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Fertilizer Guide

Early December *color response from a late October application of nitrogen in New Jersey. (Photo courtesy of Dr. Ralph Engel)*

Part 2: A Balance Between Health and Appearance

By Roger Funk, Vice President, Research and Development, and Richard Rathjens, Agronomist, Davey Tree Expert Co., Kent, Ohio

Traditionally, turfgrass managers have applied fertilizer during spring and fall using leaf color and amount of growth as a guide to the rate and the frequency of application.

Although promoting good color and stimulating shoot growth are important objectives, frequently overlooked are nutrient influences on carbohydrate reserves, root growth, and the plant's ability to tolerate disease and environmental stress.

Timing applications

An important objective in the timing of fertilizer applications should be to build carbohydrate reserves and promote root development. The response of warm-season and cool-season turfgrasses differ in this respect.

The predominant cool-season turfgrasses (bluegrass, ryegrass, fescue and bentgrass) initiate and develop their root system in the early spring and fall. For this reason, fall and winter applications of nitrogen are important to a fertilization program because they will increase carbohydrate reserves and root growth. Fall fertilization will also improve turf density by promoting greater rhizome and tiller growth.

In addition to regular fall fertilization (September and early October in Ohio), a relatively new concept called late fall fertilization is being included in many maintenance programs. Late fall fertilization is applied when shoot growth slows or approximately at the time of the last regular mowing of the season. Nitrogen applied at this time greatly enhances the photosynthetic production of carbohydrates. These carbohydrates are stored for use the following growing season

for Turf

providing spring green-up and an energy source for turfgrasses to recuperate from environmental and mechanical stress.

Another advantage of late fall fertilization is it reduces the need for high amounts of spring-applied nitrogen. Excessive spring fertilization can actually reduce carbohydrate reserves and root development by stimulating rapid shoot growth. Shoot growth takes priority over roots for carbohydrate utilization.

Applications of potassium will increase turf hardiness and tempers the stimulation of nitrogen applications.

Both spring and summer fertilization should be used to maintain the color and density produced with fall fertilization the previous year. Fertilization at these times *should not* produce succulent plant tissue which can increase the severity of turfgrass disease and reduce the plant's ability to withstand heat, drought, mowing or wear stresses.

Applications of potassium will greatly contribute to the hardiness of the plant and help "temper" the stimulating effects of nitrogen applications.

In contrast, most of the root growth in warm-season grasses (such as bermudagrass, zoysiagrass and St. Augustine) occurs during the spring and summer. Fertilization during these periods will stimulate root growth. However, only moderate applications of fertilizer should be made in early spring in areas where warm-season grasses experience winter dormancy.

Bermudagrass and St. Augustine are subject to spring root dieback following spring green-up. Heavy fertilization during early spring may result in an additional stress during this critical survival period.

Like cool-season turfgrasses, warm-season turfgrasses accumulate carbohydrate reserves in the fall when shoot growth slows. Care must be taken with the timing of fall fertilization since it may decrease low temperature hardiness if applied late. Maintaining adequate potassium levels in fall will increase the tolerance of warm-season grasses to low temperatures.

As with cool-season turfgrasses, indescriminate use of nitrogen fertilization in the summer can increase injury of warm-season grass subjected to disease or environmental stress.

Potassium will aid warm-season turfgrasses in tolerating heat, cold, mowing, and wear stresses, and reduce their susceptibility to turfgrass diseases.

Turf fertilization rates

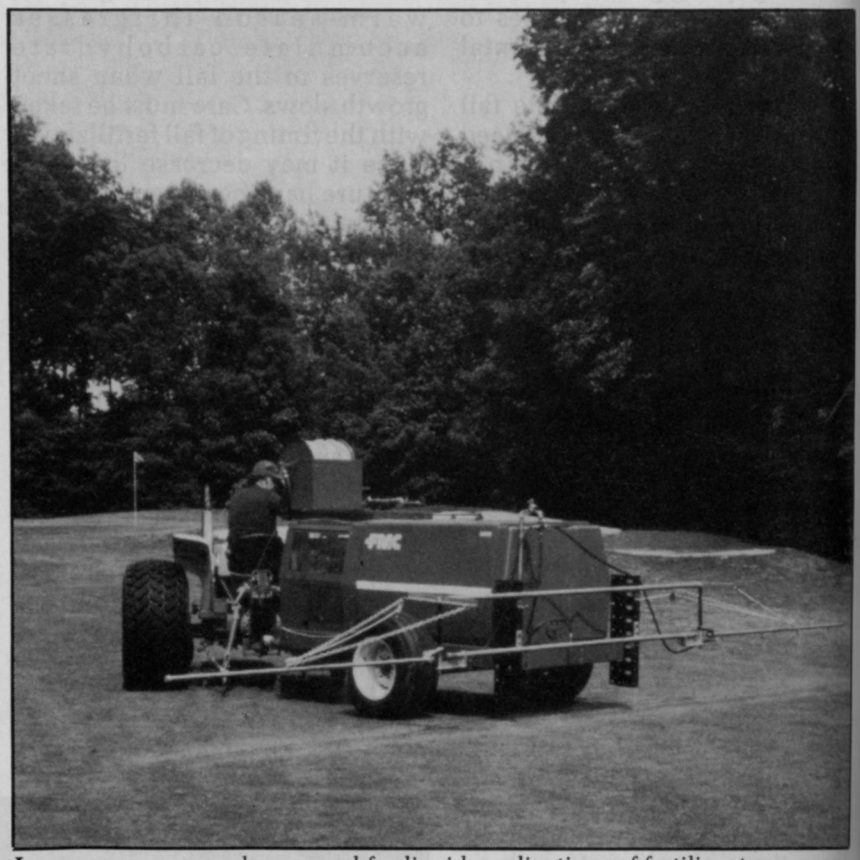
The annual nitrogen requirement (lbs. per 1,000 square feet) for turfgrasses should be determined by considering length of growing season, level of quality desired, purpose of the turf, and species and cultivars present.

The length of growing season or number of days (months) between the last killing frost in the spring and the first in the fall will vary greatly depending upon location. Along the Gulf of Mexico and in parts of Arizona and California, the average growing season is more than eight months. In contrast, it is less than four months in parts of Maine and Minnesota. The longer the length of growing season, the greater the amount of nitrogen need to maintain turfgrass quality.

The rate of fertilization should be tailored to meet the expectations of the user of a particular turfgrass site. Because the level of quality is subject to interpretation, residential lawn fertilization can range from promoting a weed-

***Hand-held nozzle** delivering liquid fertilizer from a high-pressure sprayer.*

Fertilizer



Low-pressure spray *boom used for liquid applications of fertilizer to large turf areas.*

free turf of acceptable color and density to a season-long turf of premium appearance.

The function of turf in an area, whether aesthetic or recreational, also influences nitrogen fertility level. The rate of fertilization of bentgrass, for instance can vary from 4.0 to 10 lbs. nitrogen per 1,000 square feet between a home lawn and a golf green.

Turfgrass species vary in amount of nitrogen required for maximum quality. Low fertility cool-season grasses include sheeps, hard, and red fescues. Kentucky bluegrass is considered medium fertility and bentgrass high fertility. Improved cultivars of bermudagrass will require more nitrogen than common bermudagrass.

Cultural practices, such as irrigation and clipping removal may create a need for additional nitrogen. Supplemental watering of turfgrasses will increase the rate at which nitrogen is leached from the turfgrass root zone. Losses of nitrogen are substantial when quick-release sources are applied to soils high in sand content.

Collection of clippings following mowing has been estimated to remove approximately 20 percent of the nitrogen applied to the turfgrass. As a result, additional nitrogen should be applied to maintain the same quality as where the clippings are not removed.

Clipping removal reduces nitrogen levels about 20 percent.

Phosphorus and potassium have been routinely applied along with nitrogen in fertilizers with ratios such as 3:1:2, 5:1:2, or 4:1:1. Rather than applying phosphorus

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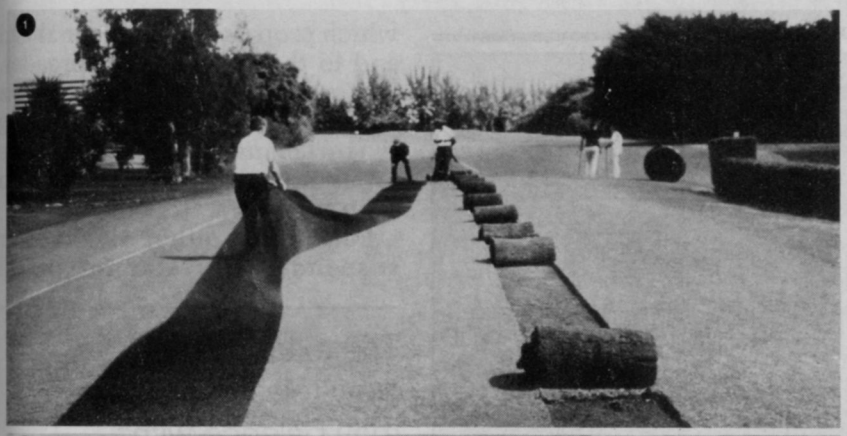

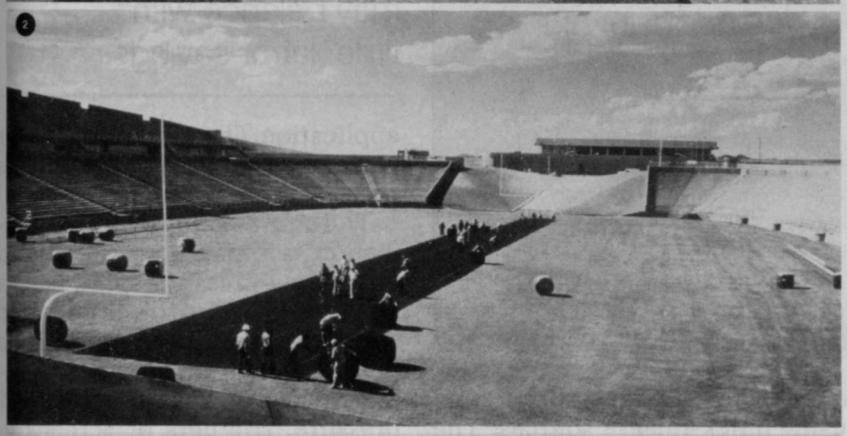

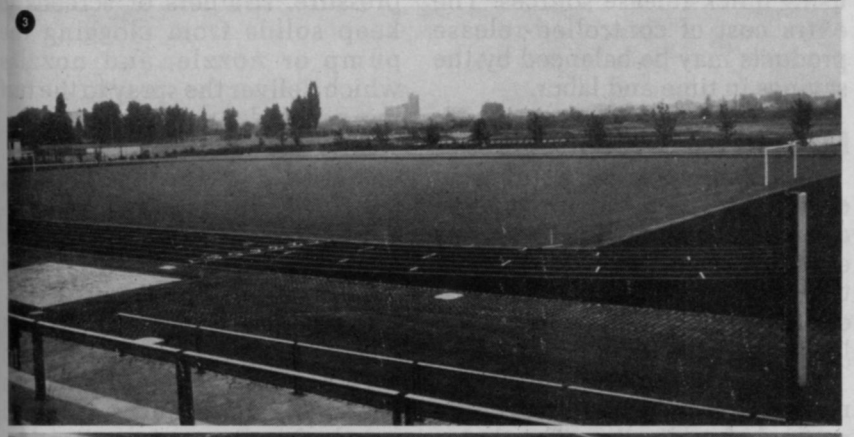

❶ **Golf courses** all over the country are using the Enkaturf® System for soil erosion problems, entrance ways to cart paths, tees, pond stabilization and for the construction of flood plains. Roots spread and grow through the Enkaturf System, making the turf more durable. In fact, eleven of the top forty golf courses are protecting their turf with the Enkaturf System.

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❸ **Soccer fields** in Europe have been reaping the benefits from the Enkaturf System for the last 16 years. The aesthetic quality of a natural playing field is enhanced with the Enkaturf System.

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Fertilizer

Table 1. Annual Nitrogen Requirement of Turfgrasses*

Species	Length of Growing Season	Nitrogen per Season lbs./1000 sq. ft.	Variations in Management
Cool Season:			
sheeps & hard fescue	4-8	0-3	low maintenance; roughs
red fescues	4-8	1-3	low maintenance to good care
Kentucky bluegrass	5-12	2-8	
bentgrasses	4-8	1-4	medium care, lawn, fairways
bentgrass, greens	5-12	6-15	clippings removed, forced growth
Warm Season:			
zoysia	6-10	1-6	adequate cover
common bermuda	7-12	2-8	most variable
St. Augustine, Bahia	10-12	2-8	warm areas, lawns
bermudagrass, fairways and tees	5-12	4-9	good management
bermudagrass, greens	8-12	8-20	may rest over winter

*Adapted from William H. Daniel and Raymond P. Freeborg's Turf Managers' Handbook.

and potassium each time nitrogen is applied, take a soil test and determine if they are really needed.

Since many soils contain high levels of phosphorus, little, if any, response may be obtained when phosphorus is applied to established turf. Soil pH correction may be a better solution than adding more phosphorus.

The rate of nitrogen applied also depends upon the time of application and the nitrogen source.

Applications of quick-release nitrogen sources in spring or fall are commonly limited to no more than 1.0 lbs. nitrogen per 1,000 square feet. Summer applications of quick-release sources are frequently limited to no more than 0.5 lbs. nitrogen per 1,000 square feet.

In contrast, applications of nitrogen using controlled-release sources are generally made at rates from one to three pounds nitrogen per 1,000 square feet.

The longer residual of controlled-release nitrogen sources reduces the need for more frequent applications required when using quick-release sources. The extra cost of controlled-release products may be balanced by the savings in time and labor.

Method of application

Fertilizers can be applied in either dry or liquid forms. The choice of either liquid or dry equipment for fertilizer application has been the subject of great controversy, particularly in the lawn care industry.

Research has shown turf responds equally regardless of the method of application. The choice of application method should be based on the turf manager's perception of efficiency, convenience, and personal preference.

Two types of spreaders are used to apply granular (dry) fertilizer; gravity and centrifugal.

Gravity or drop spreaders drop the fertilizer, agitated by a mixing bar inside a trough, through a series of slots to the turf below. The centrifugal or broadcast spreader drops the fertilizer from a hopper onto a spinning disk which propels the fertilizer ahead and to the sides of the spreader. The centrifugal spreader applies a wider swath of material allowing the turf manager to fertilizer large areas more quickly than with drop spreaders.

Fertilizer is either dissolved or suspended in water for liquid application. The amount of water varies normally from 1-5 gallons per 1,000 square feet.

> The extra cost of slow-release products may balance with time, labor savings.

The equipment for liquid fertilization is broadly classified into either low-pressure spray booms or high-pressure or hydraulic sprayers. Both types of sprayers feature a tank holding the fertilizer and water, pump to build pressure, strainers or screens to keep solids from clogging the pump or nozzle, and nozzles which deliver the spray to the turf in a particular pattern.

Low-pressure spray booms, operating at pressures of 15-60 lbs. per square inch, deliver one gallon or less per 1,000 square feet. This type of sprayer is used mainly on golf course fairways.

High-pressure sprayers can create spray pressure of several hundred pounds per square inch and use a hose and hand-held nozzle for directed application. High-pressure systems are common in lawn care.

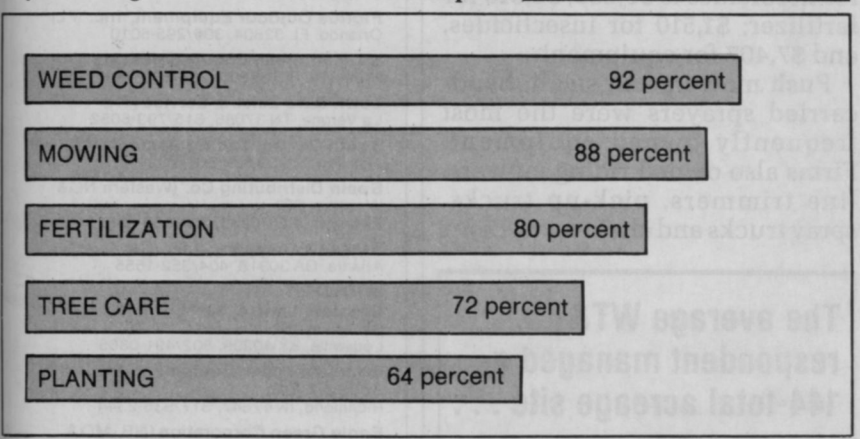
One of the latest controversies in sprayer technology is the advent of low-volume, high-pressure sprayers. The idea is to increase the concentration of fertilizer or chemicals and reduce the amount of water applied. Since less water is used, tank trucks can be smaller, cheaper, and more fuel efficient. The concept is fairly new and is being tried by a limited number of lawn care companies. WTT

LANDSCAPE MANAGEMENT

Industrial Park Management

Managers see need for finding qualified personnel, keeping quality up and expenses down and increased emphasis on weed control.

What types of services do you manage for the industrial or office park?



Dealing with shriveling budgets, controlling weeds and finding qualified personnel and contractors are three of the major areas where industrial/office park landscape managers are finding their greatest challenges.

ost purchasing decisions r equipment are ade in February and arch and in the spring d fall for chemicals.

These are the findings of an informal WEEDS TREES & TURF survey done among industrial/office park landscape managers across the country.

"We're finding it increasingly hard, due to lack of money, to provide proper care and attention to our labor force, equipment and chemical supplies," said one respondent.

"Finding conscientious employees - both skilled and unskilled - is our biggest headache," said another.

The average WT&T respondent managed a 144 total acreage site, with eight companies comprising it. Landscape firms employed seven full-time employees, two part-time and six seasonal. The companies in the park paid a monthly maintenance fee or annual fee. The landscape contractor's biggest headache is weed control. The greatest number of respondents came from firms which contract landscape maintenance and planting to industrial/office parks, followed closely by industrial/office park management firms. The majority of parks had yet to be fully developed.

Weed control tops the list of services provided with mowing, fertilization, treecare, planting, irrigation and interior building maintenance following. A few also included sweeping parking lots and snow removal. Average area irrigated is 31 percent.

"We have to try to get management to recognize grounds management as a profession . . ."

Ninety eight percent of the respondents made purchasing decisions for the landscape products they use, with most purchasing decisions being made for equipment in February and March and in the spring and fall for chemicals.

Industrial/Office Park Managers' Greatest Concerns:

- Finding Qualified Personnel
- Quality Control
- Weed Control

SURVEY *from page 37*

Most frequently-owned equipment:

1. push mowers, small sprayers
2. riding mowers, line trimmers, pick-up trucks
3. spray trucks, chain saws

Approximate budgets this year for herbicides is $3,686; $3,913 for fertilizer; $1,510 for insecticides, and $7,407 for equipment.

Push mowers and small, hand-carried sprayers were the most frequently owned equipment. Firms also owned riding mowers, line trimmers, pick-up trucks, spray trucks and chain saws. Least owned equipment were trenchers, wood chippers, motorized spray units, dump trucks and turf aerifiers.

The average WT&T respondent managed a 144-total acreage site . . .

Some managers are finding they would like more management support.

"We have to try to get management to recognize grounds management as a profession," said one manager. "When this is done, it is realizing the importance of maintaining a landscape investment."

Another respondent said he, too, noticed a "decreased interest in grounds maintenance."

Others, however, are having "problems" others would envy.

"Our biggest problem now is deciding on whether to get bigger and do a larger volume or just stay our current size," said one. "Being a smaller company enables us to better serve our customers, but we are at a point where we can't do anymore jobs than what we have now." **WTT**

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LANDSCAPE MANAGEMENT

A Family Affair

New York landscape contractor Ed DeLaurentis combines Japanese esthetics with Western efficiency in industrial and office park designs.

By Maureen Hrehocik, managing editor

Ed DeLaurentis knows "land shaping" is the heart and soul of effective landscaping.

The Mamaroneck, NY, landscape contractor, along with his brother, Joe, have seen the growth of DeLaurentis Construction Co., Inc., a lawn care and landscape contracting company they started in 1963, evolve into one of the more innovative site development contracting businesses in the country. With strong artistic overtones, the company's credo includes totally reshaping the site so that buildings will sit better, and using what other contractors frequently discard, such as rocks, as the focal point of the design. Many of the projects include stone sculptures.

Their contracts have included the Citicorp Executive Conference Center, Crossing at Blind Brook, Purchase Park, New York City's Trump Tower, the majority of landscaping done along a heavily industrial strip along I-287 in Westchester County dubbed the "Platinum Mile," and numerous municipal contracts. The company expects to do close to $5 million in business this year.

Building solid relationships with successful builders over the years has been one reason for the company's steady growth. DeLaurentis especially credits Lowell Schulman, owner and president of the Schulman Realty Group, with giving him the room to realize his creative potential.

"I'm very grateful to Lowell for allowing me to do this," he said.

Ed, as president of the company, is the "leg operation," selling business to clients and doing the design work. Joe, as vice president, supervises the on-site operations. Ed's wife and three sons are also involved in the business. It is Ed DeLaurentis' creative eye and artistic sensibilities, though, that put the distinctive DeLaurentis touch on the company's projects.

***A well sculptured** look enhances corporate park entranceways.*

Building relationships with successful builders...has been one reason for the company's growth.

DeLaurentis Construction has been one of the first landscape companies to take on a project from start to finish -- from design to grading, drainage, paving and landscaping. It is DeLaurentis' "Westernized Japanese effect" combining esthetics with efficiency, that he is especially proud of. His introduction to Japanese landscape architect Kaneji Domoto as one of the company's first customers lead to a 10-year working relationship between the two men. Domoto now refers to DeLaurentis as his protege.

It was mainly the work the two brothers got from Domoto (who was impressed with their expertise as well as ability to complete a job on-time), during the company's infancy that was one of the things, along with the economy, that convinced the brothers it was time to diversify and incorporate and expand their business. Domoto also gave them something more tangible -- a style of design that has become the company's trademark.

DeLaurentis incorporates waste