Fertilization of Warm Season Turfgrass

By Noble R. Usherwood

Nutrient management for turfgrass is important to achieve the quality and appearance expected for today's standards.

FOR EVERY 10 PEOPLE in the U.S., there is about one acre (43,560 square feet) of turfgrass. These 25 million acres are expected to increase further with new home subdivisions, with expanding turf-farm acreage, and with a growing interest in the beautification of office and industrial park surroundings.

Turfgrass has captured the interest and involvement of a greater percentage of the U.S. population than any other major crop. There are several reasons for this. A well-groomed lawn can build home value and contribute to the overall beauty of the community. For some, turfgrass is a business with economic incentives. Many gain hobby-type benefits from home lawn care. Others are involved through recreation and expect quality turf on the thousands of golf courses throughout the nation.

Like a forest of trees or a field of corn, a beautiful lawn is no more than a collection of individual plants growing very close together. These plants must compete wth each other for sunlight, water and available nutrients. Only the strong will survive. Well-nourished plants will best resist stress caused by disease, insects, occasional moisture shortage, high summer and/or low winter temperatures . . . and management-induced stress such as frequent mowing, high traffic and compaction.

Nutrient Management

Turfgrass responds to intensive management. This is especially true for the warm season grasses. A vital part of the management system is a finely tuned plant nutrition program. Such a program must be designed to supply each plant with nutrients in the right amounts and at the right time to minimize plant stress. Understanding a few basic facts concerning nutritional requirements of turf grasses can help to remove plant nutrition as a limiting factor in turf management.

Soil pH. Adjust soil acidity (pH) to the requirement of each particular species of grass. In general, nutrient availability improves as soil acidity is corrected. The desired pH range for warm season lawn grasses includes two distinct groups. See **Table 1**.

Table 1. Desirable pH ranges for warm season lawngrasses.

Moderately Acidic Soils (pH 5.0 to 5.9)	Slightly Acidic Soils (pH 6.0 to 6.9)
Bahia	Bermuda
Carpet	St. Augustine
Centipede	Zoysia

Source: Dr. J.B. Sartain, University of Florida.

Finely ground dolomitic or calcitic limestone can be used to adjust soil pH. Dolomitic limestone will also serve as a source of magnesium (Mg). For best results, mix the limestone into the topsoil during soil preparation for establishing new seedings. For established turf, top-dress 50 lb of good quality limestone per 1,000 square feet every six months until the recommended quantity of limestone has been applied.

Each nutrient contributes to quality turf in its own specific way.

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Nitrogen (N) stimulates rapid growth and provides a desired dark green color. Too little produces a weak plant and a poor return from other inputs. Too much N can be uneconomical and can reduce plant tolerance to diseases, nematodes, and other causes of plant stress.

Phosphorus (P) stimulates a healthy and vigorous root system and is essential for energy transfer critical to rapid plant development.

Potassium (K) is being "rediscovered" in the turf industry. It improves overall plant use of N since both are vital to key plant functions such as photosynthesis, protein formation, and actions of many enzyme systems. Potassium also helps improve turfgrass tolerance to heat and moisture stress and to compaction.

Sulphur (S), like K, teams with N for protein formation and is essential for chlorophyll synthesis . . . the basis for the dark green color of quality turf. Sulphur also improves plant tolerance to high traffic, winter injury and intensive cutting stress.

Magnesium is the central element in the chlorophyll molecule. A severe shortage restricts photosynthesis and the efficiency of plants to utilize other inputs. Magnesium needs often increase when soil pH is adjusted with calcitic limestone and when plant available K is high in an intensive management system.

Micronutrients, such as iron (Fe), zinc (Zn), manganese (Mn), and boron (B), sometime limit plant growth. Availability of these essential elements declines when soils are limed. Micronutrients are especially important for those grass species growing in the soil pH range of 6.0 to 6.9. Research shows, for example, that Fe can improve color of centipede turfgrass when soil pH is too high. Manganese might also limit plant growth when soil pH approaches or exceeds neutrality.

Time, Rate and Method of Fertilizer Application

Soil test results, special nutrient needs for turf quality, climatic conditions, and many other management factors go into the development of a sound fertilization program. University, USDA and private industry scientists have evaluated nutrient requirements for most turfgrass species under a variety of growing conditions.

In Georgia, turf scientists studied the N-P-K needs for centipede grass under natural shade. Results of that three-year study illustrate how a balanced, properly timed fertilization program can improve both turf quality and density.

Fertilizer Is a Team Player

Fertilizer interactions with other management practices are especially important for managers of warm season turfgrasses. The following points help illustrate some of the ways fertilizer contributes to the total turfgrass management program.

- Dr. Bob Dunn, University of Florida Extension Nematologist, reminds us that nematicides and insecticides can control pest problems, but adequate plant nutrition is essential for rapid regrowth of new roots to heal the injury. He notes, "Nutrient deficiencies, especially soil potassium and phosphorus, and compacted soils can make turf more sen-

Table 2. Influence of nitrogen, phosphorus and potassium on centipede grass under natural shade.

Time of Application		Turf Quality[1]			Turf Quality[2]		
April	Sept.	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
N-P_2O_5-K_2O lb/1,000 sq. ft.		turfgrass ratings					
1.0-0.4-0.8	1.0-0.4-0.8	5.5	5.4	3.9	8.1	8.0	5.6
2.0-0.8-1.6	2.0-1.8-1.6	5.0	4.9	4.0	8.0	7.2	6.5
2.0-0.8-1.6	0-0-4.0	5.8	6.4	6.0	8.8	8.2	7.5

[1]Quality: 1 = brown or no turf, 10 = dark green, dense, uniform turf.
[2]Density: 1 = no turf, 10 = complete, dense turf.
Source: Drs. B.J. Johnson, R.E. Burns, and R.N. Carrow, University of Georgia.

sitive to the root damage caused by nematodes."

- Dr. J.B. Sartain, University of Florida Turf Nutrition Specialist, points out that time, rate and method of fertilizer application depend upon the type of turfgrass, turfgrass quality needs, and the level of maintenance desired. He adds, "Although water and pest infestations influence turfgrass growth, more lawns suffer from nutritional deficiencies than from the former problems."

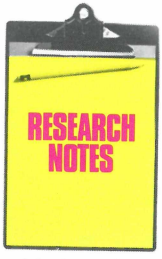
- University of Georgia scientists have documented that nutrient balance is essential. Potassium, for example, is vital for best plant N use efficiency. The proper amounts of N and K can improve plant tolerance to disease, plant color, turf density, turf quality, and plant response to other inputs such as water and certain plant protection chemicals.

DR. J.B. SARTAIN examines turf plots in Florida.

Summary

Research by turfgrass scientists emphasizes the importance of good plant nutrition and supports this conclusion: A fertile soil does not always produce a quality turfgrass, but the soil under quality turfgrass must be fertile. ■

Nebraska



Management Practices for Subirrigated Meadows

RESEARCH conducted at the University of Nebraska Gudmundsen Sandhills Laboratory over the past nine years to evaluate methods of increasing subirrigated meadow hay yield and/or forage quality indicates that nitrogen (N), phosphorus (P) and sulphur (S) are limiting factors in hay yield and protein production. The application of N, P and S increased dry matter yields over the control by a range of values from 937 to 3,315 lb/A, yields increasing with higher N rates and the additive effects of P and S. All fertilizer was spring applied. Effects on Garrison creeping foxtail and native meadow vegetation were similar. Economic analysis of the study indicated that in N, P and S applications were highly cost effective. ■

Source: J.T. Nichols, West Central Research and Extension Center, University of Nebraska. Published in Proc. Third Intermountain Meadow Symposium, Colorado Agricultural Experiment Station, Technical Bulletin. LTB91-2, pages 27-38 (1991).

American Society of Agronomy Recognizes Potash & Phosphate Institute Support

THE Potash & Phosphate Institute (PPI) was recognized as a charter member and 40-year Sustaining Member of the American Society of Agronomy (ASA) at the Society's recent annual meetings in Denver.

The Sustaining Member program was initiated in 1951 as a means for companies and other organizations to participate in furthering the agronomic profession and support the activities of the Society. ■