# *Evaluation of Golf Turf Management Systems with Reduced Chemical Pesticide Inputs*

**Jennifer A. Grant**
Cornell University

**Objectives:**

1. Evaluate the aesthetic and functional performance of golf putting greens managed with few or no chemical pesticides.
2. Determine the environmental and economic impact of golf putting greens managed with few or no chemical pesticides.

**Start Date:** 2001
**Project Duration:** 3 years
**Total Funding**: $87,000

This project was designed to provide information on the feasibility and performance of golf course putting green turf managed with few or no chemical pesticides, and is being conducted on the Green Course at the Bethpage State Park, Long Island, NY. Current golf course pest management practices ("unrestricted") have been compared with IPM and nonchemical management for three years. Further comparisons have been made between standard cultural practices and "alternative" practices that we believe reduce turfgrass stress and thereby minimize pest problems.

Alternative cultural practices included mowing at 3.3 - 4.7 mm (0.130 - 0.188 in), increased N rate and use of organic N sources, frequent hydrojecting and vertical mowing, reduced frequency of clean-up passes, and hand watering of known dry spots prior to wilting. The nonchemical greens performed poorly in the first season. Therefore, the three alternative culture greens were subsequently converted to velvet bentgrass (SR 7200), a disease-resistant species. For pest management, cultural and biological practices were employed specifically to prevent or reduce pest problems on some or all of the nonchemical and IPM greens.

In 2003, we buried these greens under a layer of brewery-waste compost for the winter to suppress snow mold and build populations of beneficial microbes, kept fertility levels high to aid recovery from dollar spot injury, applied several biological or alternative products for disease management including EcoGuard™ (*Bacillus licheniformis* ), Allude™ (phosphite product), and Endorse™ (Polyoxin-D derived from fermented *Streptomyces cacaoi*), and removed weeds manually.

Dollar spot was the primary pest in all treatments and was the target of most pesticide applications throughout the study. However, its annual incidence decreased in all IPM and nonchemical treatments. Other pests of significance in 2003 included brown patch, fairy ring, summer patch, black cutworm, and goosegrass. Compost applications likely increased the population of beneficial microbes in IPM and nonchemical greens and may have contributed to reduced dollar spot incidence. However, the winter compost covers left layers in the soil profile and were associated with damaging fairy ring infestations and a high incidence of *Rhizoctonia*.

*A field day at Bethpage was attended by 60 golf course professionals and environmental advocates.*

Over three years, IPM greens received 29-46% fewer pesticide applications than the unrestricted greens, with the greatest reductions in the second year of the study. Quality of the IPM greens equaled that of the unrestricted greens for most of the study, with exceptions in the first and third year. In the nonchemical treatments, velvet bentgrass greens performed better than their counterparts, but were sometimes below acceptable quality.

The *Poa*/creeping bentgrass greens in the "nonchemical" pest management treatment were often of unacceptable quality and received an emergency pesticide application in 2002, and several in 2003. In 2002, quality of the alternative culture greens was usually higher than their standard culture counterparts in all treatments, and they received fewer pesticide applications. However, differences were less pronounced in the second and third years.

Impact of treatment differences is being further assessed with a survey of golfer satisfaction and perceptions in October, 2003. At a public field day in August 2003, 60 people toured the course and learned about the alternative and IPM practices and products employed in our project.

In a wet year like 2003, cultural and biological methods for disease suppression are less effective. In the Northeast, *Poa*/creeping bentgrass greens are highly susceptible to disease and stress pressure in July and August. Management with few chemical pesticides continues to be a challenge during these summer months with these turfgrass species. From what we have learned to date, we believe that pesticide use can be significantly reduced in some years without compromising quality.

## Summary Points

- The nonchemical greens performed poorly in the first season. Therefore, the three alternative culture greens were subsequently converted to velvet bentgrass (SR 7200), a disease-resistant species.
- Dollar spot was the primary pest in all treatments and was the target of most pesticide applications throughout the study. However, its annual incidence decreased in all IPM and nonchemical treatments.
- Over three years, IPM greens received 29-46% fewer pesticide applications than the unrestricted greens, with the greatest reductions in the second year of the study.
- The *Poa*/creeping bentgrass greens in the "nonchemical" pest management treatment were often of unacceptable quality and received an emergency pesticide application in 2002, and several in 2003.