

## Fall Strategies for Better Lawns Next Spring

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The fall season provides optimum conditions for lawn renovation practices. The aims are to return the lawn to 100% grass cover of desirable species, to restore soil textural and physical properties through soil cultivation practices, and to return the playing surface to a stable and wear tolerant state. Carrying out key maintenance operations in the fall can provide early spring growth. Three of these important operations are (1) late season fertilization, (2) coring/aerification, and (3) weed control.

### **Late Season Fertilization (LSF) for Cool Season Grasses**

Turf managers have utilized late season nitrogen fertilization, sometimes referred to as fall fertilization, for years. This type of fertility program involves the application of much of the season's nitrogen during the late season months of September through December. It is important that late season fertilization not be confused with dormant and/or winter fertilization. The latter method implies that fertilizer applications are made after the turf has lost most or all of its green color and is not actively growing. This differs notably from the late season concept, which requires that nitrogen be applied before the turf loses its green color in the late fall.

Late season fertilization is popular because many of the agronomic and aesthetic advantages attributed to its use are not realized when spring and/or summer fertilization are practiced. Advantages of the late season concept include:

- Better fall and winter color
- Earlier spring green-up
- Increased shoot density
- Improved fall, winter, and spring root growth
- Enhanced storage of energy reserves (carbohydrates) within the turf plant

### **Quality**

Turf fertilized in September and again during October, November, or December is generally shown to possess better fall and winter color than a turf not fertilized at that time. In addition, signs of spring green-up have been shown to occur two to six weeks earlier if the turf has been fertilized the previous fall. Most importantly, the enhanced rate of spring greening is realized without stimulating excessive shoot growth that accompanies the early spring nitrogen applications called for in most turf fertility programs.

### **Timing**

The late-season nitrogen fertilization concept is designed to apply nitrogen during that period of the year (late fall) that will favor root growth over shoot growth, and favor a positive carbohydrate balance.

Shoot growth of cool season grasses occur most readily in the temperature range of 50-65°F. Root growth of cool season grasses will continue at soil temperatures close to freezing. When air temperatures in late fall consistently drop below 50°F, shoot growth slows or ceases but soil temperatures are still in the favorable range for significant root, rhizome, and stolon growth. LSF capitalizes on this differential in optimum temperatures for growth of roots versus shoots.

The timing of LSF should be made when vertical shoot growth has stopped, but the turf leaves are still green. Vertical shoot growth of cool season grasses will generally slow and stop at air temperatures of 45-50°F. A properly timed LSF will extend the “greening” time of the turf longer into the late fall and early winter without additional top growth. The green leaves remain photosynthetically active, producing carbohydrates. This carbohydrate will be more efficiently used to support root, rhizome, and stolon growth during the late fall and winter period. LSF also assists in building food reserves for the following season. It is critical the nitrogen be applied prior to dormancy for maximum efficiency of applied nitrogen. Poor timing is a common LSF mistake. Once the leaf tissue has turned brown, photosynthesis will no longer occur. Remember, “late-season” fertilization is not dormant fertilization.

### **Fertilizer Rate and Fertilizer Type**

In addition to timing, fertilizer rate and fertilizer type is critical to successful LSF. The most efficient nitrogen fertilizers for LSF are those independent of temperature for nitrogen release. Soil temperatures and microbial activity are low at this time of year, resulting in less efficiency from strong WIN methylene ureas, natural organics, polymer-coated ureas, and other temperature-dependent fertilizers.

Urea, more water-soluble methylene ureas, IBDU, and SCU are less dependent on temperature for nitrogen release and, therefore, make excellent LSF nitrogen sources.

Nitrogen rates should be in the range of 1- 1 ½ pounds of actual nitrogen per 1,000 square feet. Higher rates typically provide a better LSF response in the late fall and a better carryover response into late winter/early spring. For cool season grasses, nitrogen is the key nutrient for the LSF response with standard maintenance fertilizer ratios being acceptable.

Proper rate and nitrogen source will result in significant carryover of nitrogen for early spring green-up the following season. The standard spring fertilization rate can typically be reduced to one half or less, or eliminated, thus avoiding a spring fertilization flush. Don't couple LSF with traditional spring nitrogen fertilization rates. This defeats the purpose of the LSF strategy.

In summary, LSF lengthens the fall/winter green period and enhances the rate of spring green-up without stimulating excessive shoot growth, thus allowing the turf plant to maintain higher levels of carbohydrates than then spring/summer fertilization is used. Nitrogen applied during early spring increases shoot growth rates and decreases the levels of available carbohydrates in the plant, resulting in depressed root growth rates. LSF has no similar negative effects on root growth. No winter damage or snow mold injury typically occurs as a result of LSF. The turf manager must maintain a good

carbohydrate reserve/balance and maximum root mass. Proper timing and rate of application are important in successful long-term programs. Always remember: greener is not always better. A happy medium must be reached between agronomics and aesthetics.

### **Compaction Relief Through Coring / Aerification**

The detrimental effect of soil compaction on a variety of soil processes results from the collapse of the large pores in the soil and a loss of soil macroporosity. A compacted soil will exhibit reduced infiltration rates, reduced drainage, and poor soil aeration. Turfgrass plants seek out these macropores in soils as paths of low resistance for soil exploration, so the loss of macropores results in increased mechanical impedance to root growth and a shallow root system. Also, soil compaction results in a less favorable environment for many beneficial soil microbes, earthworms, and arthropods. Soil compaction is one of the most common problems on athletic lawn soils. It forms due to the intense activity of players and also because these soils are infrequently tilled to reduce compaction.

Some degree of soil modification would substantially improve the soil. Historically, the principal goal in soil modification was to replace the existing native soil that typically exhibits cohesive (silt/clay) behavior with a rootzone having properties of a granular (sand) nature. This goal is achieved by establishing sufficiently high sand contents in the rootzone. The recommended sand content for high traffic areas generally exceeds 75% by weight.

In addition to a soil modification program, mechanical cultivation techniques can be adopted that are effective at improving the physical condition of compacted rootzones. Regular core cultivation done throughout the year will keep the lawn free draining and in good shape. Soil cultivation carried out in the fall is sometimes done many times to get maximum results.

Which type of machine is best suited to relieve compaction? In essence, to relieve compaction the soil must be physically displaced to create fracturing so the same mass of soil occupies a greater volume (e.g. verti-drain, shatter-tine), or the soil must be removed so a smaller mass of soil occupies the same lawn volume (e.g. hollow core, deep drill).

Timing? Cultivation is best accomplished when the soil is moist but not wet. Moist soil facilitates deeper penetration of the tines. Cultivators will not effectively penetrate dry, compacted soils. It is suggested that several passes (three or four) be made over the lawn in varying directions, for best results.

There are several key advantages to late fall coring. Coring at this time of year results in considerable freezing and thawing of moisture in the holes, resulting in additional fracturing of the soil and prolific rooting can occur in the coring holes and adjacent fractured soil. This is more beneficial in the late fall than any other time since root growth of cool season grasses is occurring readily with cooler temperatures.

Late season fertilization with high Nitrogen is a good agronomic practice to couple with late core cultivation. Lawn food stimulates root growth during the fall, early winter, and spring. The core holes and adjacent fractured soil provide great open channels for the development of roots. Corrective applications of fertilizer can also be applied at this time to facilitate deeper placement.

### **Turfgrass Weed Control in the Fall**

The most effective control against the establishment of weeds in turfgrass is the culture and maintenance of dense, healthy stand of turfgrass. This preventative cultural approach is successful only if proper fertilization, mowing, irrigation, pest control etc. practices are implemented in the culture of the turfgrass. Unfortunately, in many turfgrass areas, the desirable turfgrass fails to establish sufficient competition to prevent all the annual/perennial grassy and broadleaf weeds from establishing and the need for post-emergence chemical control results.

### **Broadleaf Post-Emergence Control**

A sampling of broadleaf weeds commonly found on athletic lawns in the Midwest include: dandelion, white clover, buckhorn plantain, common plantain, common chickweed, yellow weed sorrel, ground ivy, knotweed, and black medic. Herbicides for controlling these latter weeds are post-emergent and predominantly foliar absorbed. Best efficacy from broadleaf weed herbicides occurs when conditions are optimal for absorption and translocation of the herbicide downward in the plant (i.e. usually when the weed is actively growing). In the fall, broadleaf herbicides and sugar compounds are usually transported downward. Research has linked basipetal sugar movement in the plant with corresponding herbicide movement. Therefore, fall applications of post-emergence herbicide normally provide a broader range of broadleaf weed control than spring applications. Late fall broadleaf weed applications can be very effective as long as the weed foliage is in a green, active physiological condition to absorb and translocate herbicide. Broadleaf weed herbicides can be injurious to seedling turfgrasses. Where seedlings are present from over-seeding, most broadleaf herbicides cannot be used until seedlings have matured and been mowed at least three times. Seedling turfgrass can be treated safely with bromoxynil (Buctril). Best weed control with bromoxynil is achieved if the weeds are less than 2" tall when treated. 2,4-D can safely be used on young turfgrass provided the turfgrass has been mowed at least three times and the use rate does not exceed 1.0lb ai/acre.

### **Perennial Grassy Weed Control**

Perennial grassy weeds can be a major problem on athletic lawns. A few of these weeds include: tall fescue, bentgrass, rough bluegrass, quackgrass, orchardgrass, and timothy. There are no selective herbicide alternatives for removing these undesirable weeds. The best non-selective herbicide choices are glyphosate (Killzall) and glufosinate ammonium (Finale) for spot treatment or renovation.

The Lesco product, Corsair (chlorsulfuron) continues to be available for selective tall fescue control in established Kentucky bluegrasses. However, this product should not be used on athletic lawns containing appreciable perennial ryegrass.

## **Annual Bluegrass (Poa annual)**

Annual bluegrass is a frequent problem on athletic lawns. It is well adapted to higher maintenance regimes like high fertility, frequent irrigation, and close mowing heights. It also germinates in the spring and fall in the cool-season regions.

The plant growth regulators Scott's TGR, Dow AgroSciences' Cutless, and Syngenta's Primo are capable of assisting in the suppression of annual bluegrass and the conversion to more desirable turfgrass. This approach has been used in the golf course industry with mixed swards of annual bluegrass and creeping bentgrass to convert to bentgrass. The PGR approach has not been used extensively in Kentucky bluegrass turf on athletic lawns for several reasons: (1) Kentucky bluegrass is less aggressive than bentgrass, (2) suppressive applications for Poa need to be made in spring and fall when play is active, and (3) the suppression of the desirable grass may reduce recuperative potential. However, several recent research reports refute point 3.

Prograss (ethofumesate) is a post-emergence selective herbicide capable of eliminating annual bluegrass from Kentucky bluegrass, perennial ryegrass, and others. It is most efficacious in the fall and requires 2-3 sequential applications. Managers who have chosen this approach are reporting fair to good results. It can be broadcast or spot treated.

Late fall applications of longer residual pre-emergence herbicides can be used to reduce annual bluegrass and other annual grassy weed development in the spring. This approach is not appropriate where late-season over-seeding or spring seeding is practiced.

## **Other Weeds**

Yellow nutsedge is a prevalent perennial weed found in many athletic lawns in the cool-season region. This weed is neither a grass or broadleaf, but instead a sedge. Consequently, the annual grass and broadleaf weed herbicides have limited impact on this weed. Selective control of yellow nutsedge in turfgrass areas is limited to the use of either Basagran, MSMA-containing products, or the Monsanto product marketed as Manage. Manage is applied at very low rates (1.0 oz. 2.0oz. product/acre), is foliar absorbed and has displayed excellent safety on all cool season turfgrass species. Yellow nutsedge treatment usually occurs more as a spring to early summer treatment while nutsedge is young and limited nutlet formation has occurred.

## **Conclusion**

Best management practices for cool-season grasses in the fall and late fall require:

- Proper fall fertilization
- Late season fertilization
- Proper mowing technique
- Fall coring dependent on traffic intensity and lawn conditions
- Late season coring
- Weed control where necessary but to avoid seedling injury