Fall Fertilization Is Fundamental

BY KARL DANNEBERGER

If the question was asked, "If you could fertilize only once during the year, when would it be?" I suspect the majority of cool-season golf course superintendents would answer, "In the late season."

Defined here as applying nitrogen in late fall when the turf is still green but no shoot growth is occurring, late-season fertilization (LSF) is the most important nitrogen application of the year. Interestingly, as widespread as LSF is used throughout the United States, it is not as common globally.

Historically, light frequent fertilization was practiced during the fall. The rationale was to apply nitrogen to match the shoot growth rate potential of the turf. That changed with the first research studies that reported the benefits of LSF (Powell, Blaser, and Schmidt, 1967). Given that the common LSF application rate is normally between 1 pound and 1.5 pounds of nitrogen per 1,000 square feet, the benefits associated with LSF could not be matched with light frequent fall applications.

The major reported advantages of late-season nitrogen fertilization include:

- extending the greening period later into fall;
- initiating spring greenup as much as a month sooner;
- increasing stand density late into the fall and thus reducing weed pressure; and
- increasing root growth.

Metabolically, LSF is associated with increased carbohydrate levels. Normally, carbohydrate levels increase in stems and roots during the winter months, with decreasing levels occurring in shoots. The real benefit of LSF in carbohydrate metabolism is the lack of excessive carbohydrate use in response to early spring fertilization.

Increased shoot density and root growth is demonstrated indirectly from one of the by-products of LSF — thatch. Although increased thatch layers are detrimental to turf health, thatch accumulation does provide insight into the dynamics of LSF. Thatch is composed of dead and living stems (rhizomes, stolons), crowns, leaves and roots between the zone of green vegetation and the soil surface. Living and dead roots comprise the greatest percentage. For example, 61 percent of a Baron Kentucky bluegrass thatch layer was comprised of roots (Koski, 1986). Most likely LSF favors root growth during the spring and early summer, while early spring nitrogen applications discourage root development. In Koski's study, the relative percentages of roots, stems and tillers did not vary between treatments. Thus, the associated increase in thatch also meant an increase in tiller and rhizome development.

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A disadvantage to LSF is the potential for increased winter disease injury. The primary winter disease associated with LSF is microdochium patch, also known as pink snow mold and fusarium patch. Its threat is highest when the fall nitrogen applications are made while shoot growth is still occurring. Succulent, rapidly growing turfgrass plants going into the winter would be more susceptible. But correctly timed LSF actually reduces the severity of other spring and summertime diseases.

Although the benefits of LSF are primarily associated with nitrogen, potassium is an element commonly applied during late season. Fall applications of potassium are associated with winter hardening. Conflicting reports exist, but potassium is associated with winter hardening of warm-season turfgrasses including bermudagrass. On cool-season turfgrasses, the benefits of exogenous applications of potassium when soil levels are adequate have not been reported.

With any turfgrass management practices the advantages need to be weighed against the disadvantages. In the case of LSF, especially on cool-season turfgrasses, the positives greatly outweigh the negatives. As late fall approaches, do not miss this window of opportunity.

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