

## Fertilization — Fall and Late Fall Style

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One of the very important turf management practices during the fall is fertilization. This time of year there are many other activities which require time and attention, but fertilization must also be given priority. For many reasons, turf management practices done in the fall will have a major effect on the quality of turf the following spring. Fertilization is one of the most important.

### Phosphorus and potassium in the fall

The key nutrient in fall fertilization is nitrogen. Some have suggested phosphorus and potassium are the key nutrients in fall fertilization. Certainly, these nutrients should be available to turf in adequate quantities. For example, when potassium is limiting, there is a reduction in stress tolerance. Considering the potential for low temperature injury to turf during the winter, if potassium could have an impact on reducing low temperature injury, turf managers should be sure adequate potassium is available to the turf. There is also some evidence to suggest there is an increase in susceptibility to snowmold when potassium is limiting.

To be sure there is adequate potash in the soil, use a soil test for medium and fine-textured soils. If tests suggest potash is needed, appropriate rates should be applied based on recommendation and common sense. For turfs on sands, soil tests for potassium are usually low in spite of a potash fertilization program. Regular, light applications of potash at frequent intervals (spoon feeding) should be made on sandy soils, particularly on sand greens.

When late fall fertilization is practiced, some potash should also be applied along with the nitrogen. On sands, use equal quantities of nitrogen and potash, if needed based on soil test recommendations, phosphorus can be applied in the fall fertility program as well, normally in a complete fertilizer. Seldom is phosphorus limiting on turf. An exception is when no phosphorus has been applied and clippings are routinely removed. Another potential exception is on sand greens. Sands have little capacity to hold phosphate. We have seen several cases of phosphorus deficiency on sand greens, more commonly on new greens, but also on older greens where no phosphorus has been applied for some time. Soil tests must be used to determine need for phosphorus.

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### Fall Nitrogen

For cool season grasses, both fall and late fall fertilization should be considered. Fall fertilization is best done during September, preferably early in the month. With the weather changes in late summer, the shorter days, cooler nights and more rainfall cause the turf plant to grow less rapid vertically

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(Fertilization continued)

than occurs in the spring. more lateral growth results in improvement in turf density after the rigors of the summer. So fertilization in the fall deserves top priority. Carbohydrates manufactured at this time of year will be more likely to be stored, building up the plant for next year.

Appropriate rates of nitrogen applied during the fall period depend on a number of variables, ranging from 1/2 to 1 lb. N per 1000 sq. ft. On occasion a higher rate may be justified; examples include newly established turf which needs pushing for rapid establishment or a turf which has suffered serious thinning over the summer due to injury from disease, insects, traffic or moisture stress or where an extensive weed population has been controlled, leaving open areas. On general turfs (lawns, grounds, etc.) all the nitrogen can be applied in one application. For greens and other high maintenance turfs, one can split this into two applications if the higher rate of nitrogen is needed. An alternative is to use a fertilizer which contains more slow release nitrogen. Or a spoon feeding program with weekly applications of soluble sources can be used, particularly on greens.

Normally it is best to withhold applications of nitrogen during October to permit the turf to "harden off". This permits the turf to accumulate carbohydrates and reduces the potential for frost-injury should the turf become very succulent before a major freeze. Avoiding nitrogen during October may reduce susceptibility to snow mold as well.

#### Late Fall Nitrogen

There are a number of opinions as to how and when to use late fall nitrogen applications. This occurs partly because of differences in climatic zones and variations from season to season. Perhaps a more important reason for variations in late fall fertilization is the objective for this practice.


From my perspective, the objective is to *supply nitrogen to the turf after growth has ceased*. The root system is still active since the soil is warmer than the air. Nitrate nitrogen can still be taken up and utilized by the plant. If proper nitrogen fertilization has been practiced during the fall (September) period, the turf should still be green and physiologically active. This permits the plant to continue photosynthesis whenever modest temperatures and some sunlight conditions occur. Carbohydrates manufactured during this time are not "burned off" with growth and clippings, but are stored. This builds up the plant for next spring.

Rate of application of nitrogen will again vary with turf conditions and the philosophy of the manager. For greens, 1/2 lb. of N per 1000 sq. ft. may be sufficient. If tees are still thin from traffic, especially on par 3 tees, 3/4 to 1 lb. N per 1000 sq. ft. may be needed. Fairways could receive 1/2 to 3/4 lb. Lawns & general grounds can receive 3/4 to 1 lb. N.

Some turfs may perform better without the late fall nitrogen. Some lawn care companies cannot justify the cost of late fall nitrogen to customers who may not continue with their services next year. However, the quality of the turf the next spring should be excellent when spring sales begin.

Snowmold was severe on many turfs over the winter of 1992-93. Late fall nitrogen applications contributed to greater snowmold in some cases. If turfs are hard hit by snowmold nearly every year and no snowmold preventive program is followed, it may be best to avoid late fall nitrogen.

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However, based on plot research done by Dr. Joe Vargas and observations in the field, it is clear that while in most years the late fall nitrogen may increase the amount of snowmold, there is much quicker recovery from any injury caused. The snowmold damage may be more superficial with the late fall nitrogen and/or the recovery is quicker. Either way the next spring the turf returns to a better quality condition sooner with late fall nitrogen.

For the Great Lakes region, we suggest applying the nitrogen after growth has ceased for all practical purposes. This does not mean there will be no need for further mowing, but regular mowing will not be needed. An additional mowing or two may be needed before growth ceases entirely. This occurs anywhere from the last week of October to the second week of November.

Potential problems with late fall nitrogen fertilization include the potential for leaching of applied nitrogen, late fall growth which would require more mowing, affecting snowmold and other winter injury, increase to thatch and other spring growth. In a study at Michigan State being conducted by Eric Miltner and Bruce Branham, which compares late fall nitrogen applications with those emphasizing spring applications, there is no significant leaching of nitrates from either treatment so far. If the nitrogen is applied while the plant is still physiologically active, most of the nitrogen should be used and will not be available for leaching over the winter. There is evidence from Ohio State that late fall nitrogen may increase susceptibility to thatch formation to some degree.

While there may be a small increase in growth during the fall or spring, most turf managers are satisfied that the benefits are far greater than the potential negative effects. There is no evidence for increased susceptibility to low temperatures or crown hydration injury which is caused by late fall nitrogen.

Benefits of late fall nitrogen include good carbohydrate levels in the turf the next spring, good early spring root growth, good fall and spring color and good turf density so there is less potential for establishment of spring weeds. Since root growth of cool season grasses begins before top growth, it is essential that a high level of carbohydrates exist in the plant to initiate that root growth.

The next spring the turf will have a good color. There will likely be a small increase in mowing needed in the spring compared to a turf which receives no nitrogen either in late fall or spring. But the growth will be very limited compared to a turf which receives an early spring fertilization. Avoiding early spring nitrogen has the advantages of reduced carbohydrate loss caused by the excessive growth, less mowing, potential reduction in several diseases and greater moisture stress tolerance during the summer. If we can provide a turf which has good density and fewer weeds, requiring less herbicide as well as greater stress tolerance, why should we not adopt the practice?

With many advantages apparent for late fall nitrogen and few disadvantages, it is clear why so many turf managers have adopted this practice. I have not talked to anyone who has tried late fall nitrogen fertilization who has not continued to utilize the practice for agronomic reasons. This is the best testimonial for late fall fertilization.

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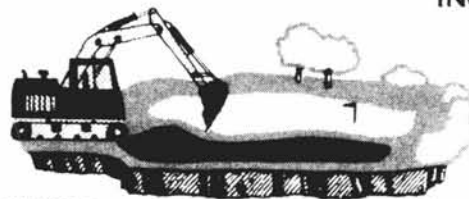
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