Soil Sampling
a critical step in the soil testing process

***by Clare Liptak, RCE Soil Testing Lab**

Soil testing is an investment yielding information worth much more than the initial cost and time required to collect a representative sample. The testing can be a routine process of agronomic management or part of an effort to resolve observed problems with field performance. In either case, the collection of a proper sample is a crucial step in the soil testing process. Improper sampling, not the analytical procedures of a laboratory or the calibration of turfgrass field equipment, may be the greatest source of error in nutrient management.

It's important to collect samples according to the recommendations of the laboratory that will be doing the analysis. The Rutgers Soil Testing Laboratory recommends that all samples submitted for nutrient testing should be composite samples, meaning that they are produced by gathering and mixing smaller soil subsamples from different areas that have important characteristics in common. This is the only way to average areas where the spreader distributing the fertilizer may have applied too much or too little. Composite sampling also minimizes other subtle but significant differences in soil produced by grading when the field was built or irregularities in irrigation patterns.

When the soil is dry enough to be crumbly in your hand, collect the subsamples from random locations of the test area using a trowel, spade or soil probe. Each subsample will be a thin slice of soil taken from below the thatch layer to a depth of six or seven inches. Each subsample, free of blades of grass and bits of thatch, should be placed in a clean, plastic bucket. Ten to fifteen subsamples from the area, broken up and mixed together, will provide plenty of soil from which to collect 2 cups for sending to the lab for testing.

Sometimes clients have difficulty deciding if one composite soil sample is sufficient for a given field. Usually an entire field may be represented by one composite sample if the type of turf and the history of lime and fertilizer applications are the same throughout the field. But there are other important differences to consider as well. If a field has a section where the soil is a different color, or texture, or if that area drains differently, that also is a reason to test the area separately. Finally, another reason to test an area separately is to determine what soil characteristics, (including drainage capability, cation exchange capacity, organic matter content, and relative amounts of sand, silt and clay, as well as nutrient levels) might account for problems that repeatedly occur in one area while the greater portion of a field is free of these problems.

Testing every two or three years is usually frequent enough to keep the pH and nutrient levels of an athletic field within the optimum ranges. A significant departure from the optimum ranges can account for loss of color, vigor, and density in a stand of turfgrass.

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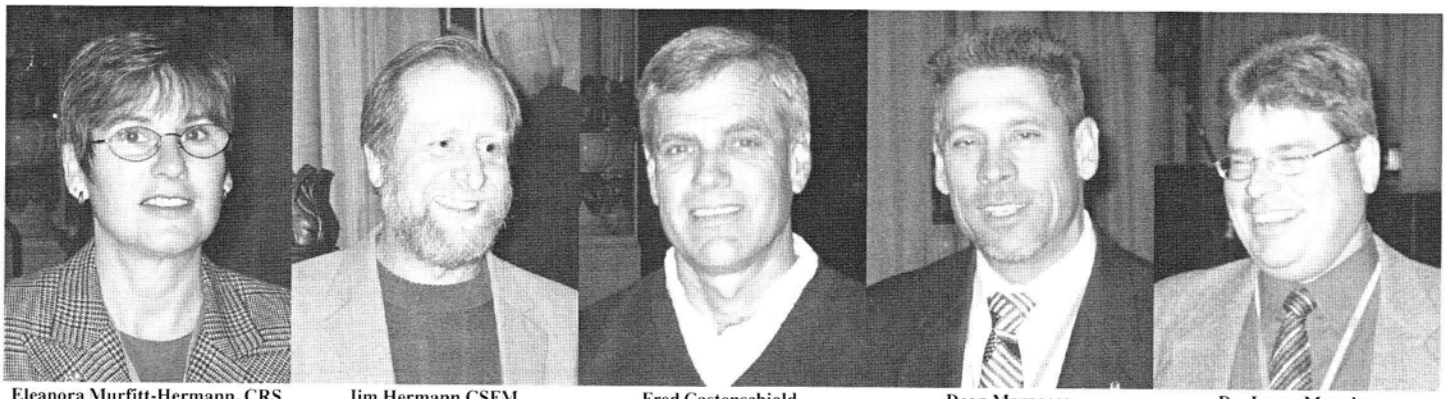

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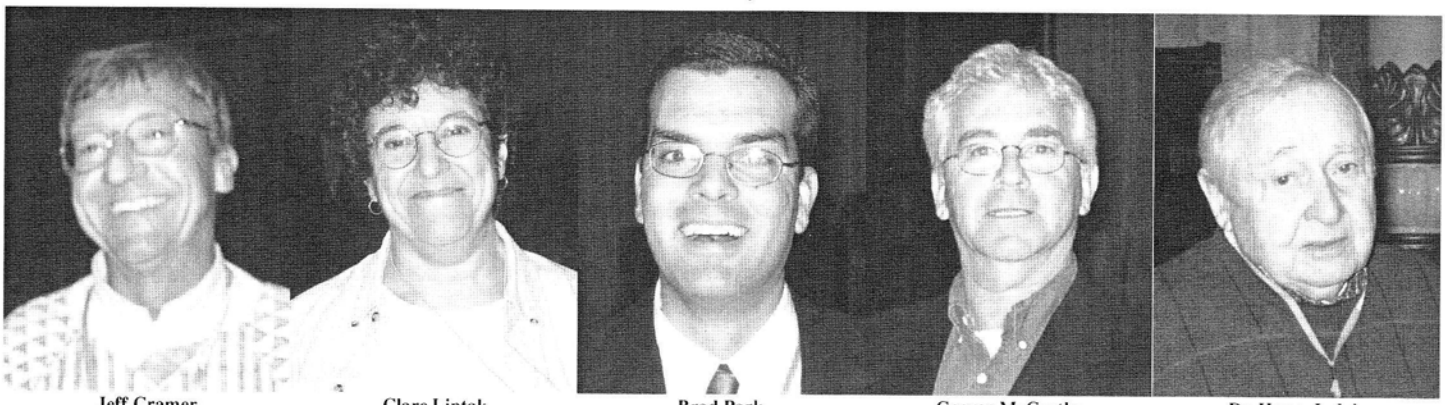

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Also, improper pH or nutrient levels can make a turfgrass stand more susceptible to attack by fungus diseases such as brown patch, leaf spot or dollar spot.

However, many other factors affect turf appearance and growth besides nutrient levels. Salt accumulation, insects and diseases, poor drainage, compaction, shallow rooting depth, drought and weed competition all have significant impacts on field performance. For example, poorly drained or compacted soils contain little oxygen, which reduces potassium uptake even when the level of the nutrient is sufficient in the soil. Drainage or compaction problems will not be evident in the samples sent to the lab but should be considered as possible sources of problems when observed in the field.

Many people ask why the Rutgers Soil Testing Laboratory doesn't routinely test for nitrogen. Nitrogen exists in the soil in different, rapidly interchangeable chemical states, and the nitrate form is easily leached from soil. These facts limit the value of nitrogen analysis because the levels of various forms of nitrogen in the field may have changed by the time the results are available.

Turf managers should keep the plant disease triangle in mind. One corner of the triangle represents the disease organism, which is always present. Turf managers can not do anything about that. Another corner of the triangle is the environment. While the turf manager can not affect the weather, he or she can certainly affect the soil environment, especially when new fields are being built. Managers can adversely affect the soil environment through improper turf maintenance practices. The remaining corner of the disease triangle is the host plant. Soil testing is an inexpensive and relatively simple way to maintain the health, color and density of the host plant - in this case, the appropriate turfgrass for a particular field. This is the corner of the disease triangle in which athletic field managers can have immediate and significant impact.

For more information on soil sampling and soil testing see the RCE – Soil Testing website www.rce.rutgers.edu/soiltestinglab/

*Clare Liptak serves on the Board of Directors for Sports Field Managers Association of NJ and works for Rutgers soil testing lab. ◆

Murphy's Law

Dr. James Murphy is an Associate Extension Specialist in Turfgrass Management for Rutgers University, department of Plant Science. Ask Dr. Murphy questions concerning agronomics.
E-mail him at hq@sfmanj.org

Question: Can "frost seeding" work to rejuvenate a worn sports turf?

Answer: Frost seeding refers to the practice of scattering seed on the surface of soil during late season (late fall and winter) and relying on freezing and thawing to incorporate the seed.

Placement of seed is one important principle of both overseeding and seeding. Frost action is often suggested as a means to incorporate (place) seed into the soil. Unfortunately, "frost seeding" is very unreliable and will most often result in very poor establishment or re-establishment of turf. The reasons are due to the seed laying exposed and unprotected at the surface of the soil for an extended period of time. The exposed seed washes into low spots with rain, blows off the bare soil with the wind, and can be eaten by birds. Moreover, the freezing and thawing that "opens" the soil surface does not provide sufficiently deep voids for the seed to be adequately incorporated into the soil. All of these contribute to poor distribution and placement of seed. Thus, uneven emergence of seedlings is typically the best one can expect from a late season seeding that is not placed into the soil.

Thus, those that must perform late season overseeding and seeding should do so with techniques that place the seed into the soil. Seed to soil contact is essential for success; without it you will have disappointing results. Slice-seeders and aerifiers are essential tools that a turf manager needs for successful placement of seed regardless of the time of season. ◆