/default.asp

Figure 2. Golfer Satisfaction Survey
Q: What is your preference for public golf courses?



Golfer Satisfaction Surveys

Golfers were surveyed annually from 2003-2005 to assess their perceptions of the visual and performance quality of greens managed under the various pest management and cultural treatments. In all years, the golfer ratings for the greens from all treatments averaged "good" to "very good" for overall quality and trackability (ability of a putt to hold a line), with the exception of the IPM alternative culture treatment in 2003 having a lower rating for trackability. In addition, all green speed ratings averaged "good speed" (as compared to "too fast" or "too slow"). Therefore, we conclude that golfers accepted the quality of greens as managed in all of our treatments in years 3-5, with the exception of times that turf was lost or greens were closed. Golfers were also queried on their opinion of pesticide use on golf courses. In all years, the majority chose an IPM approach (figure 2).

Turfgrass Quality and Performance

- Quality of the 6 IPM greens usually equaled that of the unrestricted pest management greens, throughout the 5 years. In 2005, significant differences were primarily a result of low quality velvet bentgrass greens.
- Mean ball roll distances ranged from 7.3-8.7 ft. through the season, and never varied significantly by treatment. However, these distances are below our minimum target value of 9 ft.
- Velvet bentgrass greens had very low disease incidence and severity throughout their 4 years on the course. Their quality was higher than their poa//creeping bentgrass counterparts in the first year, but have been plagued with cultural management issues since.

Further Information: Year 1-3 report at http://usgatero.msu.edu/; year 4, report #41 at http://nysipm.cornell.edu/reports/ann_rpt/AR05/comm.asp; year 5 (available spring 2006) at http://www.nysipm.cornell.edu/