

Late Fall Fertilization of Turf

Paul E. Rieke
Crop and Soil Sciences, M.S.U.

The interest in late fall fertilization of turfgrass is growing rapidly. As with any "new" idea or practice the term has many different interpretations. This is also commonly called dormant fertilization, or fertilization of dormant turfgrass. Perhaps we should begin with a definition of the term dormancy. Turgeon in his new book, Turfgrass Management, has defined dormant turf as "turfgrass which has temporarily ceased shoot growth as a result of drought, heat, or cold stress, but is capable of reinitiating new shoot growth--when environmental conditions are favorable."

In the late fall the turf plant responds to the colder temperatures and shorter days by gradually becoming less physiologically active and more dormant. Since this is a gradual process a dramatic change in the weather can change the rate dormancy is acquired by the plant. Think back with me over the years when the greens have stopped growing and no further mowing was needed. Some years this may occur as early as mid-October, while as late as early December other years.

So, to predict when dormancy is reached is difficult because weather has such an influence and because dormancy is a gradual process which continues on into mid-winter. But we can make a general statement based on "average conditions" (if there is such a thing as average weather in Michigan!) that dormancy is normally acquired sometime during the first two weeks of November in southern Michigan. Local influences can change this, such as along Lake Michigan, or in northern Michigan.

When topgrowth ceases in the fall it is known that root growth and nutrient uptake continue. Thus fertilization at this time of year permits uptake of nutrients which have been applied.

The nutrient normally considered the key in late fall fertilization is nitrogen, but one might also consider potassium application at this time of year. The need for P and K in the late fall will depend on your previous fertilization practices. If adequate amounts have been applied earlier in the fall the practicality of P and K in late fall applications could be questioned except in unusual circumstances. A possible exception might be K on sands, especially if there has been excessive rainfall and leaching of K during September and October.

Pros and cons

One should carefully consider the advantages and disadvantages of late fall N fertilization. When specific N sources are applied at the proper time in the fall we have observed grass response which has a good green color in the spring but with only limited topgrowth. Less frequent mowing was needed than with a comparable spring application. We now discourage early spring N unless absolutely necessary to allow for recovery from severe winter injury. It has also been suggested that the late season N results in lower incidence of spring-time diseases although more long-term studies are needed to further substantiate this.

Potential disadvantages include the opportunity for N loss by leaching of soluble N or washing of slow release sources applied on slopes. Further, there is concern for increased low temperature injury through increased crown hydration or desiccation, and for foliar burn if applied at a time after the irrigation system is drained. If the turf is not treated for snowmold, there may be increased susceptibility to these diseases.

Timing of N application

Proper timing of N application has a major influence on the success of the program. This is true for any time of year, of course, but is especially important in late fall N applications. We have had late fall N studies on fairways for 3 years. The first 2 years fall treatments were applied in late November and spring treatments in late March to early April. The fall applied soluble N sources gave the type of spring responses described above while the slower releasing carriers gave responses very similar to early spring applications of these slow release carriers. This makes sense in that soils were cold at fall application time and no appreciable release occurred until soils warmed up late the next spring (see Soils Research Report in the Proceedings for data).

In the fall of 1979 we changed our studies to begin treatments on October 1 with subsequent applications every 2 weeks until December 1. Responses were quite different as one could imagine. The slow release materials gave very good fall response when applied early (October 1 to October 15) but showed slow response the next spring when applied in late November to early December.

Clearly we need to apply slow release materials like IBDU, Milorganite, or UF early enough to allow for conversion to available form for uptake of N in November but after growth ceases. Based on one year's data (always a risky thing to do) it appears IBDU should be applied 4-5 weeks before the time N uptake is desired; Milorganite, 3-4 weeks; sulfur coated urea, 2 weeks; soluble N carriers, 1 week; and fertilizers which contain some soluble N and some slow release N, 1-3 weeks depending on the slow release N source. Be aware of the limitations of N uptake by turf in October, however (increased susceptibility to snow mold and winter injury, especially).

One further comment regards the outstanding response to late fall application of fertilizer which contains both N and iron. We observed this on a green at East Lansing. Some of the positive response to Milorganite may be due to the iron applied. If greenness is desired, iron applications can contribute to the color without the growth response nitrogen normally causes. We have seen this response many times during the year, of course.

Conclusions

When evaluating whether you would like to initiate a late fall N fertilization program consider all the factors, carefully, including your particular conditions. I would suggest first trying this on a fairway or two for a couple of years. Results will vary somewhat from year to year so we like to encourage some trials of your own. We need more data before we can strongly encourage late fall N as a regular practice. However, we have had good results in our studies thus far and results from other research stations in northern areas (such as Minnesota) are also very good. Further, several superintendents have practiced late fall N with good success and plan to continue the program. I would suggest using 1 pound of N applied so uptake can occur in early November. For best results the N should be available to the turf by November 15. This should precede permanent snow cover most years and will allow fertilizing before the opening of deer season!