



Environmental Case Studies

Property Name:

North Shore Country Club

PROJECT PROFILE

North Shore Country Club
Use of Composts to Improve Turf Ecology

Location:

Glenview, IL

Cordinator:

F. Dan Dinelli, CGCS, Superintendent

Type of Course:

Private Country Club

Project Description:

As the Superintendent at North Shore Country Club in Glenview, IL, I became interested in applying compost as a soil amendment after reading about research suggesting it's many agricultural benefits. Dr. Michael Boehm, Ohio State University and Dr. Eric Nelson, Cornell University have done helpful work, specifically about the effects of compost on turfgrass. Generally, researchers and practitioners recognize that incorporating high-quality compost does several things:

1. Adds food for nearly every kind of organism needed by a healthy soil,
2. Adds a diversity of organisms to the soil,
3. Encourages plant growth promoting substances in soils. Compost can also have an effect on soil structure, nutrient cycling, disease suppression, nematodes and other biological activity.

In fact, the use of composts on turf is not new. A book given to me by my Grandfather, Frank Dinelli (retired Greenkeeper at Northmoor Country Club), titled Turf For Golf Courses, by Charles V. Piper and Russell A. Oakley printed in 1917 has a chapter devoted to "Manures, Composts and other Humus Materials". Yet because compost is not widely used on golf courses, I wanted to participate in further research prior to investing in the process at North Shore Country Club.

Goals:

Our original goal was to see if the use of compost on turfgrass would suppress snow mold. But we also wanted to improve overall turfgrass ecology and health.

Implementation and Maintenance:**Phase I: Research & Evaluation**

In 1996, we participated in a two-year study of various composts and organic materials under the direction of Dr. Michael Cole of the University of Illinois and GreenCycle, Inc. (operator of several composting facilities) of Northfield, Illinois. The study was a



replicated 10' X10' plot design on our 5th fairway comprised of creeping bentgrass and Poa annua maintained at 1/2". During the field evaluation, all observations were noted. However, our main objective was to observe any disease symptom differential between the various plots.

Our first application was in the fall of 1996 to observe snow mold suppression. None of the materials demonstrated any noticeable snow mold suppression. However, plots treated with compost had a notably earlier green-up and recovery rate versus the control plots. We then repeated applications late spring of 1997. Observations through the remaining growing season showed strong dollar spot

suppression -- up to 80% reduction; improved turf color and density, and increased earthworm castings. Thus, while our initial objective of snow mold suppression was not observed, our experiment to test organic products to improve overall turf ecology proved quite successful.

Phase II: Implementation:

Based on favorable results after 2 seasons of field evaluation of compost topdressing, we implemented the strategy on all our fairways. During our normal coring of fairways, the process involves the following steps:

1. Coring with hollow tines,
2. Breaking up the soil cores with a vertical mower,
3. Topdressing with compost,
4. Mixing the soil with compost as it is matted into the surface with a section of chain-link fence,
5. Blowing the remaining tufts of turf and thatch into rough via a three-point hitch blower,
6. Picking up debris in the rough with an out-front rotary mower fitted with a bagging attachment,
7. Irrigate the area well.

We have been coring fairways like this for several years. Adding the extra step of compost topdressing has not significantly impacted the workload. The cleanup is about the same and we can still get our targeted 9 holes (15 acres) done in one day. (Note: Part of our IPM cultural program is poling, by dragging a chain over the fairways each morning to remove leaf moisture. This process also manages earthworm casting buildup).

Results:

The results so far are much the same as in the test plots: improved turf density and color; rapid healing of cored turf; Dollar Spot suppression; increased earthworm castings; and thatch reduction have been observed. We continue to monitor the impacts of compost use on turf and maintain computerized spreadsheets to evaluate our results. In time and continued applications, we hope to document improved soil structure and suppression of other diseases.

Perspective and Recommendations

Selecting quality compost is key:

Selecting quality compost is very important; you have to do your homework. Compost products are not yet standardized, so the challenge is in obtaining consistent, high quality compost. The procedure we use to assure the compost we obtain is optimal for our turf involves a series of tests. We analyze chemical, physical and biological activity (refer to the chart below for details).

- pH at 6.5 - 8.5
- None to trace amounts of ammonium, sulfide and nitrite
- Low concentrations of soluble salts, especially sodium
- We strive towards elemental balance and recommended ratios favoring the high side of potassium and calcium.

- Biosolids need to meet US EPA’s Part 503 technical rule for biosolids. All biosolids need to be tested for coliform and other diseases. Biosolids composted properly have been heated sufficiently to kill viruses, coliform and other diseases. Metals in biosolids are often high and this should be considered.

Analyzing Compost	
Chemical Analysis:	
•	In the chemical analysis we look for:

Physical Analysis

Physically we look for:

- Fine texture < or = 1/8”

Microbiological Analysis:

Microbiological analysis should show high biological activity in all functional groups and high diversity. The following six functional groups tested are:

Heterotrophic (Aerobic) bacteria

- Yeasts and molds (fungi)
- Nitrogen fixing bacteria
- Actinomycetes
- Anaerobic bacteria
- Pseudomonads

BBC Labs Inc. Can perform these tests. Soil Foodweb Inc. Can perform similar tests.

In addition, compost needs to be free of contaminants, such as weed seeds, plant parts, pathogens, stones, plastic, glass, wood, nails, etc. Compost also needs to be ‘mature’, testing >50% on the maturity index, by BBC Labs. In house maturity tests can be performed by planting grass seed in a pot, utilizing the intended compost as the growing medium, to observe seedling health and establishment. Another method is to fill a plastic bag with intended moist compost and allowing it to sit sealed in the sun for a few days. Upon opening the bag, the compost should have an earthy smell, not an offensive smell from ammonia or sulfur.

Following these procedures will help insure favorable results. Adverse effects can result when utilizing poor-quality compost. Starting slow and testing small areas first is always helpful. Developing a working relationship with local composters will help in understanding their product.

Additional Uses for Compost:

In addition to our fairway compost topdressing program, we also use compost in our ‘soil and seed’ mix for divot repair. Compost is used as topdressing while overseeding turf. In 1998, a 7,000 sq.ft. experimental putting green was constructed having 20 different root zone mixes. Each mix used USGA approved sand in a USGA root zone profile with various organic and inorganic amendments. The 90/10 sand/compost plots out performed the others considerably in seedling establishment and development. We continue monitoring other effects as the putting green matures. Compost tea is made and applied as a protective biofilm and to deliver plant growth promoting substances.

All composts are not created equal:

Understanding the chemistry, biology and science of compost is complicated. Parent material used, how it's managed during composting, and storage can all have a huge effect on the finished product and results. Yet our efforts to understand compost, particularly its microbial benefits, have paid off. Results using composts have been positive and the turf ecology is improving under our growing conditions.

Economic Costs and Benefits:

To apply compost topdressing to fairways we purchased a TY-Crop MH-400 for \$20,000. This material hauler/topdresser is used for other tasks as well, such as rapid refill of materials while topdressing greens and tees and applying sand in bunkers. The compost we currently use is a 50/50 mix of yard trimming compost and biosolids. Our cost for yard trimming compost is \$14.00/cubic yard. For us now, biosolids are freely available (EPA permits are needed). The rate used is approximately 17 yards (7 tons)/acre = 1/8" layer. Total material cost \$119/acre. We offset some costs by reducing our other fertility inputs and decreasing fungicide treatments as part of our IPM program.

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Submitted: 4/99