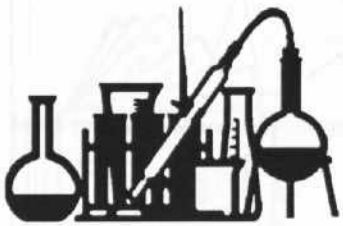

Fertilizer N Combinations: How Good Are They?

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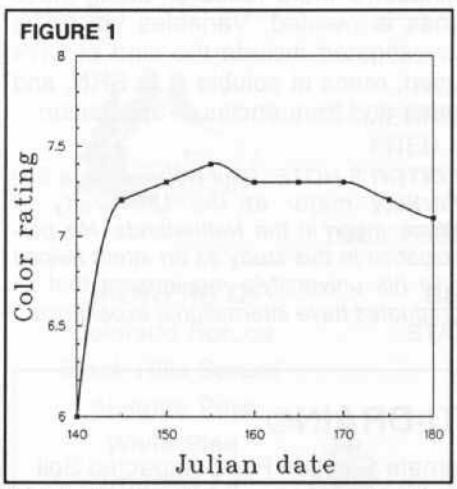
A common practice in the turf fertilizer industry is to blend together two or more N fertilizers with different N release rates. The reasoning behind this practice is that adding a soluble N source to a slow-release N (SRN) fertilizer provides more rapid color response followed by relatively uniform turfgrass color and growth for a period of several weeks. This idealized color response is illustrated in figure 1. Note the use of Julian rather than calendar dates. This is done because in using computers to operate such graphs, we cannot use calendar dates such as May 28. Rather, we have to use Julian dates in which January = Julian day 1 and December 31 = Julian day 365. Thus, the time frame in figure 1 is from May 20 (Julian date).

FIGURE 1

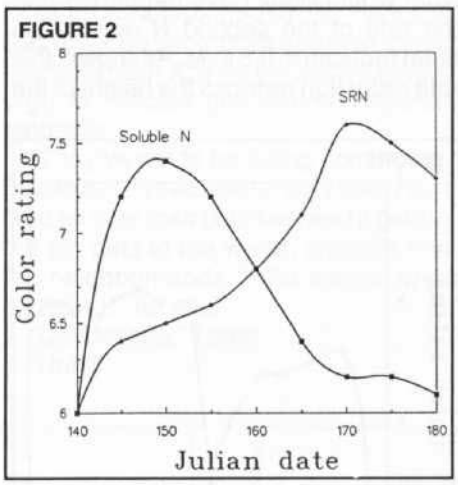


Ideal turfgrass color response to a fertilizer containing a combination of a soluble N source and a slow-release N source.

For some time now I've been asking myself the question "Do soluble N - SRN combinations truly provide the type of turfgrass response that is illustrated in figure 1?". If we look at the individual color response curves for a soluble N and for an SRN (figure 2), we note that there is a substantial period of time during which both N sources are supplying N to the turfgrass. Logic says that under these circumstances the N contributed by the two N sources has a additive effect on turfgrass color.

Adding together the color responses from the soluble N and the SRN (figure 2) leads to figure 3. If this is what is actually happening, then we're certainly not getting the nice uniform idealized color response shown in figure 1.

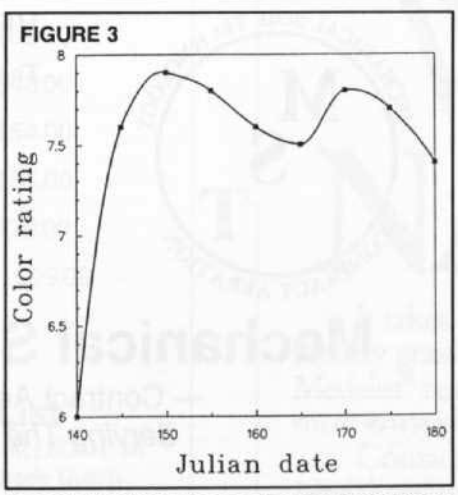
FIGURE 2



Typical turfgrass color response to a soluble N source and a slow-release N source.

This past summer the opportunity arose to test the idea that, contrary to popular opinion, combinations of soluble N and SRN do not necessarily provide the pattern of turfgrass color shown in figure 1. Paul Bouwens joined me for a four-month internship and I presented this concern to him as a research topic.

FIGURE 3

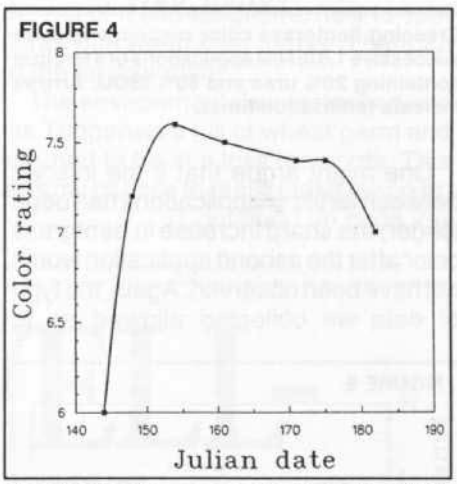


Hypothetical turfgrass color response to an application of a fertilizer containing a combination of a soluble N source and a slow-release N source.

For the project we elected to use urea as our soluble N source and IBDU (ParEx 31-0-0 Fine) as the SRN.

When we applied a combination of 20% urea and 80% IBDU to creeping bentgrass at the rate of 1.0 lb/M on May 24, the color response observed is that shown in figure 4. While this color response pattern is not exactly that predicted in figure 3, it is also not the idealized response shown in figure 1.

FIGURE 4



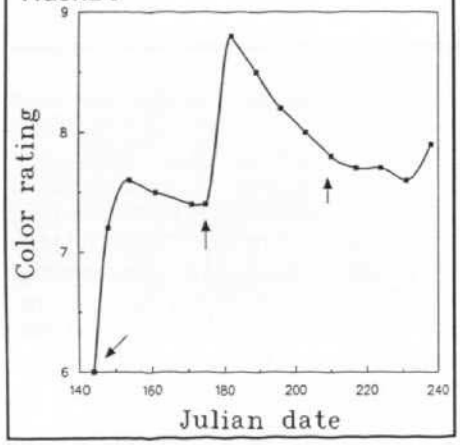
Creeping bentgrass color response to a 1.0 lb N/M application of a fertilizer containing 20% urea and 80% IBDU.

In our study, we repeated the application of 1.0 lb N on June 24 and again on August 2. Color responses to all three N applications are shown in figure 5. Surprised? We were. The very sharp increase in bentgrass color after the second N application was not anticipated. I'm fairly certain that had we continued the study longer, we would have observed a similar dramatic increase in bentgrass color in September. Unfortunately, we had to stop our field observations on August 29 so that Paul would have time to complete analysis of clippings for N and prepare his internship report before returning home to the Netherlands.

The design of our study allowed us to at any time partition the turfgrass color into responses to the individual 1.0 lb N applications. When we did this (figure 6), the reason for the sharp increase in

bentgrass color after the second application became apparent. We were still getting significant color enhancement from the May 24 application. In fact, on July 1 nearly 40% of the bentgrass color was attributable to the May fertilizer application.

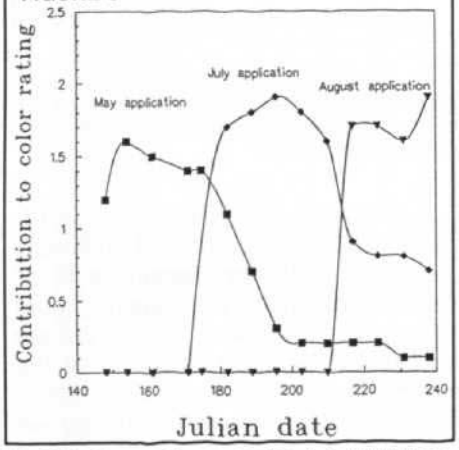
FIGURE 5



Creeping bentgrass color response to three successive 1.0 lb N/M applications of a fertilizer containing 20% urea and 80% IBDU. Arrows indicate fertilization times.

One might argue that if the interval between fertilizer applications had been longer, the sharp increase in bentgrass color after the second application would not have been observed. Again, the type of data we collected allowed us to

FIGURE 6

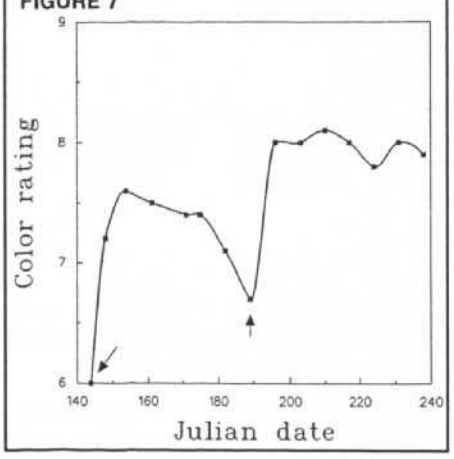


Contributions of successive 1.0 lb N/M applications of 20:80 urea-IBDU combination to creeping bentgrass color.

simulate what effect a longer time interval between the first two fertilizer applications would have had on bentgrass color. When the interval was increased from 31 to 45 days, the expected color response to two successive 1.0 lb N applications is that shown in figure 7. Increasing the interval between applications prevented the color response to the second application from rising to excessive levels (> 8.0 color ratings), but the change in bentgrass color between July 8 (Julian date 189) and July 15 (Julian date 196) was just as large as before. Not only this, but increasing the time interval between fertilizations allowed the bentgrass color to drop unacceptibly low (color rating < 7.0).

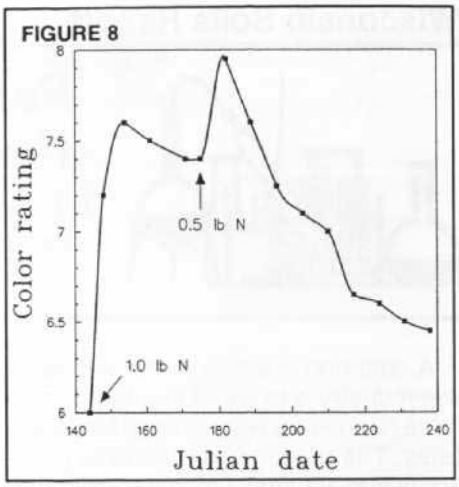
It might also be argued that only an idiot would apply 1.0 lb N to bentgrass in mid-summer. Because we had recorded color responses to urea and IBDU applied at different rates and had found responses to the two to be additive when applied together, we can also simulate bentgrass color responses at rates other than 1.0 lb. Figure 8 shows what would likely have happened had the rate of the second N application been reduced to 0.5 lb/M. As shown, this rate reduction reduces the height of the

FIGURE 7



Simulation of creeping bentgrass color response to a 20:80 urea-IBDU combination applied at a 45-day interval rather than a 31-day interval (Fig. 5). Arrows indicate fertilization times.

FIGURE 8



Simulation of creeping bentgrass color response to successive applications of a 20:80 urea-IBDU fertilizer at rates of 1.0 lb and 0.5 lb N rather than two 1.0 lb rates (Fig. 5).

peak in color response in early July, but the overall pattern of color response is far from being uniform over time.

These initial research results raise some serious questions regarding the full value of combining a soluble N source with an SRN. Earlier greenup is the only advantage we could see. The major disadvantage is sharp swings in turfgrass color resulting from successive applications of such N source combinations. More research along these lines is needed. Variables yet to be investigated include the kind of SRN used, ratios of soluble N to SRN, and rates and frequencies of application.

EDITOR'S NOTE: Paul Bouwens is a Soil Fertility major at the University of Wageningen in the Netherlands. His participation in this study as an intern helped fulfil his university's requirement that all graduates have international experience.