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TABLE 4

## Soil Test Results

Treatment	pH	Acidity meq 100g	Exch Ca (ppm)	Exch Mg (ppm)	Exch K (ppm)
<b>2000</b>					
Control	5	3.1	528	101	252
BFS	5.6	2.3	791	154	240
SFS	5.5	2.4	783	120	253
Ag Lime 6.3	2	879	260	298	
LSD (.05)	.3	ns	164	28	ns
Two Way ANOVA Treatment Prob F	.001	.148	.005	.001	.07

Continued from page 50

### Slag and lime characteristics

The slags and lime used in these studies varied in their physical and chemical characteristics. (Table 1). The order of particle size from coarse to fine was SFS was more than BFS, which was more than Ag lime.

Both slags had very low fineness factor and effective calcium carbonate equivalent (ECCE) as shown in Table 1. Steel furnace slag (SFS) was higher in pH than BFS or lime. The order of  $\text{CaCO}_3$  equivalent was Lime > BFS > SFS. The steel furnace slag (SFS) was also higher in metals common to steel alloys such as chromium (Cr), vanadium (V) and cobalt (Co). This slag had very high total Fe content (Table 1), but the Fe was apparently unavailable as there was no increase in turf tissue foliar iron levels (data not shown).

The BFS by contrast was higher in the metals barium (Ba), Strontium (Sr) and beryllium (Be).

### Turfgrass quality

Rainfall from April through October totaled 25 inches in 1998, 21.4 inches in 1999, 21.7 inches in 2000 and 20.9 inches in 2001. This can be compared to the 30-year average of 22.9 inches for the months of April to October that comprise the principal growing season for turf in northeast Ohio.

There were no significant differences in the dry matter yield (P is less than .05) for the turf plots treated with BFS, SFS, or agricultural lime in 1998 (Table 3). In 1999, with a dry late summer growing season, the dry matter yield differences were significant at the (P is less than .05) level.

The turfgrass visual quality ratings were significantly different (P less than .05 level) in

1998, but not in 1999, 2000, or 2001 (Table 2). There was an overall significant (P is less than .01) positive relationship between turfgrass visual quality and soil pH (Figure 2) over the pH range of 4.9 to 6.5 and the four years of this study. In each year the agricultural lime treatment had the highest visual quality rating and the highest soil pH (Figure 1).

The BFS, SFS and agricultural lime all increased the plant Ca content, and the lime and BFS increased the plant Mg content when compared to plant tissue sampled from the control plots (Table 3). The plant Mg content differences were significant all three years while in the first two years the Ca differences were not significant at the P.05 level.

The micronutrients iron (Fe), manganese (Mn) and the toxic factor Al were not significantly different between the treatments except in the third year (Table 3).

Treatments had no significant impact on plant tissue levels of N, K, boron (B), copper (Cu) and zinc (Zn). The N and K levels in the plant tissue were above sufficient levels for all treatments.

### Annual soil tests

The lime and slags at 2 tons/acre in both 1997 and 1998 raised the soil pH in field experiments in 1998, 1999, 2000 and 2001 (Table 4 and Figure 1).

The campus lawn site was initially strongly acidic (pH 4.9) in the control plots. While differences between the slag products and lime were small, the lime always resulted in the highest pH and the lowest level of soil exchangeable acidity. However, the slags were apparently more effective than their ECCE would predict. Both slags and lime elevated soil test Ca and Mg levels (Table 3).

The soil extractable P levels were never significantly impacted by slag or agricultural lime treatments. Soil exchangeable K levels were not significantly impacted (P was less than .05 level) by the slag and lime treatments at the P was less than .05 level (Table 4).

### Conclusions

Work conducted during 1998, 1999, 2000 and 2001 comparing the effectiveness of steel industry slags with a pelletized agricultural lime as liming material showed that these steel industry byproduct materials have potential as liming compounds. No adverse consequences were



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noted from the materials at the rates and conditions used.

Both of the slags did have a low fineness factor and effective calcium carbonate equivalent (ECCE) because of the coarse particle size of the material provided. That would need to be corrected by further grinding and sieving in order to spread uniformly and to react rapidly with soil acidity. However, the slags were apparently more effective than their ECCE would predict. The commercial agricultural lime

resulted in the highest soil pH and produced the highest turf visual quality ratings.

There was a positive relationship between turfgrass visual quality and soil pH over the pH range 4.9 to 6.5 in this four-year study. Plant Ca and Mg were increased by the slag and agricultural lime products.

The slags give turfgrass managers an alternative and potentially less-costly product to choose if the particle size of available products is fine enough for rapid correction of soil acidity.

Munn is an associate professor at the Ohio State University Agricultural Technical Institute in Wooster, Ohio.

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# The Naturals



**How two New Jersey superintendents convinced members that their environmental plans for golf course maintenance made sense**

STORY AND PHOTOS BY LARRY AYLWARD, EDITOR



Les Carpenter, superintendent of Newton Country Club, has naturalized six acres of rough as part of his environmental program.

**P**aul Dotti cranes his neck and gazes up at the hideous-looking tree on the side of a fairway at Edgewood Country Club. The tree, struck by lightning a few years ago, has a stub for a canopy. It also has unsightly gnarls in its rotting upper trunk. The creepy-looking lumber would make a great prop in some Halloween haunted house.

But this dying and distorted tree has a special purpose — and that's why it still stands proudly on the golf course. Its partially empty trunk provides a haven for wildlife.

"We know this tree is dying," says Dotti, the 36-year-old superintendent of the 50-year-old course in River Vale, N.J. "But we know there are raccoons living in it, so we left it here for them. It's not a safety hazard, and nobody complains about it. It has a good purpose."

Wildlife is also welcomed at New Jersey's Newton Country Club, located about 50 miles north of Edgewood. Les Carpenter, superintendent of Newton, says natural areas on the course are used as nursing grounds for does and their fawns. Newton, located in the woody Andover Township, is also a base for bears, wild turkeys and several bird species.

"Early in the morning, all you hear are the



birds singing,” the goateed and well-tanned Carpenter says. “It’s like listening to one continuous song.”

Since the late 1990s, Dotti and Carpenter have adhered to a sound ecological approach toward golf course maintenance in a state that’s labeled more for toxic dumps than tree hugging. Dotti and Carpenter also managed to convince their long-time members, who were accustomed to wall-to-wall manicured turf, that their environmental strategies made sense on several fronts.

Edgewood and Newton are certified by Audubon International’s Cooperative Sanctuary Program for Golf Courses. That means the courses have returned maintained areas to natural sections. It also means the courses have reduced pesticide, fertilizer and water use, and created more homes for wildlife, among other preservations.

Initially, it wasn’t easy for Dotti and Carpenter to convince their clubs’ members that more ecological plans toward golf course management were the right plans. Both superintendents had to stand their ground for their causes. They also had to explain in detail to members why the programs made sense. And they had to gain support of their green chairmen and green committees to proceed with their plans.

### The skeptics

River Vale is an upscale area about 25 miles from Manhattan. Most of Edgewood’s 300 members employ landscapers at their homes to groom their yards to near perfection. They expected the same conditions day in and out at Edgewood.

Newton, established in 1916, is located in a small town in northern New Jersey. Like Edgewood, many members have been at the club for many years and were accustomed to the entire 160 acres of the course being manicured. Carpenter describes Newton’s roughly 305 members as more diverse, consisting of plumbers, teachers, doctors and lawyers.

In 1996, Carpenter decided to pursue Audubon International’s certification at the suggestion of the club’s former board president, who had a bachelor’s degree in environmental science. Edgewood’s environmental plan officially began in 1997 with a minor course renovation. Dotti and his crew shaved down a bank to generate fill dirt needed for the renovation. Instead of planting grass where the bank used to be, they planted wildflowers.

Initially, members at both clubs were skeptical of their superintendents’ blueprints to return maintained areas to their natural states. Members were worried the “new” natural areas, including sections of native grasses and collections of wildflowers, would only lead to lost balls and cause slow play. Members were also concerned the natural areas would provide a home for deer ticks, which could lead to lyme disease.

“A vast majority of members thought it was going to be a fiasco,” says Bob Malanga, chairman of Newton’s environmental committee and a member of the course’s green committee. Malanga says some members thought Carpenter was permitting the course to look sloppy and not doing his job.

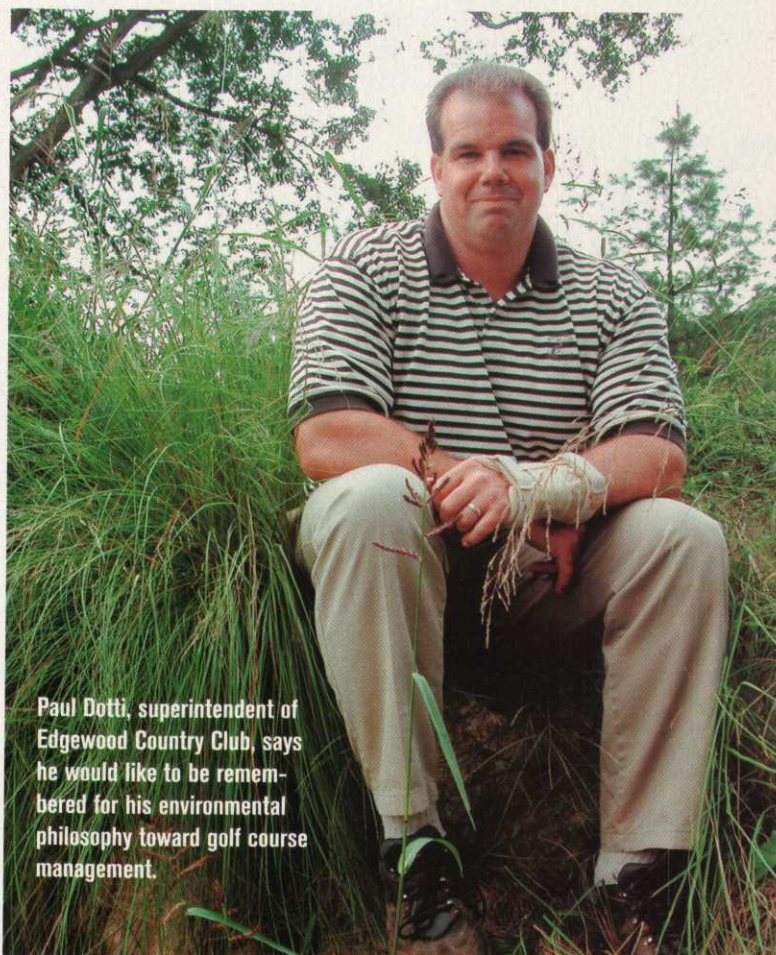
Some of Edgewood’s members grumbled, too, when they first noticed what they described as “unkempt” areas of unmowed fescue grass.

Dotti and Carpenter understood why members didn’t jump high and kick up their heels over the course’s new environmental practices.

*Continued on page 56*

### The Benefits of Going Natural

- Less maintained turf means less cost for overall maintenance.
- Wildflowers and other natural areas are aesthetically pleasing.
- More naturalized areas will attract more wildlife to courses.
- Reduced irrigation conserves water and saves money.
- Good public relations of a golf course and golf in general.



Paul Dotti, superintendent of Edgewood Country Club, says he would like to be remembered for his environmental philosophy toward golf course management.





Paul Dotti says members enjoy the natural look of the course, especially the wildflowers which are seen from many angles on the course.

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They knew the members were acclimated to the courses' well-groomed looks. They also knew that change in this case, as in many instances, was not going to be easy.

When a skeptical member questioned Carpenter for his decision to stop mowing roughs, he would politely tell the member to be patient.

"I just kept telling people to give the natural areas a season and let them mature," says the 46-year-old Carpenter, who has been at Newton for 17 years. "Most people were willing to do that."

Malanga backed Carpenter and lobbied members on his behalf. "It kind of looks like a bad haircut the first year," Malanga says, describing how a natural area appears at its beginning. "But it changes when it matures."

### Convincing members

Returning areas of their golf courses to natural settings was a gamble, Dotti and Carpenter admit. Edgewood's and Newton's members could have dismissed their superintendents' environmental plans as nonsense. But Dotti and Carpenter held their ground and convinced them otherwise.

Dotti and Carpenter knew it was vital to

communicate sufficiently to members what they were doing. Both superintendents took advantage of their clubs' newsletters to report their environmental plans.

Both superintendents also made themselves available to talk to members about their plans. More importantly, they empowered members to become part of the plans by soliciting them for their ideas and listening intently to their concerns.

"I told members, 'If you have any questions, I'm always on the course and more than happy to explain what we're

doing or what flower that is or what bird that is,' " Dotti says.

Both superintendents also pointed out to members that the environmental changes were good for economics, which the members were happy to hear. Decreasing maintained acreage meant cutting back on water, pesticide and fertilizer use, fuel for mowers, and wear and tear on equipment.

"I told members we'd probably save about \$10,000 in fertilizer, water and labor the first year," says Dotti, who has returned 30 acres of Edgewood's formerly maintained 180 acres to a natural setting of wildflowers and native grasses.

Today, Richard Bogen, Edgewood's green chairman, says members are more than aware of the cost savings.

"We don't have a budget that has a lot of frills in it," Bogen says. "That was one of the advantages of going to Paul's program."

Returning more acreage to natural areas also meant that both courses' crews could concentrate more intensely on the maintained areas. For instance, Carpenter had wanted to implement a first cut of rough at Newton, but he didn't have the manpower to do so. That changed when the course returned acreage to its natural state.

The bottom line: Members liked the idea of better-conditioned courses without an increase in labor costs.

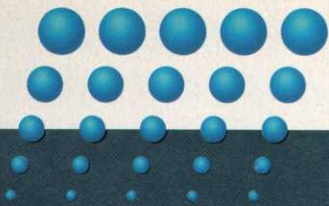
In both courses' cases, the superintendents'

*Continued on page 58*





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## The Naturals



(Top) This area of native grasses, to the right of the first tee at Newton Country Club, was formerly maintained turf. (Bottom) Some areas at Newton were naturalized because they were also dangerous to mow.



*Continued from page 56*

overall stellar reputations helped their environmental causes. They were and remain well regarded by their boards of directors and green committees because of their prior performances.

After Dotti took over at Edgewood in 1996, the course improved dramatically, especially the greens, Bogen says. Hence, Dotti became well respected at the course.

"There was such a rapid improvement in the quality of the golf course from when he took over that pretty much anything he was doing was going to be well received," Bogen says. "He's a very capable superintendent."

Malanga says Carpenter is trusted and respected by Newton's green committee, board of directors and members.

Third parties also helped to sell the environmental strategies, both superintendents admit. Newton's members wanted to hear from Audubon International, not just Carpenter, that their course needed to cut back on maintained acres. When Carpenter showed them Audubon's stance on the matters in a report, the members were more at ease. "They wanted to hear it from Audubon that we were doing the right thing," Malanga adds.

At Edgewood, conventional wisdom for the course's environmental approach soared when

USGA Green Section agronomist Dave Oatis commended Dotti and his staff for their ecological practices in a report, which was read by many members.

### Good PR

Edgewood's and Newton's environmental ways have also led to excellent public relations. Both courses have attracted much media attention, including a story in *The New York Times* about Edgewood's program. The members like the attention the clubs receive, Dotti and Carpenter say.

"Golf courses are under the microscope," Dotti says. "The perception is that we water and spray all the time and are polluting the waterways."

Increased wildlife sightings have also created good PR. Because the courses have decreased their acreage of maintained turf, the wildlife has become more apparent — and golfers love seeing animals scurrying by.

"There has always been plenty of wildlife here," Carpenter says. "But what the natural areas do is provide a corridor for animals to get from one side to the other. So you're more likely to see them."

Before the native areas were implemented, little wildlife was seen at Edgewood. Now there are several families of foxes and other animals roaming the course.

"We've got birds and animals on the course that we never saw before," Bogen says. "You see some incredible bird species at different times of the year."

### A balancing act

While members have accepted their courses' environmental directions, Dotti and Carpenter realize they must compromise with members on certain issues. For instance, Dotti says native areas will never occupy space in front of tees, where they could interfere with playability. "We don't force carries on any of the native areas, especially the ladies' tees."

Dotti must also play politician when it comes to pesticide use at Edgewood. As much as he would like to decrease chemical use even



more, Dotti knows it's his job to please the members, who desire the greenest golf course possible.

"We stick to the plan that we're going to do what's right for the environment," Dotti says. "But we're not going to do anything to upset the members. If we skip a spray or two, the members will never notice. But if we stop spraying all together, they're going to notice."

### Upholding their reputations

Despite resistance to their programs early on, both superintendents say they're surprised at how fast members accepted them. Carpenter expected it to take three or four years to convince most members that Newton was doing the right thing. But members went from complaining about the program to making suggestions about how to improve it in less than two years.

Dotti admits he expected more resistance as he kept planting more wildflowers. When golfers summoned him over in the clubhouse

after their rounds, Dotti was apprehensive and expected them to complain. But he breathed a sigh of relief when they told him they "liked the new wildflowers where the rough used to be."

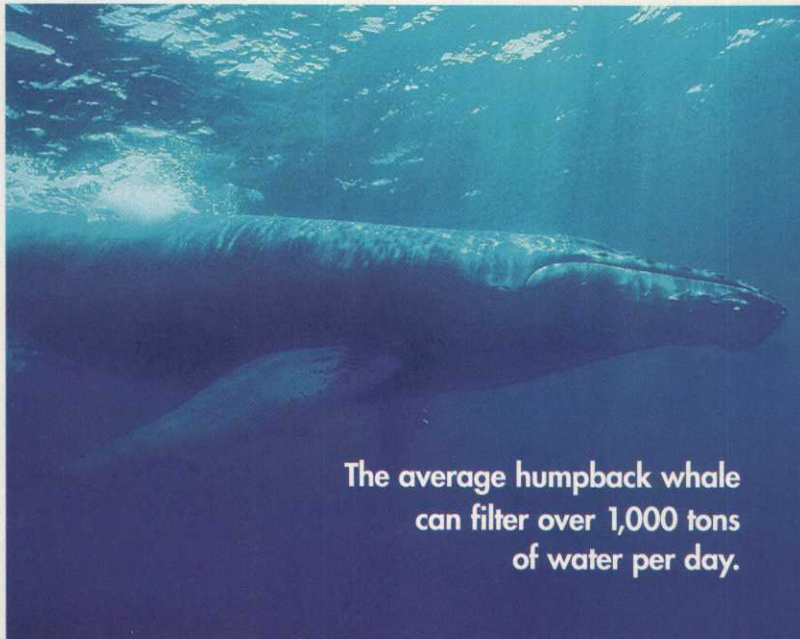
In the end, most of Edgewood's and Newton's members discovered that the natural areas didn't slow their play and that lyme disease wouldn't run rampant. The members also gained more respect for their superintendents for standing by their environmental programs from the outset.

Like some superintendents are known for their knacks for getting golf courses in near-perfect condition for star-studded professional tournaments, Dotti and Carpenter have made names for themselves for their environmental prowess.

"When I leave here, the members will know that what I did here was the right thing," Dotti says in a humble tone. "I'd like to be remembered for giving a quality product to them with as little impact on the environment as possible." ■

**"We've got birds and animals on the course that we never saw before."**

**RICHARD BOGEN**  
GREEN CHAIRMAN  
EDGEWOOD COUNTRY CLUB



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