Variables in Bentgrass Response to Dormat Applied Milorganite

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This past year I continued to study factors that influence the spring response of creeping bentgrass to dormant applications of Milorganite. I observed in 1993-94 that surface drainage, with its effect on soil moisture levels in springtime and consequential rates of soil warming, was of primary importance in determining spring color response of the bentgrass to dormant Milorganite. Soil surface color and height of mowing were of secondary importance.

The effects of surface drainage, soil surface color and height of mowing were additive. Hence, the fastest and most intensive spring coloration of the bentgrass occurred when the experimental site had good surface drainage, the bentgrass was topdressed with charcoal, and the grass was mowed at 3/8- rather than 5/8-inch. This bentgrass color response was directly related to the extent of microbial conversion of organic Milorganite N to inorganic N (ie, the rate of N mineralization). The contrast is shown in the Figure 1.

In 1994-95, the weather pattern was very different from 1993-94 and surface drainage had much less impact on Milorganite N mineralization rates, as did soil surface color and height of cut. An early January thaw left the dormant Milorganite on the south-facing, sloping site encased in ice for nearly all of January and February. In contrast, on the non-sloping site the thaw produced a crust on the snow surface but did not encase the Milorganite in ice. The consequences of this are shown Figure 2. Milorganite N mineralization virtually ceased when encased in ice but not when protected by snow cover. After snow melt the first week of March, frequent rains kept both sites extremely wet and, as a result, there were essentially no effects of surface drainage on the rate of mineralization of the Milorganite N.

Examination of Figures 1 and 2 reveals that there were substantial differences between 1993-94 and 1994-95 in terms of the percentages of dormant applied Milorganite N that were mineralized. As an example, by day 80 of 1994, the amounts of N mineralized ranged from 2.1 to 2.6 percent. In 1995, the comparable extents of N mineralization were over 12 percent. The primary reason for this is thought to be time of application of the dormant Milorganite. The Milorganite was applied November 2 in 1994 and November 22 in 1993. The apparent effect of this earlier application of the dormant Milorganite was mineralization of about 6 percent more of the Milorganite N before the time of permanent snow cover in early December.

Figure 1

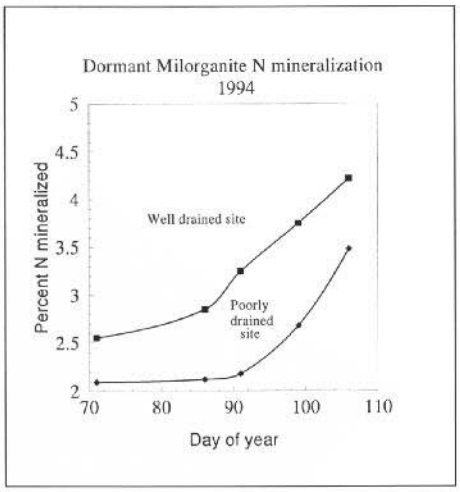
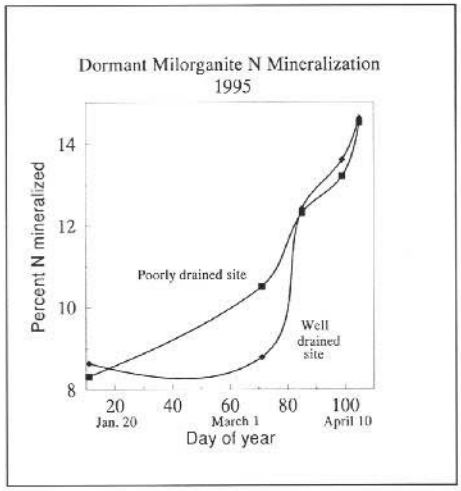


Figure 2



Bentgrass color responses to the dormant Milorganite likewise differed substantially between the two years. As shown in Figure 3, color response to the dormant Milorganite in 1994 did not become apparent until about April 15. In 1995, color differences became noticeable within a week after snow melt on March 12 and 13 (Figure 4) and persisted throughout the period of observation. While weather certainly plays a major role in the time of spring greenup, it is difficult not to suggest that the earlier application of the dormant Milorganite in 1994 favored more extensive N mineralization and significantly impacted the time and extent of bentgrass greenup in the spring of 1995.

Figure 3

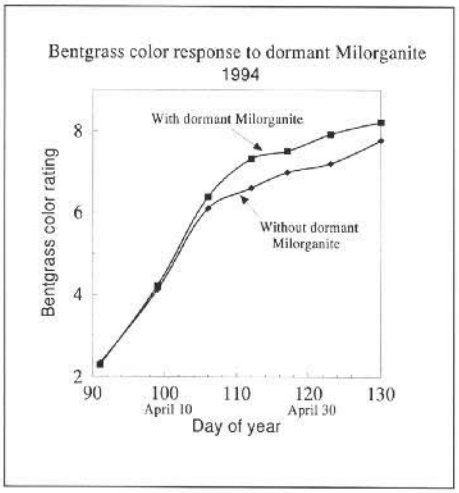
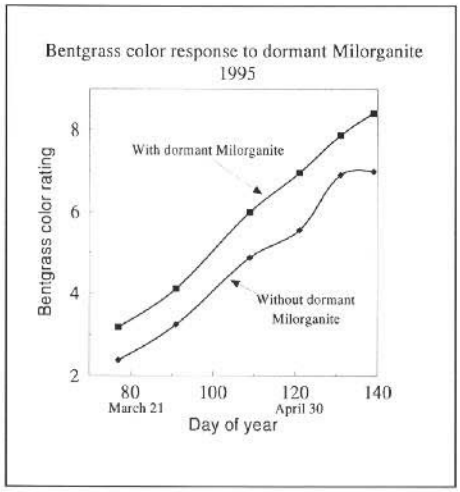


Figure 4



In November of 1994, Steve Millett inoculated patches of turf in selected plots with *Typhula*, gray snow mold. The following spring he rated the plots for incidence of the disease. The ratings showed higher incidence of snow mold on the poorly drained site with its greater and more complete snow cover. On both sites there was a clear trend toward less disease where dormant Milorganite had been applied. Significant reductions in incidence of the disease also resulted from topdressing with charcoal and from reducing the bentgrass mowing height from 5/8- to 3/8-inch.

These two years of research confirm that mineralization of dormant applied Milorganite N does occur prior to the spring following application. How much mineralization occurs depends primarily on the time of application in fall, the weather, and soil moisture. Collectively, these factors determine soil temperatures and, in turn, the rate of Milorganite N mineralization. Because N mineralization occurs in late fall and the winter months, there is a supply of inorganic N immediately available to bentgrass the following spring. This N promotes rapid greenup, presents an attractive, playable surface earlier than might occur otherwise, and delays the time when fertilization is required. Dormant applied Milorganite appears to offer the added advantage of reduced incidence of gray snow mold.