Blended vs. homogenous granular fertilizers

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In recent years there has been considerable discussion in the turfgrass industry regarding blended granular fertilizers versus homogenous granular fertilizers.

"Blended" describes the formulation process where the major fertilizer components, usually N, P and K, occur in separate particles, which are then mechanically mixed or blended together to form the desired N-P-K ratio.

"Homogenous" describes the formulation process where the N, P and K components are combined to form a single particle. Each particle would therefore contain the desired N-P-K ratio.

The uniformity debate

The point of discussion has centered primarily on the relative uniformity of application of these two basic types of fertilizers. It is believed that particles of blended fertilizers will segregate from one another when delivered from a rotary spreader, resulting in non-uniform fertilization. Conversely, segregation will be avoided by using homogenous fertilizers, thus resulting in uniform coverage.

The above situation is of primary concern when the materials are delivered from a rotary spreader. Rotary spreaders are commonly used by professional turfgrass managers because they afford ease of operation, wide swath, and relatively uniform distribution patterns.

A study was conducted at the University of Georgia in which the particle distribution of several commonly-used turfgrass fertilizers delivered from a rotary spreader was examined.

The study begins

In this study, the Scott's R-X7 rotary spreader was used to deliver the fertilizer materials. The test procedure involved passing the spreader, which contained a specified fertilizer, over a series of specially-designed collection trays. Spreader speed was maintained at approximately three miles per hour.

Seven complete fertilizer materials were tested: three homogenous formulations, two fertilizer/pesticide combination products (BFC) and two blended fertilizers without pesticide (BF).

After passing the spreader over the collection trays, a small sample of fertilizer was taken from each tray for chemical analysis.

In addition to a chemical analysis, a physical analysis was also conducted. The physical analysis consisted of passing the fertilizer material from each collection tray through a series of wire mesh screens ranging from 2.00 to 0.25 mm.

The results of this study showed that with any given fertilizer, larger particles in the 1-2 to > 2 mm size range disperse relatively uniformly across the effective spreader swath. Materials do not accumulate at the perimeter or at the midpoint or center line of the swath.

Small particle dispersion

However, at particle sizes smaller than 1 mm, a much less uniform distri-

PARTICLE SIZE RANGE OF SEVEN GRANULAR FERTILIZERS AND RELATIVE RANKING OF UNIFORMITY OF DELIVERY.

Fertilizer type	Particle Size (mm) <0.25	>0.25–<0.5	>0.5–<1	>1–<2	>2
HF_1	58.2	41.0	0.5	0.2	0.1
BF_2	9.1	64.0	20.1	6.2	0.6
BF_3	28.8	47.9	19.6	2.9	0.8
HFC_4	0.7	26.6	52.6	15.6	4.5
HFC_5	4.2	42.8	40.2	10.4	2.4
BFC_6	15.0	36.0	34.0	11.0	4.0
BFC_7	11.0	57.0	22.0	8.0	2.0

bution occurred. These smaller particles showed greatest accumulation near the center of the spreader swath. Therefore, particle size of a fertilizer may help explain why some of the fertilizers examined in this study showed relatively non-uniform delivery.

To better understand this relationship, the particle size range of each material was determined (see table). In general, those fertilizers that spread the most uniformly also showed the smallest range in particle size. However, it is important to note that not all the blended fertilizers had non-uniform delivery. For example, BF2 was quite uniform; in fact, it was comparable to HF1. More than 84 percent of fertilizer fell in two size ranges (1-2 to > 2 mm). This explains its overall relatively uniform delivery. Only HF1, which had a narrower particle size range, showed slightly more uniformity.

N remains even

Although some fertilizers had non-uniform delivery, it was often difficult to observe growth or color variation in areas fertilized with these materials.

There may be several reasons for this. Our data showed that of the three nutrients, nitrogen exhibited the least variation across the spreader swath.

Of the three nutrients, turfgrasses exhibit the most dramatic growth and color response to nitrogen in either excess or deficient amounts. Therefore, since nitrogen showed relatively good distribution across the spreader swath, it would be rare to see growth or color variations in the field when using any of the materials tested in this study.

Our results did show phosphorus and potassium as having more variation in distribution than nitrogen. However, neither one of these nutrients in excess or deficient amounts would be expected to cause an obvious growth or color response in turfgrasses. Therefore, non-uniform delivery of these nutrients over a turfgrass area would be difficult to detect.

In conclusion, in terms of uniformity of application, is there a real difference between homogenous and blended granular fertilizers? Our study showed that there can be. However, when considering uniformity of fertilizer dispersion from a rotary spreader, a uniform or narrow particle size range is more important than whether the fertilizer is blended or homogenous.

In general, our study showed that the more uniform the particle size for a particular fertilizer, the more uniform was its delivery from a rotary spreader, regardless of whether it was homogenous or blended.

Label is no help

Finally, it should be noted that information pertaining to the particle size of a fertilizer is not usually included on the product label. However, consider the other factors that are just as important when determining the potential effectiveness of a particular fertilizer.

Two important considerations would be the N, P and K analysis and the specific nitrogen carrier. Some important characteristics of the nitrogen carrier include: rate of N release, burn potential, acidifying effects, water solubility and cost per unit of N. In addition, keep in mind that the condition of the spreader, calibration, operation and terrain may also cause variation in the uniformity of fertilizer delivery.

If the wrong fertilizer is selected in regard to analysis and/or nitrogen carrier, and/or particular attention is not paid to the care of the spreader and the spreader's operation, it will probably make little difference whether the fertilizer material is homogenous or blended. **LM**