

Research Results in Use Today: The Bethpage Green Course Project

An unusual project produces useful information that may affect legislation.

BY DAVID A. OATIS

The USGA Research Program solicits research proposals every year or two on fairly broad-based categories. Having sat on the committee for a year and gone through a call for pre-proposals, I can say that it is extremely difficult to choose which few of the many worthy proposals will receive funding. Many are highly technical, extremely innovative and creative, and most are very deserving. Unfortunately, there is never enough money in the budget to fund them all, and some very tough decisions have to be made. The project discussed here, the Bethpage Green Course Project, has been one of the more innovative proposals. It helps answer a question that we could only answer intuitively before: Can we manage putting green turf without pesticides? This project, while quite different from many other studies

funded by the USGA, has produced some very useful information.

The principal investigators in the Bethpage Green Course Project are Drs. Jennifer Grant, director of the NYS Community IPM program, and Frank Rossi, associate professor of turf-grass science at Cornell University, and they received tremendous assistance and support from the Bethpage State Park staff. The study was developed as a response to anti-pesticide legislation that has sprung up on Long Island, N.Y., in the last few years. The basic objectives were to:

- Evaluate the performance of putting greens managed with few or no chemicals.
- Determine the environmental and economic impact of greens managed with few or no chemicals.

- Evaluate alternative pest management options.

The study included six separate treatments, each of which was replicated three times.

TREATMENTS

Standard Culture (ball roll > 9 feet)

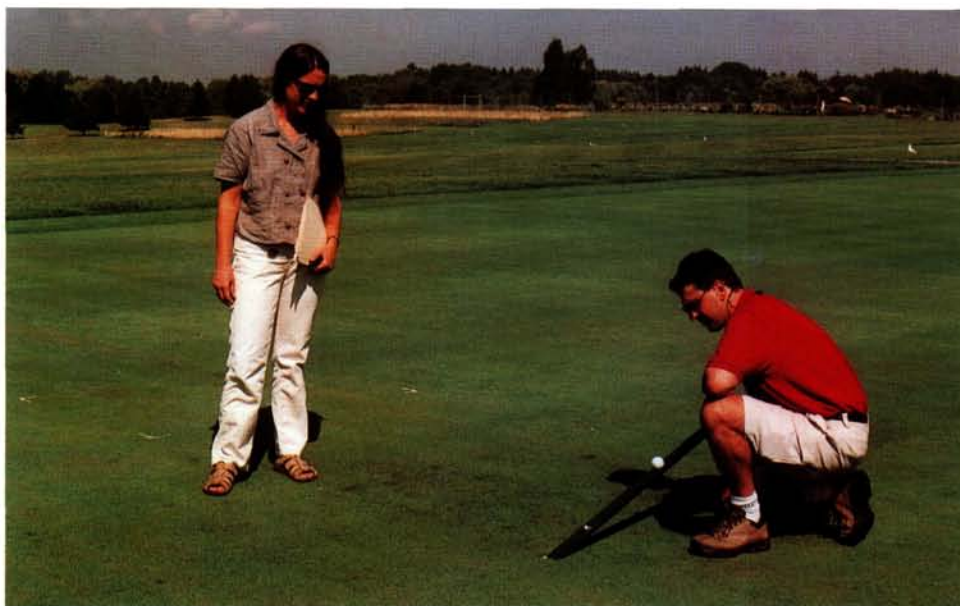
- Unrestricted Chemical Usage (Greens 1, 6, 17)
- Integrated Pest Management (Greens 3, 5, 12)
- No Chemical Usage (Greens 2, 4, 16)

Alternative Culture (ball roll > 8 feet)

- Unrestricted Chemical Usage (Greens 8, 9, 13)
- Integrated Pest Management (Greens 11, 14, 18)
- No Chemical Usage (Greens 7, 10, 15)

Cultural maintenance practices differed under standard and alternative culture treatments in order to achieve the target green speeds. The charts outlining the cultural maintenance activities for each treatment are listed in Figures 1 and 2.

Most turfgrass managers would feel very comfortable with the prediction that putting green turf managed without any pesticides would perform very poorly when subjected to heavy play, stressful weather, and normal maintenance stresses. Not surprisingly, that was one of this study's take-away messages, and these findings can be very useful for turf managers trying to justify the use of pesticides. It also should be noted that the study was performed in the Northeast, specifically on Long Island,



Drs. Jennifer Grant and Frank Rossi led the research activities conducted on the Bethpage Green Course Project. The research was designed in part to investigate if putting greens could be managed without pesticides on Long Island, N.Y.

Figure 1
Standard Treatment — Ball Roll > 9 Feet

Mowing Heights	0.110" to 0.140"
Irrigation	Automatic 3:00-4:00 AM (to prevent wilt)
Fertility	Spoonfeed (synthetic) 2.50 lbs. N 0.75 lbs. P 2.50 lbs. K
Topdressing	Light applications every 3 weeks
Rolling	As needed to maintain speed
Verticut	As needed
Cleanup Pass	Mowed 4x per week

and the results might be different if performed in other geographic areas and under different conditions.

Drs. Rossi and Grant tried many non-traditional techniques and products to improve turf quality without the use of pesticides, including various biological products. They were able to maintain *acceptable* turf quality until mid-August in all three years (2001, 2002, and 2003) of the study. Unfortunately, turf quality declined drastically at that point during each of the three years. *Acceptable* quality was defined as achieving a "6" rating on a scale of 1-9, with 9 being good, and the targeted putting green speeds often were not met. While the study clearly showed that successful turfgrass management, producing even reasonable playability, was not possible without pesticides, many other useful take-away messages can be derived from the study. The following are a few:

- The transition from pesticide usage to non-pesticide usage must be gradual and completed over a period of several years. This is not surprising, given that the greens in the study were nearly 80 years old and had gone through a lengthy period of natural selection to arrive at their current composition. Pesticide usage is a major factor in natural selection, as are many other factors such as irrigation management, fertility, cultivation, etc. The specific microclimate occupied by the turf also can play a significant role.

- The work suggests that mature courses that choose to go the non-pesticide route may have to regrass large turf areas in order to take advantage of the most recently developed turfgrasses and their improved wear tolerance and disease resistance characteristics. While many courses in the Northeast successfully manage old stands of annual bluegrass and creeping bentgrass with the use of pesticides, these same blends will not perform well without pesticide usage. As an example, Colonial bentgrass (*Agrostis tenuis*) has inherently better dollar spot resistance than creeping bentgrass (*Agrostis palustris*). There do not appear to be any Colonial bentgrass varieties that are well adapted for use on putting green turf in the United States, but there are varieties that will work well on fairways in climates where

dollar spot (and not brown patch) is the primary pathogen.

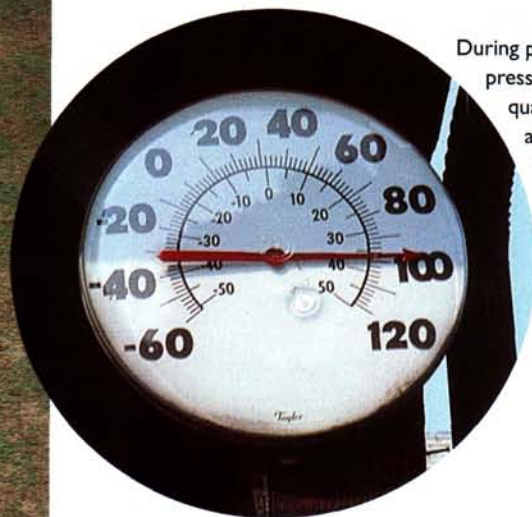
- Reduced golfer expectations are an absolute necessity if courses are to reduce or go to no pesticide usage. Current industry standards cannot be maintained without the use of pesticides.
- IPM (integrated pest management) in this and other studies has been shown to be a very effective means of reducing pesticide usage. In fact, pesticide usage in the integrated pest management treatments was reduced 35 and 50 percent, respectively, compared to the unrestricted pesticide use treatments during the first two years of the study. There was no reduction in the third year of this study (2003), probably because disease pressure was extremely high for much of the season. Still, the IPM treatments enjoyed a 28.3% average reduction when compared to the unrestricted pesticide use screens during the three years of the study, and this with no reduction in quality.
- More staff is required to go with a low or no pesticide usage approach. Additional staff are needed to perform the necessary scouting (at least 10-12 hours per week) to monitor pest populations. Extra labor also is needed to spot-treat the various different areas of the course and to experiment with the many biological products.
- Even with additional time and money to perform scouting and spot-

Figure 2
Alternative Treatment — Ball Roll > 8 Feet

Mowing Heights	0.170" to 0.185" (double cut 5 days per week)
Irrigation	After mow (pre-wilt by hand)
Fertility	Spoonfeed (synthetic and organic) 4.20 lbs. N 3.50 lbs. P 4.50 lbs. K
Topdressing	Light applications of sand weekly (no dragging)
Rolling	3x per week
Verticut and Spike	Every 2 weeks (except stress periods)
Hydroject	Every 3 weeks (raised position)
Cleanup Pass	Mowed 2x per week

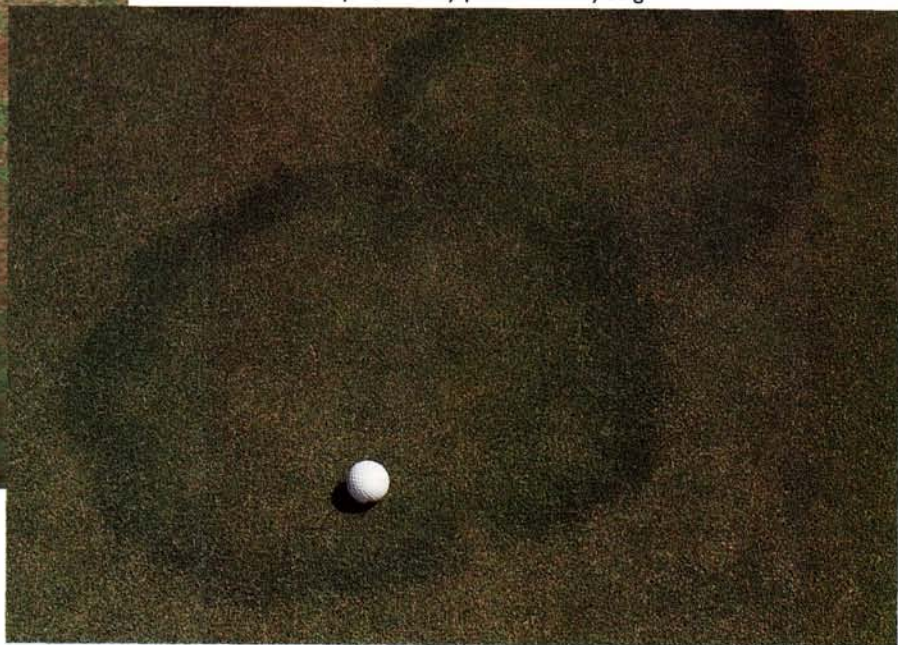


Turfgrass quality was maintained in the acceptable range through much of the season, but it declined dramatically in the no-pesticide treatments in mid-August during the three years of the research project.



During periods of high disease pressure, you can expect turf quality to drop off rapidly and significantly without the use of pesticides.

Some of the composts used in the research project seemed to provide some control of dollar spot, but they promoted fairy ring.



treating and experimentation with alternative pest management systems, the researchers could not compensate for the lack of pesticides. Thus, based on the three years of this study, it appears that some level of pest control products will have to be used to maintain even reasonable turf quality, particularly during periods of peak stress and disease pressure.

- Course owners, golfers, and members must be willing to accept risk if the decision is made not to use pesticides. The risk could entail a significant drop in playability standards or perhaps even

widespread turf loss. A very real risk also is that golfers may choose to go elsewhere to play the game.

So, the question remains: Can we manage putting green turf without pesticides? The answer is a shaky “yes,” but only with a major drop in expectations and an equally significant increase in risk. This study suggests that pesticides are necessary to maintain current industry playability standards.

In addition to the integrated pest management approach being shown to be effective, there are several other very positive outcomes from the study.

Numerous legislators visited the study site, examined the plots, and discussed the significance of the results and observations with the researchers during the course of the study. The study appears to be shaping legislation, as two counties have already adjusted their proposed legislation because of the results of the study, and three more counties currently are considering doing so.

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