The perfect match: core cultivation and fertilizer

BY BOB STAIB

Agronomists and turf managers have made remarkable strides in developing and improving natural grass playing fields for soccer, rugby, football, lacrosse, field hockey, and even baseball. The present surfaces are far more advanced than those that existed before the era of artificial turf. Still, communities and schools across the continent continue to endure a never-ending plight of muddy, bare sports fields with hard surfaces.

Twenty years ago, artificial turf was proclaimed the ultimate solution for athletic fields of all kinds. Prices were expected to come down to the point where every school district could afford artificial turf. But injuries mounted and the resulting widespread negative publicity prompted several university researchers to develop natural grass systems that matched the endurance of artificial turf. Some proved quite successful, e.g., the Purdue University-designed P.A.T. system.

But new technology has not lowered the price of sports fields. These modern systems remain out of reach for most school and community budgets. Maintaining a healthy natural sports turf field without breaking the budget requires going back to the basics of turf management.

Compaction is the enemy

Most sports fields begin the season with a solid cover of green turf. Northern turf is usually ryegrass, bluegrass/ryegrass mixtures, or turf-type tall fescue. Southern turf is usually hybrid or common bermudagrass, or tall fescue. But no single variety of turf is immune from wear and tear.

Compaction is the bane of nearly all turf surfaces. But compaction is not always due to human activity. Just plain wetting and drying of clay-type soils causes a hardness that acts as a barrier to percolation of air and water. Pounding, cleated foot traffic common to sports fields hastens compaction of all soil types. This traffic, combined with the ripping and tearing from game activities, increasingly reduces turf cover as the season progresses.

Sports fields should be core cultivated (aerified) at least twice a year: once in late summer or early fall and again in mid- to late spring. At these times the weather is more conducive to root formation and regeneration of vegetative cover. The cores can be removed or broken up by dragging them back over the surface several times. By reincorporating the same soil into the holes, turf managers save money on costs of topdressing or sand. Care should be taken not to incorporate straight sand into clay soil as the distinctly different layers act as barriers to percolation.

Core cultivation is an extremely important cultural practice to use in growing superior turfs for sports fields. But timely slow-release fertilizer applications also have a direct benefit to the grass. Soil microorganisms use nutrients to enrich the life of the soil. Turf environments typically support an active microbial population.

A well-nourished soil has billions upon billions of both single-celled and multicelled organisms whose primary function is to break down decay-resistant plant tissue (thatch) and soil organic matter. In the process, they create humus, which helps to keep the soil porous and serves as the medium for banking and exchanging nutrients for plant utilization. They also extract and solubilize insoluble elements from soil complexes for later plant uptake.

Under adverse conditions, such as compacted soils that are often too wet or too dry, the numbers of microorganisms decline drastically.

Fertilizers and microbial activity

Ureaform and methyleneurea fertilizers are unique among nitrogen sources. The carbon (C) in the nitrogen-carbon-linked polymers provides the energy microorganisms need to exist and multiply, while the nitrogen (N) is their food source. Like higher life forms, carbon is necessary for energy. Nitrogen is the chief component of proteins and amino acids. The only other fertilizers that provide useful carbon are natural organic materials with C to N ratios rarely narrower than 12 to 1. The C to N ratios of ureaform (UF) and methyleneurea (MU) are approximately 1 to 1. Decomposer microbes use both elements to fulfill immediate and long-term nutritional and energy requirements.

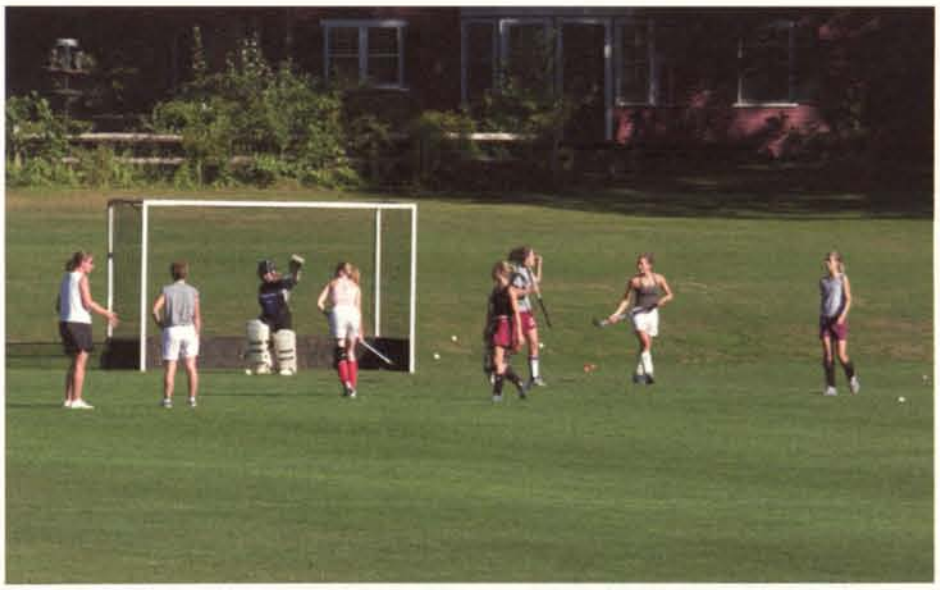
As microorganisms carry on their life processes, they return nitrogen to the soil in the ammonium (NH_4^+) form. The plants are literally the second guests at the table. Even in poor soils there is an inherent population of beneficial microorganisms that exist symbiotically with living plants. Core cultivation, and the use of UF and/or MU fertilizers will greatly enhance their numbers. The result is a complexity of benefits, chiefly a deeper and more vigorous root system.

Soil microorganisms require lesser amounts of other nutrients, many of which are available in soil organic matter and plant residue. Phosphorus is essential to the chemical transfer of energy in all living cells. Occasional applications of phosphorus can be as important to the health of microorganisms as they are for turf and other plants.

Ureaform and methyleneurea fertilizers are both slow-release N sources. Rates of these fertilizers are governed by the percentage of water insoluble (WIN) and sparingly soluble nitrogen in each.

Combine seeding and fertilizing with core cultivation

Plant roots typically show a very positive response when ureaform and phosphorus are placed directly in the root zone. In established turf, the only way to accomplish this is to apply both materials directly after core aerification. Incorporate by dragging across the surface with the pulverized cores or other topdressing material. Slit-seeding following core cultivation will place even more of the seed and fertilizer in the soil, and will help break up the cores.



Following core cultivation, apply 130 to 220 lbs. of ureaform 38-0-0 per acre (3 to 5 lbs. per 1,000 sq. ft.) plus 2 lbs. per 1,000 sq. ft. of P2O5 equivalent in a phosphate fertilizer over the topdressing or pulverized core material. Then drag or brush to move the material into the holes. Note: Where dragging or brushing isn't practical, it is still recommended that ureaform and phoshate fertilizers be applied after coring. Apply the higher rate of ureaform (5 lbs. per 1,000 sq. ft.) before beginning sports activity. This will help hasten recovery of damaged turf.

Intensively managed turfgrass requires potassium at levels equal to or exceeding that of nitrogen. Potassium is vital in maintaining leaf and stem strength, and helps the plant defend against many causes of stress. Apply 6 to 8 lbs. of actual K2O per 1,000 sq. ft. on an annual basis. Use an NPK turf-grade fertilizer or any potassium fertilizer. Potassium sulfate has a lower salt index than muriate, KCl (potassium chloride), and is safer to apply in warm weather. Since potassium fertilizer is more soluble than phosphorous or ureaform, there is no advantage in soil incorporation. Bi-monthly applications during the growing season significantly assist sports turf in recovery from wear and tear.

At certain times, all turf professionals need to push panic button. Having a ready source of good sod has rescued many grounds managers from agony and despair. Consider allocating an acre or more of turf in a lesser-used area for emergency repairs to sports fields. Ureaform 38-0-0 will encourage rapid establishment of all varieties of turf from seed. Applied to the sod bed prior to laying sod, ureaform helps fast knitting and rooting.

When growing your own sod from seed, apply ureaform with phosphorus in a 2 to 1 ratio of N to P2O5 at the rate of 400 lbs. ureaform per acre (150 lbs. N) for bluegrass and/or ryegrasses and bermudagrasses. Use one-half this rate for turf-type tall fescues. A solid cover will be established quickly, and additional nitrogen should not be necessary for 12 months.

In sod beds for all turf except tall fescue, apply 130 lbs. ureaform per acre or 3 lb. per 1,000 sq. ft. (1.14 lbs. N per 1,000 sq. ft.) in a 2 to 1 ratio of N to P2O5. Note: Phosphorus may be derived from DAP (diammonium phosphate), MAP (monammonium phosphate), or a straight super phosphate fertilizer. For tall fescue, use one half this rate of ureaform nitrogen in a 1 to 1 N to P2O5 ratio. **ST**

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