

Compost on trial in green, fairway tests

Enterprising golf course superintendents begin their own research to determine the value of compost as a disease fighter and waste reducer.

After hearing for many years about compost experiments at universities, two innovative golf course superintendents are launching their own research to see if the recycled soil supplement lives up to its claims in the real world.

The courses, one in Connecticut and the other in Illinois, are working with GreenCycle, Inc., a green waste recycler, to demonstrate whether the agronomic benefits seen in lab tests of compost can be realized on their courses.

University laboratory and field tests typically show compost helps improve nutrient levels, water retention and thatch in many soils.

Evidence in recent years indicates that compost helps fight turfgrass disease by creating conditions that support high populations of beneficial microorganisms; these organisms may crowd out or directly attack

harmful fungal strains that can weaken or kill grass.

Fungal disease are especially critical in the game of golf because the grass is under severe stress. The grass, especially on putting greens, is mowed frequently, and kept very short. Further stress comes from golfers' spikes, clubs and golf carts, as well as maintenance machinery like mowers. Fungicides for prevention or cure of diseases, represent one of the largest single-budget items for golf courses.

Scientists are still trying to understand the mechanisms of natural disease suppression. A handful of biological fungicides have been labeled for the green industry, but the amount of knowledge still to be learned far exceeds today's knowledge.

"I've always looked to research to guide operations, so it's natural to take the opportunity to run our own research," says John Napier, superintendent at the 27-hole Stan-

Compost is applied to North Shore fairway with this sizable broadcast spreader.



Sod nursery germinates quickly

ley Golf Course, a municipal course in New Britain, CT, that hosts about 75,000 18-hole rounds a year—"a golf factory that gets a lot of stress," describes Napier.

Relying on research

"Anything we learn helps us in the future. If operations improvements come out of this project, that'll be great for us. It would also be great for the general waste disposal in this country," he adds.

Napier has built a putting green sod nursery that puts compost to the test as a soil amendment in new construction (see sidebar).

"The point is to see how the [compost] affects germination, without using the geotextile cover. We definitely saw some plots on the nursery were greener than others, with a better turf stand.

"It will be interesting to see what kind of increase in germination there is," says Napier.

"Looking at it in winter, it's tough to tell. We'll narrow it down in March and April.

"Obviously, this time of year we worry about snow mold. It's been brisk and cold lately, but I'm not seeing any type of disease at all."

Napier says spring—"when things get moving"—will reveal if there's any significant leaf spot or dollar spot control. We also took some bio-solid and topdressed our chipping green. That's going to be interesting, because we usually did get root pythium on that green."

Composts are mixtures of decomposing vegetation or other organic materials. They're manufactured from a variety of organic waste sources, many of which previously would have been hauled to landfills. Because they can be manufactured from different materials, they can vary significantly in quality and performance.

Like peats, their primary function is to add organic matter to soils. This organic matter "buffers" turf from environmental

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The Stanley course had a 500 sq. ft. sod nursery built in the traditional manner, with a sand/peat mixture. The research began with the initial plan of adding another 500 sq. ft. and using compost rather than peat for the organic element of the root zone mix.

"Instead of adding 500 feet, we're adding on about 6,000 square feet and trying a wide variety of different materials to see what works best," says Superintendent John Napier.

"It's well worth the effort if we find a better way to produce a green at lower overall cost, while recycling organic wastes. It will pay off in years to come, for this course and everyone in and out of the golf business."

Organic materials are added to sand-based greens soil systems to "kick start" the natural process that is seen in a mature green. On a mature green, old roots die off and slowly break down into gasses that pass out of the soil, and leave behind some organic materials.

Napier began to install a bentgrass nursery at Stanley on October 11. He seeded with Providence bent on November 7 and covered it with a geotextile.



The nursery was seeded at a rate of 1½ pounds of seed/1000 sq. ft



Napier roto-tilled the nursery with the tiller set at a depth of eight inches.

"By early December, we saw some germination," says Napier.

Napier says he has used this method of seeding in the past and wanted to know if the compost will give off enough heat to speed up germination and establishment.

Maturation of the new turf in the different soils is another issue. Also, will composts might produce something harmful to young plants?

"Initially, we used the small backhoe/loader to haul the sand and sand/soil mixes to their proper plots. Using the trap rake and grading rake, we set the bottom layers to the correct depths."

Each test bed is 10-inches deep, 6-feet wide and 20-feet long. The experiment is to run for at least three years.

The compost and bio-solid material from GreenCycle was then brought in.

"After all the plots were finished, we roto-tilled the green with the tiller set at a depth of eight inches. We then rolled the green and smoothed the surface with the trap rake."

Napier says the nursery was seeded at a rate of 1½ pounds of seed/1000 sq. ft along with starter fertilizer at a rate of one pound N/1000 sq. ft.

"Our long term goal is to put some cups in the ground and allow golfers to putt while they wait to tee off on a par 3 located a few yards away," says Napier.

"We think this will help us test the green for wear and tear and stress." □

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demands placed on it. But composts and peats are two very different substances.

Composts:

- ▶ are finer textured than peats,
- ▶ have less organic matter content than peats,
- ▶ have lower cation exchange capacities,
- ▶ and generally have higher levels of soluble salts.

While composts have shown that they can reduce soil bulk density and increase the infiltration rate of heavy soils, their use in putting greens is still being investigated.

Fairway test

Dan Dinelli of North Shore Country Club, Glenview, IL, is working on fairway tests with Green Cycle composts. His course is maintaining fairway test plots for a disease suppression study started last spring by Dr. Michael Cole, University of Illinois at Urbana-Champaign.



'The compost definitely reduced the thatch and increased the earthworm activity, judging from the concentration of castings on the surface.'

-Dan Dinelli

Dinelli is using compost as a regular part of his fairway topdressing program and is researching the machinery and techniques that will make it as efficient as possible to use compost in place of peat during those maintenance operations. GreenCycle is sponsoring Dr. Cole's research and working with Dinelli to find the best screen grade and quality of compost for his needs.

"It's still too early for results about disease suppression in Dr. Cole's study," says Dinelli. "That's a long-term project that will have to be watched for in a couple of years. But from the standpoint of my course main-

tenance, I can definitely see benefits from compost applications on the fairway."

Dinelli's crews made one compost application on the North Shore fairways, with some sections left untreated as a test.

"The compost definitely reduced the thatch and increased the earthworm activity, judging from the concentration of castings on the surface. The compost gave us a denser, greener stand of turf."

Compost fights layering

One of his goals in applying compost to the North Shore fairways, says Dinelli, is to

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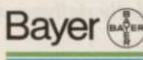
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Circle 107



John Napier, right, examines germination samples with Jamie Repenning, from compost supplier GreenCycle, center, and Greg Bugbee of the Connecticut Agricultural Experiment Station.

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avoid developing a troublesome layer at the surface.

Here's the procedure he used:

- ▶ He added the compost as one more step to standard aeration procedures.

- ▶ The fairway was core-aerated, and the cores pulverized with a vertical mower. Then, the compost was spread with a broadcast spreader.

- ▶ The soil-compost layer is then dragged with a section of chain link fence, which pulls the mix into the aeration holes and also helps gather up debris, such as thatch.

- ▶ After dragging, the fairway is cleaned with an air blower to move remaining debris into the rough, where it is cleaned up with rotary mowers with bagging attachments.

"We only added one step, the compost application, says Dinelli, "so we didn't need to make the composting a whole separate project."

Dinelli says disease suppression on the compost-treated fairways was hard to see. Disease pressure varies from year to year at many courses, and the summer of 1996 was a mild season.

"I don't think you can fairly evaluate a

From left, Jamie Repenning, John Napier and Greg Bugbee at the Stanley Golf Course nursery site.

product you apply just once during the growing season. I can't think of any product—fertilizer, pesticide, whatever—that you apply just once. I'd like to do the compost once a month and see what happens over the long term.

"But given those qualifications, with mild weather, and just one application, we spent just 38 percent of our typical fungicide

expenditure this year," Dinelli says.

Dinelli wants to limit synthetic products and increase the natural course conditions.

He has applied the Nature Safe organic fertilizer to the fairways in 1996, and uses a BioJect system to let the course irrigation water distribute two known anti-fungal biologicals—*Trichoderma harzianum*, marketed as Bio-Trek 22G, an EPA-registered biological fungicide—and the known antagonist bacteria *Pseudomonas aureofaciens*, used for disease suppression in farming.

"We're trying to bring these entities to-

gether to create a healthier environment for the turf, in the hopes that it can withstand all the stresses, one of which is disease," says Dinelli. "There's very little known about beneficial biological agents when it comes to turf; and we're trying to expand on that knowledge."

'If operations improvements come out of this project, that'll be great for us. It would also be great for the general waste disposal in this country.'

—John Napier

While he's learning on the job, Dinelli says there's a need for compost producers to continue refining their manufacturing processes to achieve greater physical and chemical/biological consistency in compost. **LM**

