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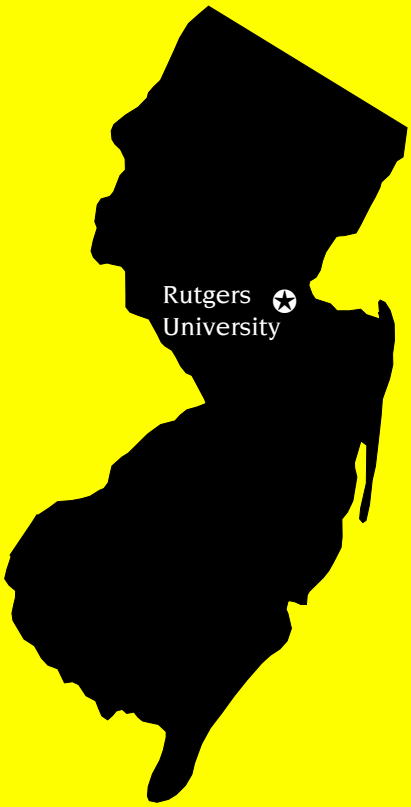

THE NEW JERSEY TURFGRASS ASSOCIATION

In Cooperation With

RUTGERS COOPERATIVE EXTENSION
NEW JERSEY AGRICULTURAL EXPERIMENT STATION
RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, Cook College, Rutgers University in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. It also allows these professionals to reach a more general audience, which includes the public. Articles appearing in these proceedings are divided into two sections.

The first section includes lecture notes of papers presented at the 1996 New Jersey Turfgrass Expo. Publication of the New Jersey Turfgrass Expo Notes provides a readily available source of information covering a wide range of topics. The Expo Notes include technical and popular presentations of importance to the turfgrass industry.

The second section represents performance of turfgrass cultivars and selections in New Jersey turf trials. The primary objective of these papers is to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

Special thanks are given to those who have submitted papers for this proceedings, to the New Jersey Turfgrass Association for financial assistance, and to those individuals who have provided support to the Rutgers Turf Research Program at Cook College - Rutgers, The State University of New Jersey.

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THE POTENCY OF CULTURAL PRACTICES IN ATHLETIC FIELD MAINTENANCE

Dr. James A. Murphy[1]

Maintaining a dense, vigorous, and well-groomed turfgrass cover is a primary requisite for high quality athletic field playing surfaces. It provides attractiveness for spectator appeal and community pride. Of greater importance may be the soft resilient surface that provides a cushion to protect athletes against injuries, and ensures a surface that not only helps in footing but is ideal for the play of various athletic activities. Also, it eliminates the nuisances of dust and mud. For a turfgrass cover to fulfill these functions satisfactorily, proper turf establishment and maintenance practices must be used. Investments in the establishment, renovation, or reconstruction of athletic field turf are wasted unless suitable provisions are made available for the maintenance program.

Effective turf maintenance requires the adoption of a integrated program oriented toward producing favorable conditions for the development and growth of vigorous, healthy turf. All too often, only certain aspects of maintenance receive attention due to budget limitations and/or interests of the persons responsible for the care of the turf. A suitable maintenance program requires a budget that supports the materials, equipment, and personnel (including a conscientious and knowledgeable supervisor) to accommodate a variety of procedures. The maintenance program should include attention to these factors:

Soil Test. Periodically (at least once every 3 to 5 years) test soil to determine acidity and nutrient status of the soil as a guide for specific lime and fertilizer applications. Soil test results are needed to determine the need for liming, rate of lime, appropriate ratio of the fertilizer grade to be used (e.g., 4-1-2, 2-1-2, 2-0-1, etc.), and rate of fertilizer application (pounds of material per 1000 ft^2 of turf). Soil tests results provide the information needed to select the fertilizer material that will provide the appropriate balance of essential nutrients such as phosphorus and potassium.

Lime. Apply limestone according to soil test results to maintain a soil pH in the range of 6.0 to 6.7. The soil test will indicate whether calcitic or dolomitic limestone is needed and the rate at which to apply the liming material.

Nitrogen Fertilization. Keep in mind that athletic field turfs can vary considerably in soil type, turfgrass species and cultivars, and exposure to sunlight and wind. These factors and others influence the need and timing of nitrogen fertilization. Nitrogen fertilization will be most effective when applied during periods that are conducive to vigorous growth. Uptake of the nitrogen fertilizers by the turf will be most efficient when applied immediately before a rainfall. Many factors must be considered when scheduling a fertilization. Below are some generalized relationships between nitrogen fertilization and the seasonal usage of athletic turf; deviations from these suggested programs should be based on the condition of the turf and soil and expectations of playing field (turf) quality.

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For lower maintenance fields, apply a slowly available nitrogen fertilizer at 1.0 to 1.5 pounds of nitrogen per 1000 ft^2 at least once each year. Late summer or early fall is the most appropriate time. Areas demanding a higher quality turf for greater playability and/or aesthetics will probably require additional fertilizer; most likely at least three fertilizations (spring, late-summer, and fall) would be needed when expectations of playing field quality are high.

Timing of the fertilizer applications should also vary according to the seasonal use of the turf. Fields used intensively during spring will likely benefit from two fertilizer applications in the late-summer to early-fall period (the first fertilization in September and the second in October). The rate of nitrogen fertilization will vary from 0.5 to 1 pound of actual N per 1000 ft^2 depending on the current and expected quality of the turf. For superior color, density, and vigor of turf during the spring, a third application of 0.5 to 0.75 pounds N per 1000 ft^2 applied in late November or early December may be appropriate. The timing of spring fertilization will likely be delayed until late spring (e.g., mid- to late-May) or eliminated in a program that employs three fertilizations during the late-summer to late-fall period. Late-spring fertilization will be necessary when recovery of the turf is needed after intensive use during spring.

Athletic fields that receive intensive use in the fall should have some nitrogen fertilizer applied several weeks before the time of greatest use. For many fields, a mid- to late-August fertilization at 0.5 to 0.75 pound N per 1000 ft^2 would be appropriate. Additional fertilization in September or October at 0.75 to 1.5 pounds N per 1000 ft^2 would encourage turf recovery during the season of use as well as recovery after fall play. An early spring fertilization should be performed at 0.75 to 1.5 pounds N per 1000 ft^2 if the turf has not completely recovered from the damage incurred during the previous fall season of play. If the turf has recovered sufficiently, a spring fertilization should be delayed until the turf shows signs of poor growth and vigor (e.g., mid- to late-spring).

This discussion of N fertilization is intended to provide a reference from which to design a fertilization program. Modifications will be necessary to accommodate the varying site and environmental conditions encountered at your location. For example, older fields grown on a high quality soil with good fertility may not require as much fertilization as a more recently constructed field.

Mowing. During periods of infrequent use, maintain a mowing height of 2.5 to 3 inches at a frequency determined by the growth of the turf. A higher mowing height (2.5 to 3.0 inches) is critical to enhance stress tolerance of turf during the hot humid weather of June, July, and August. During the season of active use, baseball infields and soccer and football fields may be mowed closer to enhance playing quality. The mowing height of a turf should be lowered gradually (no more than 1/3 of an inch per week) and initiated as early as six weeks before the first game. Immediately after the playing season, the high-cut mowing height should be resumed. Proper mowing frequency will avoid any necessity for clipping removal. Three mowings per week may be necessary on medium to high quality fields. Keep mower blades, reels, and bed knifes sharp and properly adjusted. Employees operating equipment should be thoroughly trained for proper operation of equipment and recognition of the need for mower adjustments affecting the quality of cut.

Watering. In situations where an irrigation system is available, apply water as infrequently as necessary to maintain proper soil moisture and avoid drought stress of the turf. A thorough watering once or twice a week during drought periods is preferable to light daily sprinkling. Sufficient water should be applied in a single irrigation event, to wet the entire root zone of the turf. Keep in mind that watering is of little or no value if liming, fertilizing, and mowing practices are neglected or done improperly.

Weed Control. Apply selective broadleaf weed control materials only when weed infestations become a problem. Chemicals such as 2,4-D, 2,4-DP, MCPP, and dicamba (or a combination of these materials) may be used to control many broadleaf weeds. Fall and spring are the most appropriate times. Areas with a history of crabgrass invasion can be most effectively protected by a dense vigorous stand of turf. If necessary, apply a preemergence herbicide before the crabgrass germinates in the spring (before mid-April). A postemergence herbicide can effectively control crabgrass if applied to small (one to two leaf plants), actively growing crabgrass. Make sure to read and follow all label directions for proper pesticide use.

Insect Control. White grubs, billbugs, sod webworms, and chinch bugs are the major turfgrass insects. Application of an appropriate insecticide at critical periods of their activity is required to avoid serious damage and/or destruction.

Aerification/Cultivation. Regular cultivation of the turf and soil is necessary on athletic fields subjected to intense traffic, especially when the soil is susceptible to severe compaction. Effective aerification requires equipment capable of extracting a 1/2 to 3/4 inch diameter core of soil to a depth of 2 to 3 inches. Frequency of aerification is determined by the intensity of field use and severity of soil compaction. High priority fields that receive intensive use will most likely benefit from two to four aerification treatments per season. Spring and fall are the best seasons for this procedure.

Deep Subsurface Cultivation. Many old athletic fields that were established on soils that are highly susceptible to compaction will benefit from deep subsurface cultivation. This type of cultivation will create 1/2 to 1 inch diameter holes to the 6 to 12 inch soil depth. Such aggressive cultivation can alleviate deep compaction of the soil, thereby improving water drainage, infiltration and turf performance. This equipment is expensive to purchase, but can be readily contracted from area vendors for nominal costs. Treatment with deep cultivation equipment has sufficiently improved many older sports turfs and, as a result, has avoided the high costs of reconstruction. It should be noted, however, that deep cultivation will not solve compaction problems associated with improper construction practices (i.e., severely compacted subgrades that limited subsurface drainage of water).

Repair. Many factors can contribute to a loss or weakening of the density of a turf cover. Intensive use is a major factor, particularly in finer-textured soils with poor drainage. Short of reconstructing such areas to correct the problem(s), a suitable turf cover can be restored through renovation procedures. Renovation may involve eliminating weed infestations, applying lime (if required) and fertilizer, core aerification, verti-grooving, overseeding with a mixture of suitable turfgrasses, and drag matting. Because of their relatively rapid establishment and wear tolerance, the improved turf-type perennial ryegrasses and turf-type tall fescues should be considered as major components of a suitable overseeding or re-seeding mixture. Refer to Rutgers Cooperative Extension publication FS108 entitled "Renovation of Turf" for more detailed information.

This procedure of renovation is an effective means of introducing seed into an existing turf without destroying the existing grasses, grade, or contour. It will not, however, solve soil drainage problems which would require complete reconstruction. Late summer through early fall is the best time for repairs. In situations where the field is actively used for football, the procedure can be successfully performed in late fall or early winter if soil and weather conditions permit; early spring would be the next best time for renovation of football fields. Use of the area must be restricted until the new seeding has become well established. In situations where use of the field cannot be restricted to permit adequate establishment of a new seeding, sodding should be considered for the establishment of a turf. Certified sod is strongly suggested for the establishment or re-establishment of a turf by sodding. Please refer to Rutgers Cooperative Extension publication FS738 entitled "New Jersey Seed Standards for Sod Certification" for more detailed information regarding the species and cultivars used for sod.

Suggested seed blends and mixtures and seeding rates for intensively used turfs include:

Turfgrass Species	Amount of Seed (% by weight)	Seeding Rate (pounds per 1000 ft^2)
Kentucky bluegrass (at least 3 cultivars)	100%	2 to 3
Perennial ryegrass	100%	4 to 5
Kentucky bluegrass Perennial ryegrass	80 to 85% 15 to 20%	3 to 4
Tall fescue Kentucky bluegrass	85 to 95% 5 to 15%	6 to 8

Field Use. A well established and maintained turf can withstand a significant amount of use without serious damage. Abuse, however, will cause permanent damage that cannot be overcome by the best maintenance program. Use of athletic fields, under certain conditions, must be restricted to preserve a turfgrass cover. A football stadium, for example, cannot be kept in prime condition for interscholastic competition if it is also used for everyday intramural activities. Moreover, the use of fields during inclement weather is likely to result in permanent damage to the field that will require extensive or partial reconstruction work to repair.

Many athletic field maintenance programs lack sufficient resources to overcome deficiencies in the original construction of the field(s). Under such circumstances, the best maintenance practices are limited in their effectiveness and are discouraging to those managing and using the fields. Often the best solution to a problem of this nature is reconstruction. Natural turfgrass athletic fields for various activities can be successfully achieved when based on proper construction, establishment, and maintenance procedures.