

# Natural Organic Fertilizer Considerations

Making superintendents better consumers.

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Motherhood, apple pie, and the American flag generate warm, fuzzy feelings for most Americans. Concepts like keeping the golf course firm, dry, and fast convey similar feelings to golfers. For turf managers, it's solid management, using only enough water, fertilizer, and plant protectant chemicals to grow healthy grass. There are no arguments to any of these points. The same "good feelings" are often extended to using natural organic byproducts on golf courses.



Ash is the residual material left over after the organic matter is combusted or burned off as carbon dioxide. This material may have the potential to add extra fines in the upper soil profile, contributing to decreased infiltration.

Turf managers have many options for fertilizing their turf. One of these options is the use of "natural organic" fertilizers. Unfortunately, not all natural organic (NO) fertilizers are the same. Much has been written and discussed within the industry about these products, and many turf managers get a good feeling about using them. After all, aren't they good for the environment? Aren't they a good way to use up all those abundant byproducts of our society? Don't they help discourage disease? Don't they help build up the beneficial microbes and organic content of soils, especially those (perceived) sterile soils used in green construction? Isn't using these products . . . well . . . good? The answer to all these questions is "yes and no."

Here is our disclaimer. It is important to state that these are not bad products.

That said, they are not wonder products. They have their strengths and weaknesses, just as any category of products does. The purpose of this presentation is to make golf course superintendents *better consumers*. That is, to ask the right questions about the NO products used on the golf course in general and on putting greens in particular.

## THE ORGANIC MYTH

Keep in mind the fallacy, or myth, of organic nitrogen. To the grass plant, it does not matter where the nitrogen comes from. The plant cannot distinguish (or use) organic or inorganic nitrogen differently. In fact, nitrogen can be taken up by the grass plant *only* in an *inorganic* form. This occurs when the soil microbes transform organic forms

of nitrogen into the inorganic form the grass plant can use.

Thus, these NO products are used for reasons other than to provide a "better form of nitrogen" to the grass plant. As stated above (and as common sense would suggest), not all natural organic products are the same. Far from it. Among other things, one aspect of these products that makes them different from each other is their mineral or ash contents. The table below shows some significant differences between three commonly used (and for the purpose of this presentation, unnamed) NO fertilizers in one very important area of concern: their ash content.

## ASH TEST ANALYSIS<sup>1</sup>

Product <sup>2</sup>	Percent Ash
Natural Organic Product A	50.8%
Natural Organic Product B	35.1%
Natural Organic Product C	26.0%

<sup>1</sup>Analysis by Dr. Andy McNitt, Penn State University

<sup>2</sup>Random samples collected from superintendents' stocks

## WHAT IS ASH?

As defined by Dr. Bob Carrow, University of Georgia, "Ash is any inorganic mineral attached to any organic material. This could include sand, silt, clay (and clay binders), and nutrient salts." Ash is the residual after the organic matter is combusted or burned off as carbon dioxide. It is not that "inorganic" is in itself a problem. Nutrient salts are inorganic and can test as ash. What can



be a concern is the accumulation of extra ash, extra fines, in the upper profile of a putting green, posing potential consequences for the turf manager. Sand-based rootzones can accumulate silt and other fines from wind, flooding, topdressing material, and other means. The overuse of these NO products could be one avenue where this process is accelerated.

Today we are using denser turfgrasses on our greens, be they bentgrass, bermudagrass, or even paspalums. Also, the older and more open grasses are being dwarfed, made denser, by the use of growth regulators. Extra ash in a fertilizer can only aggravate an all-too-common concern in the upper profile of a green — too much density, too much “stuff” that holds water, shortens roots, encourages moss and algae, etc.

Let’s do some quick math. Let’s assume that a hypothetical natural organic fertilizer contains, as an extreme, 50 percent ash and has a nitrogen content of 5 percent. When a fertilizer of this analysis is applied at a rate of 1 lb. of actual nitrogen per 1,000 sq. ft., 20 lb. of NO fertilizer is applied per 1,000 sq. ft. This equates to 10 lb. of mineral ash, or “stuff,” per 1,000 sq. ft. True, 5 percent of this mineral content could be the fertilizer salts, but the rest is ash. This may be cause for concern when a turf manager applies 2 lb. of nitrogen per year as a NO fertilizer, since 20 lb. of ash (fines and fertilizer salts) is also being applied. This could be a red flag or, at best, a yellow flag.

Excess ash can exacerbate all sorts of problems that already exist in the upper profile of a putting green. Such a green may be under-aerated and under-topdressed, and where excess moisture exists through irrigation or rainfall, problems can develop. When the sealing-off of the surface of a green occurs, extra work is needed to aerate the plugged zone, remove the cores, and topdress to fill the holes and ultimately to dilute the zone of fine particles, regardless of where they originated. Therefore, our suggestion is that these



While a certain amount of organic matter accumulates, the organic/thatch interface of this 10+-year-old putting green looks questionable.

NO products can and perhaps should be used in moderation and only after the superintendent knows more about the physical characteristics of the NO fertilizer being used.

## GENERAL USAGE GUIDELINES

- As a general rule of thumb, the best release rates from these products tend to occur in mid to late spring and early fall. While many of these fertilizers do contain quick-release nitrogen, some of the nitrogen is also slow-release, requiring microbes to break down the nutrients into a plant-usable form. A general guideline suggests that for every 18°F temperature rise between 32°F to 95°F, soil microorganism activity increases by 1.5 to 3.0 fold; thus, nitrogen release from organic sources in the hot, humid summer months can be much more rapid. Microbes need good soil aeration to work.
- Summer usage can increase algae and result in maximum NO fertilizer

release rates. This could be either good or bad. It depends on what the turf manager wants. After all, it is during these conditions when the microbes that release the nutrients should be most active. This can result in a difficult-to-predict release curve. Increasingly, superintendents are relying on soluble, spoon-feeding programs to maintain turf at this time of the year. The bottom line is that when soil temperatures are less than 55°F, these fertilizers tend to exhibit slow release rates. When soil temperatures are above 80°F, release can be rapid.

- Soil pH levels below 5.5 can affect release curves because of lower microbial activity.

## ENVIRONMENTAL BENEFITS

- **New golf course construction.** Natural organic fertilizers (and composts) incorporated into new soils can be beneficial. In fact, in the USGA Green Section’s *Tips for Success* publication, part of the pre-plant fertility in new construction is recommended to be from a natural organic fertilizer.
- **Recycling.** Golf courses are wonderful sites to utilize and recycle byproduct materials, be they wastewater, natural organic fertilizers, and composts.
- **High bulk and micronutrients.** These low analysis products allow the turf manager to spread low rates of nitrogen as a granular fertilizer, also containing a long list of micronutrients.

## CONCLUDING THOUGHTS

- Do not confuse natural organic fertilizers with composts. They are different. Natural organics generally have higher nutrient contents that are listed on the label as fertilizer and, thus, must meet fertilizer laws regulating nutrient content claims. Composts do not claim a specific nutrient content and are usually added to a soil to enhance organic matter content rather than serve as a fertilizer.
- Develop a buyer’s checklist. What are the strengths and weaknesses of the products available to you? The informa-



tion will help determine when and where to use these materials to their best advantage.

- Cost per pound of nitrogen. The nitrogen contained in natural organic fertilizers can be very expensive. Price it out.

- Review the expected release curves for any fertilizer product you plan to use, including NO fertilizers. Which product is right for your need? Be sure

(dollar spot) infection centers for two consecutive years, some products had no effect, and some fertilizers used in these tests resulted in an *increase* in dollar spot infection centers. Literature reviews are full of these contradictions. Clearly, general claims for disease suppression may vary from product to product due to the wide range of different natural organic products available to our industry.

consumers. Natural organic fertilizers have been part of our industry for decades. These products provide the turf manager with a low-analysis, easy-to-spread, environmentally sound material that can be used for all sorts of reasons, from supplying the grass with micronutrient-rich, low-nitrogen-analysis fertilizers . . . to melting ice and snow! Nevertheless, know the strengths and compensate for the weaknesses of



Topdressing remains one of the most effective putting green maintenance operations, both for better putting surfaces and for managing organic accumulations.

to use those products at the right time of the year to accent their strengths and negate their weaknesses.

- If you are committed to using large amounts of composts and natural organic products, adjust your golf course maintenance and management programs to mitigate concerns about the potential “fines,” the ash, they may contain. Some additional aeration and topdressing will have to be scheduled through the year.

- Research is unclear on whether or not NO fertilizers suppress disease. One study showed that some products *reduced* the number of *S. homoeocarpa*

- As Dr. Frank Rossi stated in his article from the September/October 2004 issue of the USGA *Green Section Record*, “There are no silver bullets” and “superintendents need to spend more time learning basic science.” He is right. When in doubt, always ask questions, be it of your regional USGA Green Section agronomists or scientists from state land-grant universities. Unbiased opinions along with applicable research are the foundation of the USGA Green Section and state university research and extension programs.

The purpose of this article is to help golf course superintendents be better

any NO products that you use on your course. Where a possible concern exists, either use these products in moderation or on areas of the golf course where their possible weaknesses are of less concern. In other words, be a *better consumer!*

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