Golfdom'S PRACTICAL RESEARCH DIGEST FOR TURF MANAGERS

TURFGRASS TRENDS

EFFECTS OF ORGANICS

Organic and Biologically Amended Fertilizers

PART 2 Seasonal effects on turf quality and leaf chlorophyll content

By Adam Van Dyke

Superintendents manage large acres of turfgrass visible to the public and are often the targets of public scrutiny over the environmental impact of their management practices — specifically the use of synthetic fertilizers and pesticides. As the golf industry embraces the sustainable management movement, it seems like a plethora of commercial products containing organic and biological materials are being marketed to, and used by, superintendents.

Reasons for using these types of materials vary, but their use is nothing new (Carrier, 1923). However, the renewed interest in organic and biological products might be a way to reduce synthetic inputs on the golf course. The products also have uncharacterized benefits that may or may not improve turf health.

Research has shown that organic sources of nutrients can provide equally as good or better quality and growth of turf compared to synthetics (Rossi, 2006; Agnew, 1992), and biological inoculants have shown promise as bio-pesticides (Nelson et al., 1994). But studies in the field have lacked consistency (Nelson, 1998). Benefits associated with organic and biological materials often depend on application techniques (Jackson, 1999; Agnew, 1992) and environmental conditions (Rossi, 2006; Peacock and Daniel, 1995), creating uncertainty for end users. Therefore, the continued study of these types of materials under specific management regimes, and in different climatic regions, is important.

This study tested some commercially available organic and biologically amended fertilizers on golf course fairways in the Intermountain West for two years. The objective was to evaluate their effects on turf quality and leaf chlorophyll content when compared to some synthetic fertilizers.

The author would like to thank the superintendents at the courses — Troy VanDenBerghe at Willow Creek Country Club and David Willis at Glenwild Golf Club — for their assistance with this work.

Materials and methods

In Part 1 of this series, I explored assessing snow mold control with these specific

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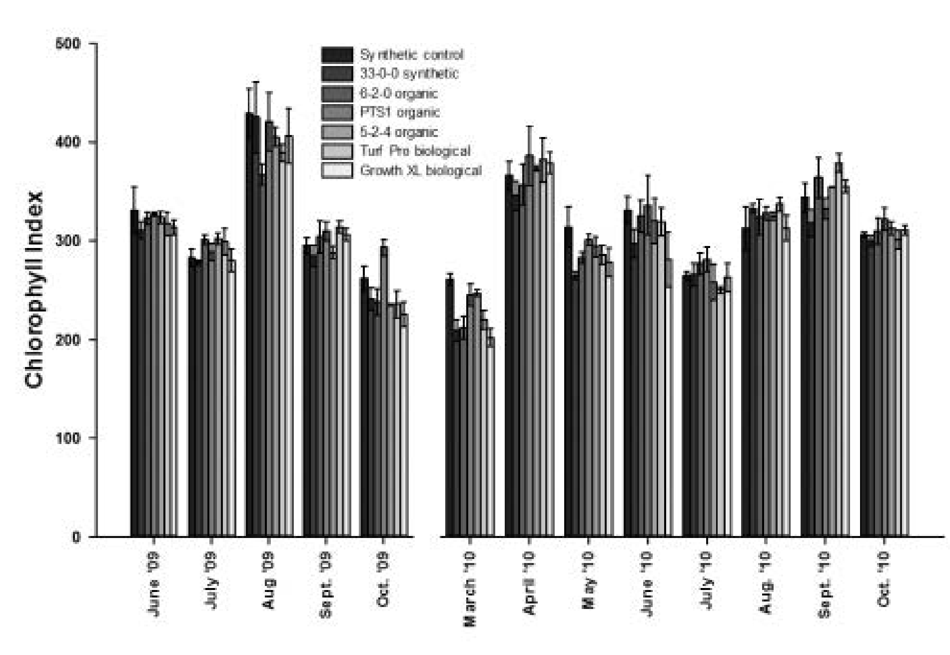
Editor's note: This is the second of a two-part series evaluating some organic and biologically amended fertilizers on actual golf courses. In September 2011's *Turfgrass Trends*, the author reported snow mold control data on highly maintained golf course turf after using these materials for two years compared to a PCNB fungicide.

IN THIS ISSUE

Effect of fertilizers on chlorophyll content of perennial ryegrass/creeping bentgrass fairway turf in 2009 and 2010. Error bars indicate standard deviation of the mean (n=3).

FIGURE 1: FERTILIZER IMPACT ON CHLOROPHYLL CONTENT



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organic and biologically amended fertilizers on two golf courses. It also provided background information for the Willow Creek Country Club in Sandy, UT, used exclusively for this part of the experiment.

Three organic fertilizers and three biologically amended soil inoculants that contain nutrients were applied to a fairway for two years and evaluated against three synthetic fertilizers. The organic fertilizers consisted of Milorganite 6-2-0 classic (Milorganite, Milwaukee, WI), Sustane 5-2-4 (Sustane Natural Fertilizers, Cannon Falls, MN) and PTS1, an experimental material whose analysis and company are confidential. Biologically amended materials included Growth XL 16-4-8 (3 Tier Technologies, Orlando, FL), Turf Pro liquid 0.5-0.2-0, and Turf Pro dry 1.8-0-0.1 (Organic Products, Groveland, FL). The synthetic fertilizers were Andersons' 33-0-0 material (Andersons Golf Products, Maumee, OH), and Utah's Finest brand 23-3-16 and 20-4-20 materials (Great Basin Turf, Layton, UT). Programs for applying the organic and biologically amended fertilizers were based on manufacturers' recommendations to control snow mold. Synthetic fertilizers were applied at the same rate of nitrogen (N) to normalize the treatments, but differences in other nutrients occurred. Granular fertilizers were applied by hand, while liquid treatments were foliar applied with a pressurized backpack sprayer.

Turfgrass quality was assessed each month on a 1 to 9 visual scale, with 9 being best, 6 lowest acceptable, and 1 worst quality. Turfgrass color was also measured each month using a chlorophyll meter that estimated the chlorophyll content in the leaves on a 0 to 999 index scale, with higher numbers equaling darker green plots. Greenup was also evaluated each spring on a 1 to 9 visual scale, with 9 having the darkest green turf.

Turfgrass quality

All organic and biologically amended treatments provided acceptable turf quality from June to October in 2009, and most had acceptable quality from April to October in 2010. That was not statistically different from the synthetic control. Turf Pro-treated plots had significantly higher quality in April, 2010, while Growth XL- and PTS1 organic-treated plots had significantly lower quality in May 2010 compared to the synthetic control. Additionally, PTS1 organic-treated plots had significantly lower quality in August, 2010 due to poor uniformity from annual bluegrass (*Poa annua* L.) encroachment. It is unclear why this weedy grass appeared in these plots during the fall of the second year.

Chlorophyll content

The treatments did not influence turf color on most dates in this experiment (data not shown). However, PTS1 organic-treated plots appeared to have significantly darker green turf in October, 2009 compared to both synthetic-treated plots, while Growth XL-treated plots had significantly lighter green turf compared to the synthetic control (Figure 1).

Additionally, Growth XL-, Turf Pro-, and some organic-treated plots had significantly lighter green turf compared to the synthetic control in March of 2010. However, Turf Pro-treated plots had significantly darker green turf compared to both synthetic-treated plots in September of 2010. Color differences measured in 2009 and early 2010 in Growth XL- and Turf Pro-treated plots may be explained by the reduced N inputs in the first year.

This study tested some commercially available organic and biologically amended fertilizers on golf course fairways.

Conversely, color enhancements in Turf Pro-treated plots in the fall of 2010 cannot be explained considering the same reduced N inputs. A half-rate N treatment was not included in the study for comparison, and effects of Turf Pro in reduced N programs should be investigated further.

The synthetic control had significantly darker green turf compared to 6-2-0 organic-treated plots in the spring of 2010 and compared to PTS1 organic-treated plots in the spring of 2011.

Perhaps climatic differences in each winter influenced release characteristics of these organic fertilizers, explaining the inconsistent data in each year. The synthetic control also had significantly darker green turf in the spring of 2010 compared to Turf Pro and Growth XL biological-treated plots. This may be explained by reduced N applied in the late fall of 2009.

Conclusions

The organic and biologically amended fertilizers provided acceptable quality and similar color of fairway turf as some synthetic fertilizers for most of the two-year experiment. However, differences in form of N, release characteristics, amount and other ingredients contained in the products likely confounded the results, making direct comparisons difficult.

Despite the uncontrolled variables in this experiment, results support statements made by Ostermeyer (2003) that organics and biologicals can play a role in golf course management. Much more research is needed, however, to characterize their effects, identify specific uses and develop local strategies to best integrate these materials into golf course management programs geared toward reducing synthetic inputs.

Adam Van Dyke, M.S., is owner and president of Professional Turfgrass Solutions, L.L.C. He specializes in conducting scientific studies and consulting for the golf industry. He can be reached at adam@proturfgrass solutions.com.

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