# Drought-tolerant varieties

■ Select grasses according to the nature of the area to be covered, water availability and effect desired. For any of the lawn grasses to produce an aesthetically pleasing turf, supplemental water must be applied. Generally, grasses should be considered high water requirement plants, but drought tolerant turfgrasses are becoming increasingly available.

Here are National Turfgrass Evaluation Program (NTEP) ratings of various commercially-available varieties, grouped by cultivars. These are the highest ratings in each group of trials, with no statistical differences evident. Please note that most ratings are based on limited site evaluations. All are from NTEP 1992 progress reports.

| BUFFALOGRASS (wilting) | |
|---|---|
| 315 | 9.0 |
| 609 | 9.0 |
| Bison | 9.0 |
| Buffalawn | 9.0 |
| NE 84-378 | 9.0 |
| Sharps Improved | 9.0 |

| BUFFALOGRASS (dormancy) | |
|---|---|
| 609 | 8.2 |
| Texoka | 7.8 |
| 315 | 7.2 |
| Plains | 7.2 |
| Bison | 7.0 |
| Sharps Improved | 7.0 |

| PERENNIAL RYE (dormancy) | |
|---|---|
| Nighthawk | 8.7 |
| Patriot II | 8.7 |
| Pebble Beach | 8.7 |
| Sherwood | 8.7 |
| Affinity | 8.3 |
| Envy | 8.3 |
| Stallion Select | 8.3 |
| Accolade | 8.0 |
| Achiever | 8.0 |
| Advent | 8.0 |
| Barrage | 8.0 |
| Caliente | 8.0 |
| Brightstar | 8.0 |
| Competitor | 8.0 |
| Cutter | 8.0 |
| Gator | 8.0 |
| Goalie | 8.0 |
| Morning Star | 8.0 |
| Navaho | 8.0 |
| Quickstart | 8.0 |
| Target | 8.0 |
| Topeka | 8.0 |
| Prizm | 8.0 |

| KENTUCKY BLUEGRASS MEDIUM-HIGH MAINT. (wilting) | |
|---|---|
| Eagleton | 8.7 |
| Barmax | 8.3 |
| Monopoly | 8.3 |
| Silvia | 8.3 |
| A-34 | 8.0 |
| Indigo | 8.0 |
| Blacksburg | 7.7 |
| Challenger | 7.7 |
| Classic | 7.7 |
| Freedom | 7.7 |
| Nustar | 7.7 |
| Preakness | 7.7 |
| Suffolk | 7.7 |

| KENTUCKY BLUEGRASS LOW MAINTENANCE (dormancy) | |
|---|---|
| Fortuna | 5.0 |
| Voyager | 5.0 |
| Merion | 4.7 |
| Unique | 4.7 |
| Banjo | 4.3 |
| Amazon | 4.0 |
| Barzan | 4.0 |
| Bronco | 4.0 |
| Chelsea | 4.0 |
| Destiny | 4.0 |
| Merit | 4.0 |
| Opal | 4.0 |
| Ram-1 | 4.0 |

| KENTUCKY BLUEGRASS MEDIUM-HIGH MAINT. (dormancy) | |
|---|---|
| Barzan | 5.0 |
| Glade | 5.0 |
| Ronde | 5.0 |
| Indigo | 4.7 |
| Marquis | 4.7 |
| Merit | 4.7 |
| Viva | 4.7 |

| KENTUCKY BLUEGRASS LOW MAINTENANCE (recovery) | |
|---|---|
| Monopoly | 6.3 |
| Banjo | 5.0 |
| Alene | 4.7 |
| S. Dakota Cert. | 4.7 |
| Barzan | 4.7 |
| Kenblue | 4.3 |
| Nustar | 4.3 |

| TALL FESCUE (recovery) | |
|---|---|
| Hubbard 87 | 6.3 |
| Phoenix | 6.0 |
| Adventure | 5.7 |
| Chieftain | 5.7 |
| Guardian | 5.7 |
| Jaguar II | 5.7 |
| Monarch | 5.7 |
| Sundance | 5.7 |
| Willamette | 5.7 |
| Winchester | 5.7 |

# Athletic field soil is a key to avoiding injuries

by Henry Indyk, Ph.D.

**Modified topsoil root zone mix. A 10-inch layer is spread over the subgrade showing one of the drainage lines.**

■ Consider athletic field soil conditions from two major perspectives: the best possible growth situation for the turf, and the basis for player safety.

For optimum turf growth, soil conditions must be suitable from both chemical and physical standpoints.

Chemical conditions include pH, nutrient status, level of salt concentration and contaminants.

Physical conditions include soil texture, infiltration and percolation, drainage, and susceptibility to compaction. From the standpoint of safety, add field grade and contour, evenness or levelness, existence of depressions, and undesirable debris.

**Assessing conditions**—Know what's wrong before you take any action. Soil conditions must be assessed to analyze existing situations properly. This must be done by someone with knowledge and background in soils, someone who knows what to look for and how to judge conditions accurately.

A great deal can be determined by visual observation during a site visit: physical conditions including soil texture, drainage, levelness, contour, grade, depressions, percentage of debris and existing turf condi-

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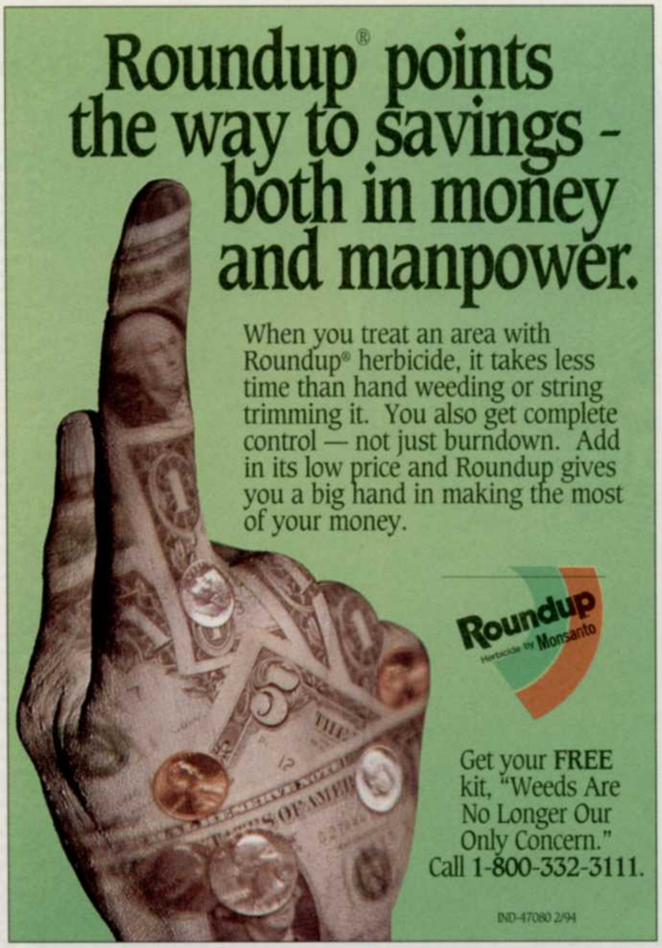


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**ATHLETIC SOIL** *from page 32*

tions (density, evenness and vigor). Even hardness can be determined to some degree, though for best accuracy a physical measurement of hardness can be taken with an impact machine.

The site visit includes soil sampling for a laboratory quantitative assessment of chemical and physical characteristics. Take soil samples according to field variability, pulling some samples from each area with variations. From 10 to 20 samples should be taken. Gather them with a soil sample tool to a depth of at least six inches.

Combine and thoroughly mix the collected samples in a clean container. By testing the samples together, rather than testing each sample individually, results will reveal a composite of the entire field.

Send air-dried samples to a qualified, reputable laboratory for chemical testing and physical analysis.

Chemical testing should include levels for soil acidity (pH) and the major nutrients of phosphorus and potassium, and calcium and magnesium. If the field is in an area where micronutrients are normally deficient, test for these also.

Physical analysis should include mechanical analysis for sand, silt and clay proportions. This will help predict the ability of the soil to infiltrate and percolate water, its drainage characteristics, water-holding capacity, and its compaction susceptibility. Information gained from this analysis can be fortified with other laboratory determinations, such as sand fractionation, bulk density and percolation rate.

Visual assessment and lab test results combined provide useful information on the existing status of the field.

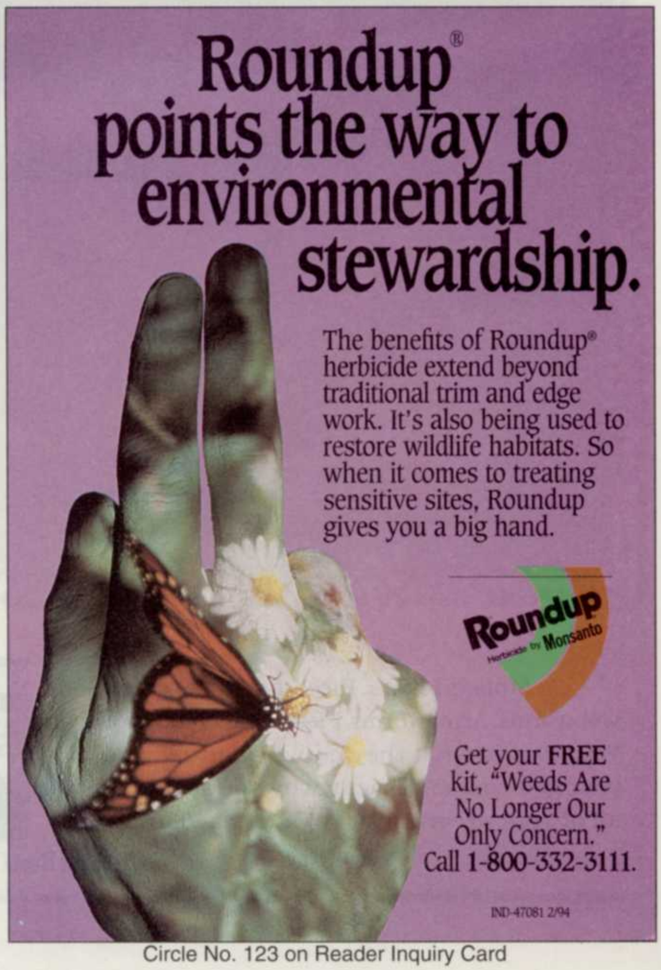
**Corrective procedures**—It's vital to know what the soil profile conditions should be for the growth and support of a dense, vigorous and healthy natural turf sports playing surface in order to determine what needs to be done to get there.

Corrections in the chemical area will be based on the results of the laboratory analysis and are generally issued in prescription form by the lab. For example, use v amount of x material to alter the y level by z amount.

The proper pH levels for favorable turfgrass growth range between 6.0 and 7.0 with 6.5 being ideal. High ph—alkaline conditions—require acidifying; low pH—acidic conditions—must be neutralized. Sulphur compounds correct alkaline conditions; lime corrects acidity. The farther pH levels range from the ideal, the harder it will be to correct pH conditions for the proper establishment and maintenance of turfgrasses.

Lab prescriptions also spell out the amount and type of corrective materials to be applied according to specific nutrient deficiency levels.

In spite of pH and nutrient levels, high salts or other contaminants can affect turf growth. Contaminants may be due to misapplication of chemicals, or the result of leaks or spills. Excess salts may also come from contaminants. They may build up in coastal regions when areas are inundated with brackish water during flooding. In the Southwest, natural salt levels may be great enough that salt crusts appear on the soil surface.

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Salt concentration is measured easily with a conductivity test. Using water to leach out excess salts can be a long, time-consuming process. The water to be used also must be tested for salt levels. Gypsum can be used to accelerate the leaching process. In some cases where high salt levels exist, it may be necessary to replace existing soils. The new soils must be tested also, before changes are made.

Though a visual assessment gives a qualitative analysis of physical conditions (the sand:silt:clay ratio), it should always be backed up with a laboratory mechanical analysis to establish quantitative proportions. In addition to this mechanical analysis, a sieve analysis ,also known as a sand fractionation analysis, should be conducted.

The sieve test separates and grades sand particles by specific sizes: very coarse, coarse, medium, fine and very fine. If the sand component is predominantly in the fine/very fine range, the small particles can fit together so closely that the sand functions more like silt and clay and their restriction on the rapid infiltration and percolation of water required for suitable athletic field soils.

Corrective procedures to improve filtration, percolation rates and compaction resistance require soil modification to change the physical make-up of the soils. To be effective, these modifications must incorporate the right amount of the right quality of sand. The critical factor is testing of the sand for particle size, pH, and salt index prior to use. There's no point bringing in sand that has problems of its own.

Stipulate sand fractions with 90 percent in the coarse range (1.0 mm) down to the fine range (0.25 mm). Little—10 percent or less—of the sand should be in the range above very coarse or below very fine.

Depending on available sand sources, silica sand is preferred to calcareous sand, which normally carries a high pH.

**Drainage problems**—One can go through all the steps of rebuilding the soil, doing everything ideally, so that the soils are chemically and physically on target, grade the field, sod or seed, and have the field look beautiful until the first big rain. Then problems may appear: what happened with all of the expended energy and cost in rebuilding the soil?

Modification of the upper layer of soil, no matter how great the depth, is not the solution to a drainage problem unless the subsoil is such that it allows drainage, which is a rare solution. Essentially, what is above the subsoil, with good physical characteristics that allow percolation and infiltration, is then impeded by the subsoil barrier which causes water to back up.

An internal soil drainage system is needed to correct subsoil drainage problems, allowing the modified field media to function properly.

Rebuilding the soil requires "in depth" homework. Know what you have, where you want to go, and what you need to get there—and test every step of the way.

*—Dr. Henry Indyk is turfgrass agronomist for Turfcon, the professional consultation branch of The Greenway Group, Horsham, Pa. He was extension specialist with Rutgers for 30 years. Indyk is secretary of the national Sports Turf*


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