SLOW-RELEASE NITROGEN FERTILITY FOR TURFGRASS

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Fertilizing Turfgrass areas with slow-release nitrogen fertilizers is a common practice on golf greens, athletic fields, and other Turfgrass areas. Though more expensive than quick release nitrogen fertilizers, the advantages of longer turf response and low Turfgrass burn potential associated with slow-release forms have made them popular. When choosing and using slow-release nitrogen fertilizers, remember that release characteristics can vary dramatically with different materials and with different conditions.

Some slow release fertilizers, such as sulfur-coated urea and Osmocote, are quick-release nitrogen like urea, coated with a material which must be penetrated or broken before the nitrogen is released. Breakdown of the coating results from microorganism activity but physical breakage from traffic or rough handling can also increase the rate of nitrogen release and reduce the length of time nitrogen is released.

On slow-release nitrogen source, IBDU, releases nitrogen slowly because the molecule into which the nitrogen is bound dissolves very slowly in soil water. In the case of IBDU, the rate of nitrogen release is dependent principally on the amount of water in the soil.

Other slow-release forms of nitrogen, such as UF and Milorganite release nitrogen slowly because microorganisms must break down the nitrogen-containing molecules before the nitrogen can be taken up by Turfgrass plants. The nitrogen release rate depends on how easily the molecules are broken down and on the level microorganism activity. During cool or very dry conditions, nitrogen release will be minimal because microorganism activity is limited.

The point to remember is the rate of nitrogen release and thus the length of time that turf responds to a slow-release fertilizer application can vary dramatically with fertilizer properties and also with existing soil conditions. The results of some experiments in Minnesota and Wisconsin demonstrated this fact well.

In the experiment the fertilizers IBDU, Milorganite, and Sustane (a natural organic fertilizer derived from composted turkey litter) were applied and evaluated at three golf course putting greens. The fertilizers were applied at a rate of 2lb. N/1000 ft^2 on June 9 and September 27, 1988. Each fertilizer treatment was replicated three times on each green.

Following the June 9 fertilizer application, a color response on the Sustane plots was evident within several days at all three locations, the most dramatic which is shown in Figure 1. Subsequent color ratings indicated the response to Sustane was of short duration (figure 2). Three weeks after the fertilizer application color ratings of the Sustane plots had dropped while IBDU plots were just coming to a peak. Four weeks after application IBDU plots were at their peak in terms of visual color. Analysis of clippings taken four weeks after fertilizer applications showed that clippings from IBDU plots had higher nitrogen content (averaging 5.1% nitrogen) that clippings from either Milorganite plots (4.4% nitrogen) or Sustane plots (4.3% nitrogen). Unlike Sustane or IBDU plots, the Milorganite plots never did show a period of substantial visible response to nitrogen being released, perhaps due to a gradual low level of nitrogen release throughout the experiment. After two months all the plots had rather low visual ratings and the turf appeared to be in need of nitrogen.

Following the September 27 fertilizer application, there was again a quick visual response on the Sustane plots, as shown in Figure 3. The response to Sustane did not fade as quickly as it had following the June application and turn on Sustane plots continued to have

high color ratings up to four weeks after fertilizer application. The longer residual response to Sustane may have been due to the cool temperatures of October reducing the microbial activity ant thus lengthening the period of release of nitrogen from the Sustane fertilizer. Visual response to IBDU again peaked about four weeks after application. Color ratings taken the following May (33 weeks after fertilizer application) demonstrated a definite beneficial color response to IBDU the spring following a fall application of fertilizer. At that time response to Milorganite and Sustane applied the previous September had disappeared.

These experiments show slow-release nitrogen fertilizers react dramatically different from each other in terms of turf response and residual time. Even a single slow-release fertilizer can have differing results at different location or at different times of the year for a single location. Consequently, in choosing slow-release fertilizers and in developing a turf fertility plan, it is best to test how the turf at your location responds to different fertilizers. By putting out your own test plots and watching the response to several different fertilizers, you will likely achieve better results than by using general recommendations determined elsewhere. In implementing a nitrogen fertility program, turf color can be an excellent indicator of the need for additional nitrogen.

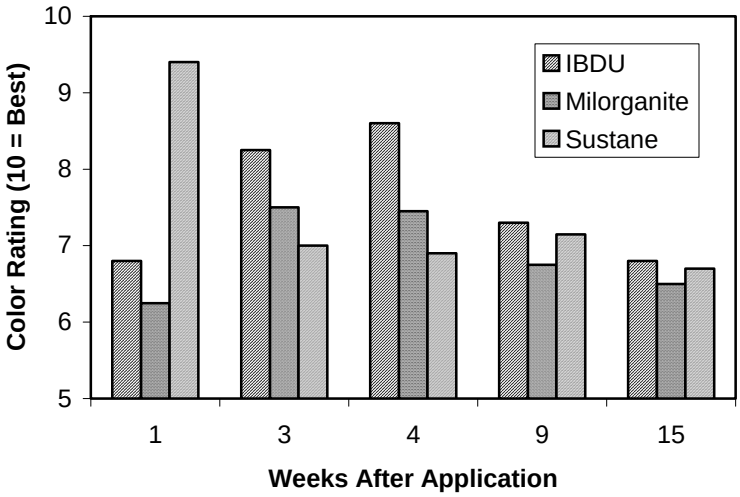

Figure 2. Average color ratings at three locations following June 9 fertilizer application. Rating scare was 1 to 10 with 10 best.

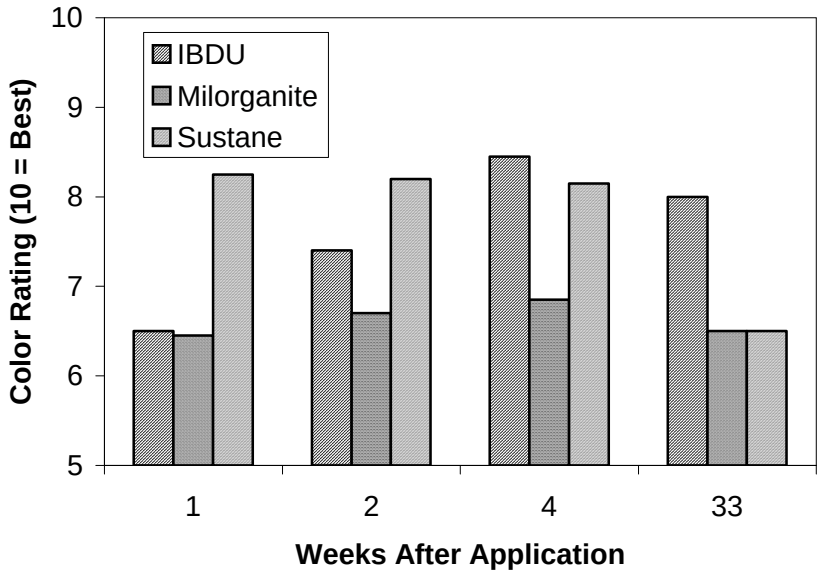

Figure 3. Average color ratings at three locations following September 27 fertilizer application. The 33 week color rating was May 19 the following year. Rating scale was 1 to 10 with 10 best.