

## SOILS RESEARCH - NITROGEN CARRIERS, POTASSIUM RESPONSES, AND HYDROPHOBIC SOIL STUDIES

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The responses of turf to several nitrogen carrier treatments were evaluated again in 1973. The average quality ratings from the East Lansing study are given in Table 1. The nitrogen was applied at the rate of 4 pounds per 1000 square feet for the year. Applications were made in April, two-thirds in April and one-third in August, or one-third in each April, June, and August, according to treatment as outlined in Table 1. The 24-4-8 fertilizer contained one-third of the nitrogen in the IBDU form and two-thirds as water soluble nitrogen; the 24-4-12 contained one-half of each; the 24-0-12 contained two-thirds IBDU and one-third soluble nitrogen. The fine IBDU was in the 0.7-1.4 mm size range, while the coarse material was 0.7-2.0 mm. These materials were provided by the Swift's Agricultural Chemical Co. The 19-6-13 was a coated fertilizer provided by the Sierra Chemical Co. The 32-0-8 and 30-3-10 were O. M. Scott's Co. products. The sulfur-coated urea was provided by the Tennessee Valley Authority; Milorganite by the Milwaukee Sewerage Commission, and the ureaformaldehyde by DuPont.

The data in Table 1 indicate that all sources which contained appreciable slow-release nitrogen gave very poor responses in May from the April applications. Only the complete carriers which contained considerable water soluble nitrogen (as the 24-4-8 with 2/3 water soluble N) resulted in good color and growth responses in May. The unseasonably cool weather in May pointed out the need for some water soluble nitrogen in the spring, especially during a year such as 1973.

After the unusually poor quality ratings in May several of the treatments resulted in good quality turf the rest of the growing season (fine IBDU, coated 19-6-13, sulfur-coated urea). The sulfur-coated urea resulted in the best average quality ratings for the year as was observed in 1972.

After 4 years of uniform nitrogen treatments on Merion Kentucky bluegrass at Traverse City, the average visual quality ratings differed somewhat from the East Lansing results. In this study the nitrogen was applied at the rate of 8 pounds per 1000 square feet in one application in late April. The water soluble carriers (ammonium nitrate, urea, ammonium sulfate) were apparently leached out of the root zone by the end of the growing season on this well-irrigated sand, resulting in poorer average quality ratings than other carriers (Table 2). Milorganite gave the best average quality in 1973, followed by ureaformaldehyde, IBDU (fine), sulfur-coated urea, and 19-6-13 (coated), respectively.

Fertilization of a Cohansey bentgrass green with IBDU and coated with 19-6-13 was studied in 1973. It was necessary to core the green and work the fertilizer into the coring holes (with or without top-dressing soil) to prevent removal of the fertilizer with the greensmower. Some surface applied water soluble nitrogen will be needed with this fertilization technique to mask the "greening" pattern associated with the nitrogen concentrated in the coring holes.

After seven years of nitrogen treatments on sodded Merion Kentucky bluegrass (clippings removed) the soil potassium has been reduced to the point where potassium

Table 1. Effect of 1973 nitrogen treatments on visual turfgrass quality ratings of Merion Kentucky bluegrass at East Lansing. Averages for 3 replications and 7 dates of rating.

| Treatment<br>Carrier | Date(s) of Application        | Date of Quality Rating (1=best; 9=poor) |      |      |      |      |      |       |      |
|----------------------|-------------------------------|---|------|------|------|------|------|-------|------|
|                      |                               | 4/20                                    | 5/24 | 6/16 | 7/19 | 8/20 | 9/12 | 10/11 | Avg. |
| 24-4-8               | Apr                           | 2.0                                     | 1.0  | 1.0  | 3.5  | 2.8  | 2.8  | 4.8   | 2.57 |
| 24-4-8               | 2/3 Apr, 1/3 Aug              | 1.8                                     | 1.7  | 2.3  | 4.7  | 4.5  | 1.3  | 2.0   | 2.62 |
| 24-4-8               | 1/3 Apr, 1/3 June,<br>1/3 Aug | 1.5                                     | 3.0  | 4.8  | 2.5  | 3.0  | 1.0  | 1.7   | 2.50 |
| 24-4-12              | Apr                           | 2.2                                     | 1.5  | 2.5  | 4.0  | 3.0  | 2.8  | 5.2   | 3.02 |
| 24-4-12              | 2/3 Apr, 1/3 Aug              | 1.7                                     | 2.3  | 3.2  | 4.0  | 4.2  | 1.2  | 2.5   | 2.72 |
| 24-4-12              | 1/3 Apr, 1/3 June,<br>1/3 Aug | 1.5                                     | 3.2  | 4.0  | 2.7  | 2.8  | 1.7  | 1.8   | 2.52 |
| 24-0-12              | Apr                           | 2.2                                     | 2.0  | 2.0  | 4.0  | 3.2  | 2.5  | 4.0   | 2.83 |
| 24-0-12              | 2/3 Apr, 1/3 Aug              | 1.5                                     | 2.7  | 3.2  | 4.2  | 4.0  | 1.5  | 2.7   | 2.81 |
| IBDU (fine)          | Apr                           | 1.8                                     | 4.8  | 2.8  | 1.8  | 1.5  | 1.2  | 2.5   | 2.36 |
| IBDU (fine)          | 2/3 Apr, 1/3 Aug              | 1.3                                     | 4.8  | 2.7  | 3.0  | 2.3  | 1.8  | 2.3   | 2.62 |
| IBDU (coarse)        | Apr                           | 1.5                                     | 6.3  | 3.5  | 2.7  | 1.5  | 1.5  | 1.8   | 2.69 |
| IBDU (coarse)        | 2/3 Apr, 1/3 Aug              | 1.3                                     | 4.7  | 3.5  | 3.7  | 2.2  | 1.8  | 2.2   | 2.76 |
| 19-6-13 (coated)     | Apr                           | 2.0                                     | 5.2  | 3.7  | 1.2  | 1.0  | 1.2  | 3.2   | 2.48 |
| 19-6-13 (coated)     | 2/3 Apr, 1/3 Aug              | 1.5                                     | 4.5  | 4.5  | 3.2  | 1.8  | 1.8  | 1.2   | 2.64 |
| 16-7-12 (coated)     | 2/3 Apr, 1/3 Aug              | 2.0                                     | 3.8  | 4.3  | 2.8  | 2.7  | 1.5  | 1.8   | 2.71 |
| S-coated urea        | Apr                           | 1.8                                     | 4.3  | 2.5  | 1.0  | 1.3  | 1.0  | 3.8   | 2.26 |
| S-coated urea        | 2/3 Apr, 1/3 Aug              | 1.5                                     | 4.0  | 3.0  | 2.0  | 2.2  | 1.2  | 2.2   | 2.29 |
| 32-0-8 (Scott's)     | 2/3 Apr, 1/3 Aug              | 1.7                                     | 2.8  | 1.7  | 4.0  | 4.3  | 1.3  | 2.5   | 2.62 |
| 30-3-10 (Scott's)    | 2/3 Apr, 1/3 Aug              | 1.7                                     | 2.0  | 3.0  | 5.3  | 4.8  | 2.0  | 3.5   | 3.19 |
| Milorganite          | 2/3 Apr, 1/3 Aug              | 1.7                                     | 5.7  | 1.7  | 4.3  | 4.8  | 2.8  | 3.5   | 3.50 |
| Ureaformaldehyde     | 2/3 Apr, 1/3 Aug              | 2.7                                     | 4.7  | 3.7  | 5.2  | 3.5  | 3.3  | 5.0   | 4.00 |
| None                 | -----                         | 5.0                                     | 8.0  | 7.5  | 8.0  | 8.0  | 6.5  | 7.5   | 7.21 |

Table 2. 1973 Traverse City average visual turfgrass quality ratings. Nitrogen applied at 8 pounds per 1000 square feet in April. Averages for 3 replications

| Carrier          | <u>Average Quality Rating</u><br>(1=best; 9=poor) |
|------------------|---|
| Ammonium nitrate | 2.7   |
| Urea             | 2.5   |
| Ammonium sulfate | 3.1   |
| Milorganite      | 1.4   |
| Ureaformaldehyde | 1.7   |
| IBDU (fine)      | 1.8   |
| S-coated urea    | 2.0   |
| 19-6-13 (coated) | 2.3   |