Crumb rubber
improves field wear tolerance

By Matthew Goddard and Dr. John Sorochan

Athletic fields are exposed to some of the most intense traffic conditions of any turfgrass environment. In many cases, frequently used fields encounter injury beyond their ability to recover. In this situation, loss of an actively growing turfgrass surface can result in bare areas that affect the playability of the field.

Athletic fields require a turfgrass species that can withstand traffic and recuperate from wear. In cool-season environments, Kentucky bluegrass (KBG) and perennial ryegrass are the species of choice. Conversely, bermudagrass is used extensively in warm-season environments. This presents a problem for turfgrass managers in the transition zone region of the country where no turfgrass species is ideally suited for growth. Regular use can take its toll on athletic fields. As traffic continues, wear patterns can develop, especially if the turfgrass cover has entered winter dormancy and no longer actively growing.


Crumb rubber on crowns

Crumb rubber is a product made from recycled automotive tires. Past studies have shown that topdressing crumb rubber over actively growing turfgrass can improve wear tolerance and prolong the playability of these fields. Our objectives were to determine the wear tolerance of four turfgrasses in the transition zone with and without crumb rubber topdressing under simulated athletic field conditions, and to determine if improved cool and warm-season turfgrass species can be used for transition zone athletic fields.

To test this, four different turfgrasses, Tifway hybrid bermudagrass, Riviera and Quickstand bermudagrasses, and Thermal Blue hybrid Kentucky bluegrass were evaluated with and without crumb rubber topdressing to determine the wear tolerance of each species under simulated athletic field traffic in the transition zone. In this area, bermudagrass is often used on athletic fields because of its wear tolerance and recuperative potential. These attributes make Tifway hybrid bermudagrass a good choice for athletic fields, but cost and cold tolerance limit its use in the transition zone. Riviera bermudagrass is an improved common bermudagrass cultivar that is similar to Tifway bermudagrass in density and overall quality. In addition, it has greater cold tolerance and can be established from seed, but wear tolerance and recuperative potential of Riviera had not been determined.

One of the issues concerning the use of bermudagrass in the northern parts of the transition zone is the loss of color and active growth as it enters winter dormancy in the fall. To account for this, sports turf managers often overseed to provide an actively growing turfgrass cover throughout the fall athletic season. Unfortunately, overseeding is not an option for all athletic fields due to budget limitations. As a result, these athletic fields are subjected to significant wear during periods when active growth does not occur.

Hybrid bluegrass without crumb rubber topdresssing

Hybrid bluegrass with crumb rubber topdressing

Recent advances it turfgrass breeding efforts have introduced new turfgrass cultivars that have potential for use in transition zone athletic fields. Most KBG varieties do not perform well in the transition zone due to a lack of tolerance to heat, drought, and disease. Texas bluegrass (TBG), mainly a forage grass, demonstrates higher levels of heat and drought resistance relative to KBG, but has poor turfgrass quality. Thermal Blue is a hybrid of these two species and possesses genetic traits from each species allowing it to survive the hot, humid summers of the transition zone and provide an actively growing turfgrass surface during the fall athletic seasons.

To test these turfgrasses under simulated athletic field wear, the Cady Traffic Simulator (CTS) was used. The CTS is a walk-behind Jacobsen core cultivation unit with artificial feet to simulate athletic wear. Two passes with the CTS is designed to generate wear equivalent to that sustained during a football game between the hash marks and the 40-yard lines.

The four turfgrass species were subjected to 1 (low traffic) or 3 (high traffic) simulated games per week. Timing of traffic applications was established to mimic fall high school football schedules. Plots receiving crumb rubber were topdressed twice with 10/20 mesh particle size crumb rubber to achieve a depth of 0.75 in.

Results

Hybrid bluegrass (HBG) retained its color and provided an actively growing turfgrass surface after bermudagrass plots had entered winter dormancy. Riviera and Tifway bermudagrasses were more tolerant to wear than Quickstand. Quickstand consistently ranked lowest in percent cover, which shows that Riviera, Tifway, and HBG are better suited for athletic fields. Crumb rubber proved to significantly reduce the amount of wear sustained during traffic events. All plots receiving crumb rubber treatments had improved turfgrass cover at the end of the season than those not receiving crumb rubber topdressing.

Crumb rubber provided a more resilient turfgrass surfaces, reducing the amount of athletic field wear as a result of traffic. By retaining the amount of actively growing turfgrass cover, crumb rubber provided a safer playing surface. This study has introduced a new management practice for transition zone athletic field managers use to improve the overall performance and longevity of their fields.

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Best Management Practices

Best fertility management includes the use of soil tests, an understanding of the nutrient requirements for each turf species, careful observation, and balancing aesthetics v. function. Proper interpretation of soil tests will allow you manage both components and develop the best fertility programs. Meticulous recording keeping of soil test reports, fertilizer applications (rates, formulation, dates), and turfgrass responses are essential to developing a strong and consistent fertility program.

When observing turf responses look for turf color, growth, quality, recuperative capacity, establishment speed and consistency, wear tolerance, playability and responsiveness to fertilizers. Use soil tests to uncover underlying poor turf performance or overt and negative turfgrass conditions like nutrient deficiencies. Soil chemistry and microbiology are complicated; therefore keep it simple use soil tests as a rough guideline with strong consideration to basic agronomic principles, including subsurface and surface drainage, promoting the correct ratios of air, soil, and water, adequate fertility, and thatch management using frequent mechanical cultivation.

Common lab tests for sports turf

Exchangeable nutrient data/Nutrient sufficiency levels[END ITAL]. Represents the amount of each nutrient present in the soil and the extent to which plant requirement are met (sufficiency) for optimum growth (lb/A). Usually expresses as low/ optimum/high.

Extractable Nutrient Data[ENDITAL] (ie. soluble paste extract). Represents the nutrients that are easily extracted from the soil and therefore the best indication of plant availability (ppm).

Cation Exchange Capacity (CEC) Represents nutrient holding capacity (target 4 cmol/kg soil).

pH. Soil reaction affecting most notably nutrient availability and microbial activity

Organic Matter (OM) Percentage. Indicates degree of organic matter accumulation which can affect drainage, soil reaction, and presence/extent of localized dry spots (target ≤ 4%)

Soluble Salts/Sodium. Represents the level of salinity and sodium in the soil. High levels of salinity (various salts) will impact the soil reaction, infiltration in the top two (2) inches, and plant water relations. High sodium (≥ 3% of total CEC or sodium adsorption ratio > 2) will negatively impact soil structure and permeability. Salinity or sodium problems usually arise due to poor irrigation water quality or lack of rainfall, particularly in arid or semi-arid regions.

Irrigation Water Quality. In general it is good idea to test the irrigation water to determine if problems exist. Potential problems including high bicarbonates (HCO3-), or high Na+ and Cl- concentrations compared to calcium (Ca2+) and magnesium (Mg2+).

LETTER TO THE EDITOR

Bio-fuels not so great

Dear Editor,

Re the article by Chris Harrison on "Alternative fuels power next wave of equipment" (Jan. '08, p. 40): Mr. Harrison states that "Emissions from bio-fuels and biodiesel blends are lower than petroleum-based diesel fuels making them more environmentally friendly." This statement is totally false.

In fact, bio-fuels (ethanol) and biodiesel often burn less efficiently and pollute more than most petroleum-based fuels. This type of "Al Gore" reporting that selectively ignores data that shows these fuels, while being an alternative to petroleum-based fuels and lessening our dependence on foreign oil, are not always cheaper or cleaner. The additives that have to be put into the biodiesel fuel tanks, to keep it from growing bacteria, are even worse at polluting the air when it is burned.

Mr. Harrison should have checked the facts (all the facts) instead of writing a "sexy green" article that gives many in our industry incomplete information. I am all for lessening our dependence on foreign oil and being good stewards of the environment, but let's be wise in how we do it. It is not a quick fix, and this type of article fuels the fire that the "feel good" fix is just around the corner, and does not address the economics. [For example] the installation of an underground, 500-gallon biodiesel storage tank, if a permit can be obtained (currently Los Angeles County will not issue any permits for biodiesel storage tanks) costs a minimum of $50,000. These costs, plus the current information coming from several fleet managers who are now seeing more frequent servicing on equipment using biodiesel, should make us all "look before we leap."

Richard Farmer, Manager, Landscape Services
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Latest biostimulants on the market

ROOTS Concentrate

ROOTS Concentrate is an advanced plant supplement that promotes rapid root growth and plant regeneration. When applied to seedlings or cuttings, it penetrates roots to create a stronger root system and faster plant growth. It is non-phytotoxic, formulated for soil or foliar application, and designed to supplement all fertilizer programs, and can be applied through injection and drip irrigation, fertigation, or sprayer system.

Roots Plant Care Group

For information, fill in 054 on reader service for or see http://www.oners.hotims.com/14681-054

ProPlus JumpStart

The new ProPlus agronomic formulation JumpStart is designed to improve overall soil conditions and allow faster, more complete seed germination and turf establishment. It can be applied during overseeding or grow-in projects. It has a proprietary formulation that includes beneficial soil bacteria, humic acid and a wetting agent, which work together to improve water infiltration and retention, and promote faster nutrient uptake and conversion.

Profile Golf

For information, fill in 055 on reader service for or see http://www.oners.hotims.com/14681-055

Aminoplex

Aminoplex, a true biostimulant, contains 15 free amino acids, complex polysaccharides, and natural phytohormones. It can be applied as a foliar or soil drench and is designed to promote plant health preventatively, therefore sequential applications are recommended prior to and during the onset of environmental stresses such as heat, drought, and salinity. Free amino acids are hypothesized to conserve plant energy, making more available to upregulate natural defense mechanisms during environmental stresses.

Grigg Brothers

For information, fill in 056 on reader service for or see http://www.oners.hotims.com/14681-056

Launch and Focus

PBI/Gordon's Launch or Focus, formulated as liquids or granules, provide ingredients that increase germination rates and promote growth of fibrous roots. They also transform minerals for absorption by plant systems, promote growth and assist seeds in breaking dormancy. And treated plants recover from play stress more quickly.

PBI Gordon

For information, fill in 057 on reader service for or see http://www.oners.hotims.com/14681-057

BioGain WSP + Sprint 330

This package combines BioGain WSP, a bionutrient and beneficial bacteria blend that improves plant response and improves water and nutrient uptake. Sprint is a chelated iron additive that strengthens chlorophyll production and results in richer, greener turf, trees and shrubs.

Becker Underwood

For information, fill in 058 on reader service for or see http://www.oners.hotims.com/14681-058