# Late Fall Fertilization: A Prescription for Turf Recovery

*Pete Landschoot*
*Department of Agronomy*
*Penn State University*

The hot, dry summers left many lawns, athletic fields, and golf courses parched, brown, and thin. With the rains and cool weather of September and October, most turf recovered, but thin lawns are still present in certain areas. This year, many turf managers are planning to make late fall fertilizer applications with the hopes of improving turf density and vigor next spring. In this article, we will examine how late fall fertilizer applications influence turf performance, when to make your applications, and which types of fertilizers and rates provide the best response.

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## Why fertilize in late fall?

Fall is the time of year when cool-season turfgrasses recover from summer stress-related conditions, such as drought, heat, and disease. The cooler temperatures and moist conditions are conducive to good turf growth and, provided that plants are properly fertilized in late summer, turf begins to accumulate carbohydrate reserves in stems, rhizomes and stolons. Carbohydrate reserves help turf resist winter injury and disease and serve as a source of energy for root and shoot growth the following spring.

Research has shown that if fertilizer applications are made in midfall (mid-October to early

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November) while turf is actively growing, the plants begin to deplete carbohydrates and may not acclimate to the cold weather properly, thereby increasing potential for winter injury and disease.

Late fall fertilization has been promoted as a means of prolonging turf color into early winter without increasing the chance of winter injury and disease (winter color will be more noticeable in regions where winters are warmer and during mild winters). Late fall fertilization can also enhance spring green-up without the excessive stimulation of growth that often accompanies early spring fertilization. This green-up often will last into midspring.

Another *reported* benefit of late fall fertilization is an increase in rooting (thought precisely when and how this increase occurs is a source of some debate). While most fertilizer applications are made in spring and late summer in attempts to promote root growth, much of the fertilizer is used by the shoots, sometimes preferentially over roots. One reported advantage of late fall fertilization is that roots are still growing at a time when top growth has ceased, thus allowing the roots to make full use of the fertilizer. But, the roots are growing very slowly and if the soil is frozen, not at all.

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Recent studies at Ohio State refute conventional thought that late fall fertilization increases rooting in winter. In fact, this research showed no increase in Kentucky bluegrass root growth during late fall or winter following late fall fertilizer application. However, when compared to early spring applications of nitrogen, late fall fertilization increased rooting in spring. Presumably, this benefit

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was due to early spring green-up from a late fall application, which alleviated the need for early spring fertilization. When fertilizer was not applied in late fall but, instead, in early spring, excessive shoot growth occurred, depleting carbohydrate reserves that would have otherwise gone into root production later in spring.

The take-home message from the Ohio study is that while the net effect of late fall fertilization on rooting is slight, fertilizer applications in late fall may be more beneficial with respect to rooting than early spring applications.

Late fall fertilization is occasionally blamed for increased winter injury, snow mold and annual bluegrass encroachment. A few studies have been designed to examine the influence of late fall fertilization on winter injury, but none have conclusively demonstrated detrimental effects.

Heavy fertilization in midfall, when grass shoots are actively growing, can enhance snow mold (presumable due to reduced hardening and increased succulence of plant tissue). University research has shown that late fall fertilization may actually reduce winter diseases.

While some studies have shown increased annual bluegrass populations in fall, there is no good evidence to show that this increase is related to late fall fertilization.

## When to apply

Most experts agree that late fall fertilization should take place when foliar growth stops (or slows to the point that turf no longer needs to be mowed), grass is still green, and before the soil freezes. In Pennsylvania, this period usually occurs around Thanksgiving, however, it may occur later in the southeastern portion of the state and earlier in northern regions. Application timing also may vary from year to year depending on weather conditions.

## Fertilizer sources and rates

Most late fall fertilization programs include moderate amounts of nitrogen, phosphorus and potassium. Rates of 1/2 to 1 lb soluble N/1000 sq ft are recommended over higher rates (assuming a late summer application was made) to avoid winter injury, excessive growth in spring, and leaching or runoff.

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A recent study at the University of Illinois showed that when nitrogen was applied at moderate rates in late fall (1 lb of N/1000 sq ft.) both urea and sulfur-coated urea provided a better early spring color response than Milorganite. However, when Milorganite or sulfur-coated urea was applied in late fall at a higher rate (2 lb. of nitrogen/1000 sq ft.), the spring green-up response was similar to that obtained from applications of urea at a lower rate (1 lb of N/1000 sq ft in late fall and 1/2 lb of N/1000 sq ft in early spring).

Slow or controlled-release nitrogen sources are generally preferable on sandy soils because of reduced potential for leaching. Nitrogen fertilizer should never be applied to frozen soil due to the increased chance of nutrient runoff.

## Suggested rates of nitrogen fertilizers for late fall fertilization

***Bentgrass fairways and greens***

1/2 lb soluble N/1000 sq ft

1 lb slow-release N/1000 sq ft.

***Kentucky bluegrass/ perennial ryegrass/fine fescue lawns and grounds***

1 lb soluble N/1000 sq ft.

1-1/2 to 2 lb. slow-release N/1000 sq ft.

Although application timing is not as critical with phosphorus and potassium as with nitrogen, these elements can benefit turf when applied in late fall. Phosphorus is important in root growth and maturation of turfgrasses.

Application rates should be determined according to soil test

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recommendations. If your soil test report indicates a need for phosphorus, late fall is a good time to fertilize. However, there is no need to apply additional phosphorus if it is present at sufficient levels.

Turfgrasses require potassium in relatively large amounts, so annual applications are usually required. This element enhances rooting, cold-hardiness, disease-resistance and wear-tolerance. For these reasons, late summer and late fall are ideal times to fertilize with potassium.

## Summary

Late fall fertilization should take place when shoot growth ceases, the grass is still green, and before the soil freezes. Benefits of fertilizing in late fall include better winter color, enhanced spring greenup, and increased rooting. Typically, low to moderate amounts of soluble nitrogen provide good turf color without excessive shoot growth in early spring. However, slow-release nitrogen sources can also provide a good color response in early spring when used at higher rates. To avoid potential leaching and runoff problems, use slow-release nitrogen sources on sandy soils. Do not apply fertilizer to frozen soils.

*Credit:* The Keynoter, *Fall 1995.*

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