Early- and Late-Season Fertilization

by Bob Tracinski

Sports turf managers fertilize to support and manipulate turfgrass growth on their fields. When properly combined with other cultural practices and matched to the turf's needs, growth cycles, and soil nutrient levels, early- and late-season fertilization are instrumental tools. A solid understanding of the basics is necessary to make that proper match.

The basics

Like all plants, turfgrasses require essential nutrients for survival. Water (H_2O) and carbon dioxide (CO_2) provide the basic elements they need: oxygen (O), hydrogen (H), and carbon (C).

Other nutrients are divided into two groups: macronutrients and micronutrients. Macronutrients include: nitrogen (N), potassium (K), phosphorus (P), sulfur (S), magnesium (Mg), and calcium (Ca). Micronutrients include: iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), molybdenum (Mo), boron (B), and chlorine (Cl).

Of the macronutrients, N, P, and K are categorized as major (primary) nutrients; plants need large amounts of these elements. Ca, Mg, and S are classified as secondary nutrients, and plants require lesser amounts of these materials.

Macronutrients and micronutrients are found in the soil, and all of them except N originate in the rock from which the soil was derived. N originates in the air, but atmospheric nitrogen is only available to plants when it is fixed in the soil either chemically or biologically. N can also be found in organic matter.

The amount of each element present in the soil varies depending on such factors as soil composition, temperature, precipitation rates, and humidity levels. These factors affect the accumulations of organic matter in the soil.

When soil resources do not provide adequate quantities of specific nutrients for the desired level of plant growth, fertilization supplies those nutrients. In such controlled situations as sports turf management, individual fertilization programs must be designed for the turfgrasses and soil profiles of each field.

Fertilizing products are available in liquid and granular forms, and they come in fast- and slow-release varieties. Factors such as application time and effort, costs, and the specific needs of individual fields help determine the appropriate form, type of release, and mix of nutrients.

Assess conditions

Warm-season turfgrasses need nutrients most during the summer's active-growth period. Cool-season turfgrasses require more attention when their growth peaks in the spring and fall. Ideally, adequate supplies of needed nutrients are available at the proper times to fill these needs, but there are additional considerations.

You must assess existing conditions. Soil testing can provide information on pH and certain nutrient levels, but the nutrients present in the soil may be unavailable to the plants if their uptake is hampered. This can indicate improper pH levels in the soil, or it may mean that previously applied fertilizer compounds haven't been activated.

Tissue testing provides a picture of what is being used by plants at the time of testing. Frequent tissue tests (monthly or bi-weekly if possible) reveal patterns that develop from such influences as weather changes and irrigation. Coupled with additional tissue testing in specific micro-climates or

trouble zones, these tests provide valuable data for fine-tuning your fertilization program.

Sports turf managers often care for multiple fields, and soil profiles can range from native soil to sand based. Obviously, a native-soil field with common bermudagrass turf will have much different fertilization requirements than a sand-based field with an improved bermudagrass turf.

Further, fertilization programs become more complex if any of the warm-season turf is overseeded with cool-season turfgrasses. Even when fields are exclusively planted with cool-season turfgrasses, a variety of species and cultivars within those species will complicate requirements for specific nutrients within the fertilization program.

Early- and late-season applications

Early-season fertilizer applications can serve several purposes. For cool-season turfgrasses, complete fertilizer compounds combine N, P, and K with other selected macro- and micronutrients. Fertilization can boost overall quality of weak or damaged turf, or it can augment nutrient levels depleted by heavy precipitation.

When early snows disrupt your late-season fertilization schedule, early-season applications can help alleviate deficiencies. Spot applications of specific nutrients can balance uneven growth patterns caused by excessive wear or by certain cultivars' reactions to adverse winter weather. They can deepen the color of damaged or under-fertilized turf.

Early-season applications to cool-season turfgrasses that have been overseeded into warm-season turfgrasses can stimulate spring growth. This allows fields to be used while the warm-season turf is still dormant.

Once active growth approaches, combine heavy applications of N with reduced mowing heights. In conjunction with the naturally occurring higher temperatures, these measures assist transition by reducing the vigor of the cool-season turfgrasses and stimulating the warm-season turfgrasses. The timing of such applications should coincide with traditional early-season fertilization for warm-season turfgrasses.

Late in the season is the ideal time to fertilize cool-season grasses. In the cool-season zone, this application should be timed to coincide with the natural slowdown of top growth. This enhances root development and builds hardiness, so the plant can withstand the winter and emerge in vigorous condition in the spring.

N and K are especially important for this purpose. On heavily used, multi-sport fields, choice of nutrients and the rate and timing of their application should be adjusted to keep existing turf active and to stimulate overseeded turf as late into the season as possible. On low-maintenance fields, 1/2 to 3/4 of the annual N supply may be applied late in the season.

Late-season fertilizer applications for warm-season turfgrasses also promote root development and increased hardiness. However, they are made in late summer, as the end of the plants' active-growth cycle approaches.

If your field is overseeded with cool-season turfgrasses, fertilization must be timed carefully to avoid late-season stimulation of the warm-season turfgrasses. This would divert energy to top growth at the expense of below-ground resources. Once the warm-season turf is dormant, fertilization programs can concentrate on the overseeded cool-season turfgrasses.

Precautions

Sports turf managers have an obligation to use fertilizers properly to safeguard themselves, field users, and the environment. Always follow labels precisely.

Comply with application rates. More is not better, and it may be too much. Overfertilizing can produce adverse results rather than beneficial ones.

Whether you're making granular or liquid applications, make sure equipment is functioning properly and calibrated accurately, and that all safety features are in place and operational. Applicators face the highest risk of exposure, especially during mixing and loading procedures. Carefully follow all precautions related to appropriate clothing, safety equipment, and material handling procedures.

Coordinate applications around field-use scheduling and communicate with coaches and field-user groups. Follow appropriate posting procedures to comply with national, state, regional and local regulations, as well as any requirements established by your facility. ❑

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