

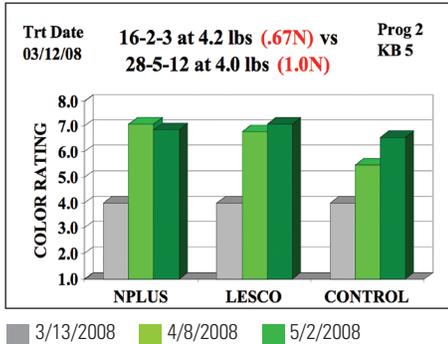


# Clarus Technology for Single Treatments

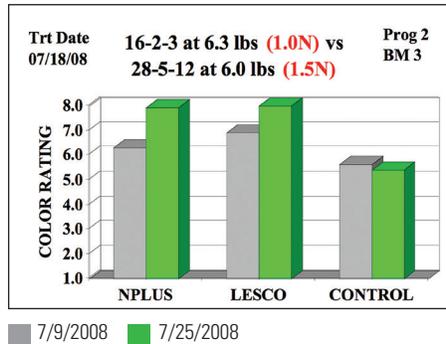
*Research Studying Organic Nutrients for Formulating Products Reveals a Classical Fertility Response Without Overapplying Nutrients*

## Nutrients PLUS – Single Treatments with Organic Nutrients (Figure 1)

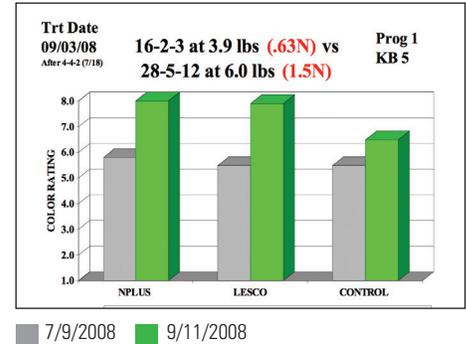
### SPRING - KENTUCKY BLUEGRASS



### SUMMER - BERMUDA



### FALL - KENTUCKY BLUEGRASS



Notes:

1. Warm-season and cool-season grass types responded throughout the seasons—spring, summer and fall.
2. Besides Bermuda and Kentucky Bluegrass, applications of 16-2-3 were also made to tall fescue with similar results.

Lesco is a registered trade name of John Deere Landscapes, Deere & Company of Moline, IL 61265

A number of Nutrients PLUS granular fertilizers were used in the long-term study commissioned by Nutrients PLUS. Nutrients PLUS 16-2-3 in particular provided a good example of how singular treatments can deliver results at significantly reduced rates of nitrogen (Figure 1). This is partly explained by classifying fractions of water insoluble nitrogen (WIN) from both organic sources, poultry manure and biosolids, like it is in conventional slow release nitrogen such as Urea Formaldehyde (UF). Together, these two sources of organic nutrients in 16-2-3 essentially replicate UF's range of activity. There are historical and technical reasons why the two distinct organic fractions have not been combined previously. Utilizing modern processing methods, both are now available to be mixed. Again, the combined mixture offers extended periods of activity closely resembling that found in standard UF formulations. By adding in three other conventional sources with their respective periods of release within the shorter ranges (quickest, quick and slowly available) a customized finished product is produced.

A caveat remains. The two organic fractions of WIN are delivered to soils embodied in a complex of organic matter. UF is not. In the absence of these substances less biochemical reactivity results and the mineralization of nitrogen to plant available form is diminished. The delivery of WIN embodied within self-contained sources of energy that gets used towards ensuring its conversion into a more available form is a more efficient methodology. Adding to this effect and supported by the results of bioassays<sup>1</sup>, the presence of naturally derived beneficial microbes in the particular form of composted poultry manure used when making the mix (of five nitrogen sources) will further enhance the product's performance. The benefits from the direct uptake of simple organic substances are also known. Auxins and humates are examples. They are known plant growth regulators with many benefits such as suppression of diseases and increased drought tolerance. While not the purpose of this report, an objective comparison would also have to include these merits of WIN complexed in organic matter but not provided by UF.

<sup>1</sup> Soil Food Web, Port Jefferson, NY, 2003

Virginia Tech- E.H. Ervin, Ph.D. *Budgeting Organic Matter into Programs with Fertilizers Containing Natural and Organic Ingredients for Sustained Functionality with Reduced Nitrogen Inputs on Cool and Warm-season Turf grasses.* 2008-2011





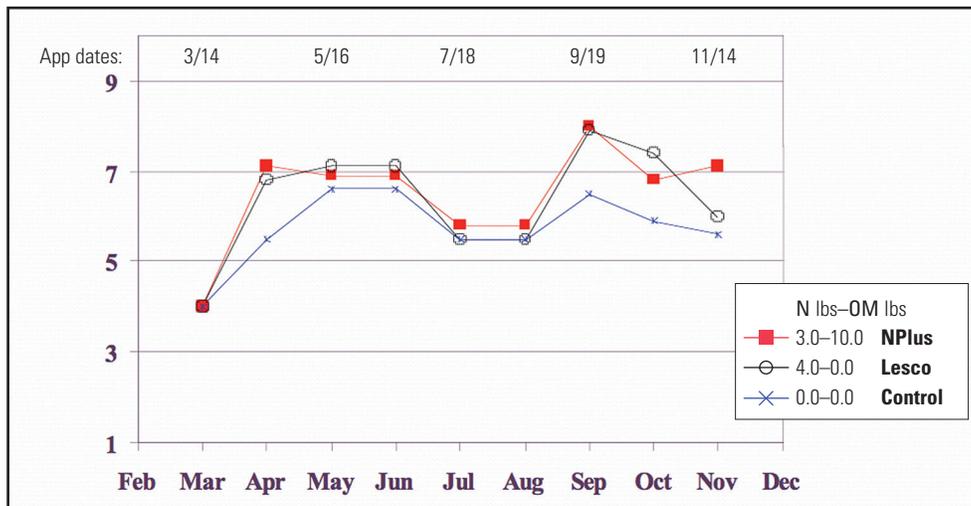
# Clarus Technology for Programs

*Research Studying The Budgeting of Organic Matter Reveals a Classical Fertility Response Without Overapplying Nutrients*

## Nutrients PLUS – Fertility Programs with Organic Matter (Figure 2)

### 5-TREATMENT YEARLY PROGRAM - KENTUCKY BLUEGRASS

Color Rating: 9 = best



**Notes:**

1. Controls received no fertilizer and conventional programs received standard N rates (4 lbs/1000 sq ft/year) but no organic matter.
2. Programs with organic matter received less N (3 lbs/1000 sq ft/year) plus either 10 lbs, 15 lbs or 20 lbs of organic matter.
3. Kentucky Bluegrass (KB), tall fescue and bermuda grass are all a part of the study.
4. For each grass type there are both high maintenance, 5-treatment programs and low maintenance, 3-treatment programs.

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Color responses with no significant difference were realized in programs with organic matter compared to conventional programs without organic matter. Those with organic matter had 1/3 and at times 1/2 the amount of nitrogen applied (Figure 2). This supports the experiment’s hypothesis. Nitrogen is over applied with strictly chemical fertilizers. Results achieved more efficiently in single treatments were sustained by adding more organic matter programmatically. Prescriptively, Clarus Technology adds energy to the soil. 18 programs in all to include 100’s of applications with organic matter, all worked without applying more material. In Clarus programs, enough readily available nutrient provides the same green-up as the conventional programs.

Further, these results were extended throughout the entire season and may be attributed to the combined benefit of how organic nutrients are released with how they are complexed in organic matter. Based on these findings, the budgeting of quantified amounts of organic matter predicts similar results to a conventional program. The reduced nutrient requirement, alone, offers the industry a proactive approach to nutrient management. Equivalent color and quality were also obtained without adding clipping production. Besides reduced mowing, savings in labor and energy to manage clippings, this also prevents cell elongation from too much nitrogen that may help plants conserve water.

Of interest in the future will be the new discoveries this study inspires as the first prescriptive approach to formulating with organic nutrients based on evaluating their signature release from organic matter and for budgeting organic matter itself for an entire range of valuable biochemical and biostimulant responses.

*Made by Nutrients PLUS Using Clarus Technology*

