110 Kinds of Plants.
43 Types of Insects.
1 Spray.

You're looking at a picture, not of a place, but of an idea: ORTHENE™ Tree and Ornamental Spray, and why it means so much to professional gardeners, nurserymen, arborists and golf course superintendents.

ORTHENE offers blanket protection against an amazing variety of insect pests. It's cleared for use on a long list of trees and plants, from orchids to roses to ponderosa pine, even for turf. Cleared last year for use against turf insects, ORTHENE* has just been okayed for mole crickets in Florida—the main enemy of professionals' healthy greens and fairways.

By using ORTHENE, one spray lets you kill pests like tent caterpillars, whiteflies, Japanese beetles and thrips on contact. Plus it provides lasting residual action against other insects from aphids to scale crawlers to sod webworms. It's a great way to make the whole job of protecting flowers, trees and turf simpler, and more effective.

If you're a professional in the plant care industry, ORTHENE can actually make it easier to do a better job of protecting plants. You ought to know more about it. To find out, send in this coupon.

ORTHENE 75 S Soluble Powder (Florida SLN).
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Circle No. 221 on Reader Inquiry Card
TABLE 1
Growth Regulators Available for Turf

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Trade Name</th>
<th>Manufacturer</th>
<th>Vegetative Suppression</th>
<th>Root Absorbed</th>
<th>Foliar Absorbed</th>
<th>Restriction of Roots &amp; Rhizomes</th>
<th>Phytotoxic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maleic Hydrazide</td>
<td>Several</td>
<td>Uniroyal Chemical</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>moderate-severe</td>
</tr>
<tr>
<td>Mefluidide</td>
<td>Embark</td>
<td>3M Corporation</td>
<td>X</td>
<td>X</td>
<td>Some</td>
<td>Some</td>
<td>low-moderate</td>
</tr>
<tr>
<td>Flurprimidol</td>
<td>Cutless</td>
<td>Elanco Corp.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>low-moderate</td>
</tr>
<tr>
<td>Amidochlor</td>
<td>Limit</td>
<td>Monsanto Corporation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>low-moderate</td>
</tr>
<tr>
<td>EPTC</td>
<td>Short-Stop</td>
<td>Stauffer Company</td>
<td>X</td>
<td>X</td>
<td>?</td>
<td>X</td>
<td>severe on fine turfs (recommended for tall fescue)</td>
</tr>
</tbody>
</table>

*Phytotoxicity can depend on environmental conditions, plant health and cultural practices.*

Suppression or control of weeds is an important consideration in using PGRs.

that are injured by traffic or other mechanical or biological factors.

Growth regulators inhibit the initiation and/or development of secondary lateral shoots. Interference in root initiation and development will obviously deter from the maintenance of high quality turf. Growth regulators have been shown to interfere, to some extent, with these normal root renewal processes.

Plant growth regulators

The current PGRs available for turfgrass use are listed in Table 1.

**Maleic hydrazide** was the first growth regulator available for turf, and has been used in rights-of-ways in a number of locations. It suppresses turfgrass growth by inhibiting cell division in the shoots, roots, and buds of the turfgrass plant. Maleic hydrazide's broad activity in the root and bud areas has caused restricted root and rhizome growth of Kentucky bluegrass. Its use has been limited primarily to low maintenance areas because of possible phytotoxicity and excessive inhibition of plant growth under stress.

**Mefluidide (Embark)** is one of the newer plant growth regulators. Mefluidide suppresses vegetative growth and seedhead production, and inhibits cell division and meristematic activity in plant areas that contact this PGR. It is absorbed by the foliage, but is not as readily translocated in the plant as maleic hydrazide. This is a possible reason that root and rhizome suppression does not appear to occur with mefluidide.

**Flurprimidol (Cutless)** is also a new PGR that has good vegetative growth suppression and some weed suppression. Flurprimidol has been ineffective for seedhead suppression in some research studies. However, combinations of flurprimidol and mefluidide are alternatives where seedhead suppression is desired. Flurprimidol has shown some activity
BLUEGRASS QUALITIES WITH TALL FESCUE PRACTICALITY

You'll quickly notice Mustang's finer texture, rich dark green color and dense, uniform turf—and you'll understand why we say Mustang has bluegrass-like qualities.

But there's more to Mustang turf-type tall fescue than beauty; it's tough and durable. It's heat and drought tolerance, winter hardiness, and ability to endure low mowing heights are remarkable. Mustang even shows improved resistance to Helminthosporium netblotch and many other diseases.

Best of all, Mustang is practical, because it performs extremely well under low maintenance conditions like minimum fertilization, watering and mowing. National tests and actual applications in parks, golf courses and playing fields have proven it.

That's why Mustang is becoming the favorite choice of professional turf managers, over K-31 and many other commercially available varieties.

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Produced by:

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(503) 926-8866

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JUNE 1986/WEEDS TREES & TURF 43
Let us send you a sample of FeRROMEC™ so you can see with your own eyes how fast it changes weak-looking dull grass into vibrant, deep-green, healthy-looking grass.

As a professional golf course superintendent or grounds-keeper, you will immediately recognize the significance of what I am about to say...

We at PBI/Gordon have been quietly testing our patented Ferromec under a wide variety of growing conditions, and the results are conclusive!...

Ferromec will not only deliver rapid and dramatic color responses in turf as a result of foliar intake, but will also deliver a therapeutic dose of iron to the turf through root absorption.

It means that now you can have deep, vibrant, healthy green turf without an unwanted overdose of fertilizer which could lead to all sorts of problems and exposure to disease.

No wonder we are so eager to get a sample of Ferromec in your hands. But, meantime, we urge you to take a minute or so to better understand why iron is such an elusive material, and how PBI/Gordon has managed to harness it for you.

Ferrous Iron is Very Fragile.

As you know, the basic problem of supplying iron to turfgrass is its fragility in the Ferrous ++ state. Only Ferrous iron can be utilized by a plant and, ironically, almost as soon as Ferrous Sulphate is applied it turns to the non-usable Ferric+++ state. Once oxidized, the reversal with organic matter acting as a reducing agent is so slow there is a question if it would ever occur.

And thus it is that scientists devised chelating, which is intended to fix the iron molecule in the Ferrous state. If chelating is properly done, it is effective.

Half of this green at Hodge Park Golf Course in Kansas City was sprayed with Ferromec and, within 24 hours, the color change was dramatic. Under normal growing conditions, visual response usually occurs between 8 and 48 hours after application. However, if moisture and temperature extremes exist, the response may be slower. Ferromec is also effective on trees, shrubs and herbaceous plantings.
Iron that Produces Within 24 Hours

This is the molecular structure of Ferromec. Note that ferrous sulphate is bonded to a urea molecule and will remain stable. Ferromec utilizes a recombinant urea process to achieve the unique composition. It is classified as an organometallic compound.

But it is very expensive and so slow to release that it could be many weeks before a treatment of chelated iron could produce a significant color change in the grass.

Ferromec Works Right Now!

At PBI/Gordon we have a patented process of bonding a Ferrous iron molecule to a molecule of urea, which stabilizes the iron in a Ferrous state. Notice the diagram above of the Urea/Ferrous sulphate molecule which is called Ferromec.

Ferromec can be mixed with liquid fertilizer and Super Trimec® broadleaf herbicide, and it will not harm the equipment. The Ferromec is almost immediately assimilated so the color change occurs very rapidly. The Ferromec which reaches the ground is taken up by the root system because the grass has such a voracious appetite for the nitrogen content of Ferromec.

Neal Howell Can Answer Your Questions about Iron in Turf

Iron is definitely established as an essential micronutrient required by all plants. Yet, the amount required can vary dramatically depending on the pH of the soil, the composition of the fertilizer that is being used and the plant that is being fed.

To help you better understand how to use iron in your turf program, we have brought Neal Howell into the PBI/Gordon organization as Director of Technical Sales Services of Soil Supplements. He is a leading authority on iron and is as near as your telephone when you have questions.

You'll like Neal. He's a real Iron-man whose roots go back to the Iron Knights of the "Hell on Wheels" gang of the 2nd Armor Division from Fort Hood (that's General Patton's old bunch).

Ask for Samples of these New Products from PBI/Gordon

Other new products that have been developed and thoroughly tested by PBI/Gordon are Bov-A-Mura®, a patented, natural organic activator that turns thatch into humus; and Transfilm®, a patented year-around plant protector that is up to five times more effective in reducing transpiration, and lasts up to twice as long as conventional plant protectors.

For your free samples of Ferromec, Bov-A-Mura, and Transfilm, write or call . . .

Toll-free 1-800-821-7925
In Missouri 1-800-892-7281
Ask for Customer Service Department.

Inform us of bids to be let.
We furnish detailed specs and names of distributors serving your area.

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Ferromec® is a trademark of PBI/Gordon Corporation.

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Target the enemy for effective insect control

DURSBAN*

Win the war against chinch bugs, sod webworms, billbugs and other insect enemies that invade your turf. Lebanon has the ammunition you need—two insect control formulations containing DURSBAN Insecticide.

Greenskeeper Insect and Grub Control and Country Club 19-4-6 with DURSBAN

DURSBAN sets its sight on harmful insects for effective surface and soil control, but it won't harm birds, pets or other lawn allies. It also doesn't build up toxic levels in the soil and is the only insecticide with published human toxicity data.

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Enlist the Total Turf Troops

Of course, DURSBAN is backed up by Lebanon Total Turf Care and its complete network of sales representatives, distributors and service professionals. Lebanon is a major distributor for The Dow Chemical Company. And because we're 'Partners with Dow', additional DURSBAN formulations are available.

For more information on DURSBAN, or our full line of fertilizers, SCU blends, combination products and straight chemical products, call our Greenline today at 1-800-233-0628; in Pennsylvania, call 717-273-1687. And start winning the battle against insects and other turf enemies from the ground up.

Lebanon TOTAL TURF CARE

A division of Lebanon Chemical Corporation
P.O. Box 180 • Lebanon, PA 17042

BETTER TURF CARE FROM THE GROUND UP.

"DURSBAN is a registered trademark of The Dow Chemical Company.

Circle No. 127 on Reader Inquiry Card

PGRs from page 42

on poa annua suppression (control) in fine turf situations.

Amidochlor (Limit) is a root-absorbed PGR, thus requiring moisture within 3-5 days after application to wash it into the root zone. Amidochlor has shown both vegetative and seedhead suppression. No apparent root growth suppression has been associated with amidochlor.

EPTC (Short-Stop) is a new PGR that is recommended for use on tall fescue because it can cause phytotoxicity on finer turfs. Short-Stop does provide weed suppression characteristics since it is closely related to the pre-emergent herbicide Eptam.

PGR considerations

There are more PGRs to choose from

The slow growth rate of turfgrass plants treated with a PGR retards the recuperative potential of the plant.

then ever before. With the new PGRs and new experimentals being tested, the future looks promising.

One note of caution is to always analyze the situation in which you use the PGRs. A PGR may show differential activity for different grasses.

For example, tall fescue and perennial ryegrass are generally more difficult to suppress than Kentucky bluegrass. Plant growth regulators by their nature inhibit the renewal process of turfgrass plants. Renewal of leaves and tillers is a necessary process to sustain quality turf.

Plant growth regulators, unfavorable environmental conditions or any factor that reduces tiller and leaf initiation results in lower turf density. Lower density can favor weed encroachments, loss of turf/soil stability, erosion, excessive water runoff and other related problems.

Disease incidence has been more prevalent on turfgrasses treated with a PGR. The slow growth rate of turfgrass plants treated with a PGR retards the recuperative potential of the plant.

These factors are important in deciding if a PGR is right for a specific situation.

On highway rights-of-ways, turf quality is of less concern than other factors, but functionality (density) with regard to turf/soil stability and erosion are critical in deciding on a PGR along with repetitiveness of its use and site selectivity.

WT&T
CUT A BIG CHUNK OUT OF YOUR MOWING AND TRIMMING.
LIMIT® can cut your tough

LIMIT SLOWS GRASS GROWTH FOR UP TO SIX WEEKS.

Monsanto, the company that brought you Roundup® herbicide, now brings you another important turf management tool. LIMIT turf regulator is the guaranteed way to slow the growth of bluegrass, fescue, and ryegrass for up to six weeks.

LIMIT BUYS YOU TIME IN YOUR BUSIEST SEASON.

Five years of testing by Monsanto and turf managers have proven it: LIMIT can reduce by half the time you spend trimming and mowing treated areas. LIMIT buys you time. Time your crews can use for priority projects, especially in the spring.

THE ONLY TURF REGULATOR TO WORK THROUGH THE ROOTS.

Unlike other turf regulators, LIMIT works through the roots. Not through the foliage. The result? You can spray LIMIT earlier. Only LIMIT works before green-up, as well as after. It fits your schedule. Not the other way around.

ALL KINDS OF TURF MANAGERS GIVE LIMIT HIGH MARKS:

FRED TRAUT
Grounds Supervisor,
Sheppard and Enoch Pratt Hospital,
Baltimore, MD

JOE KOSOGLOV
Golf Course Superintendent,
Hillcrest Country Club,
Indianapolis, IN

"...on real steep, hard-to-mow slopes, LIMIT reduced equipment usage, the hazard to my employees...and my labor of mowing."

"We use LIMIT in areas that require a lot of handwork. I'd recommend LIMIT to any golf course superintendent spending too many hours in areas he'd rather not be."
Get a free quart of Roundup® when you buy LIMIT®
For every 1 gallon of LIMIT® turf regulator you buy between November 1, 1985 and June 15, 1986, (Postmark extension until July 15, 1986.) you get 1 quart of Roundup® herbicide free! This purchase may include any combination of quart or gallon containers of LIMIT. One quart of Roundup for each whole gallon of LIMIT purchased.

Fill out the coupon below, sign and mail it with a true and legible copy of your dated dealer invoice (invoice cannot be returned) in the postage-paid reply envelope provided, to the pre-addressed fulfillment center. Your envelope must be postmarked no later than July 15, 1986. Monsanto will send you a quart of Roundup® free! Allow 2-3 weeks for processing. Reproduced or altered rebate vouchers will not be accepted. This offer made only through official rebate voucher. Void where licensed, taxed, or prohibited by law. This certificate has no cash value. Any applicable sales tax must be paid by the customer. Multiple claims are allowed. We will not pay twice on same invoice.

LIMIT® and Roundup® are registered trademarks of Monsanto Company.
As sure as grass grows, you need LIMIT.

- One application controls growth for up to six weeks.
- Labeled for repeat applications.
- Reduces mowing and trimming by half.
- Saves you valuable manhours.
- Fits your work schedule — apply before or after green-up.
- Will not wash-off — rain actually improves uptake.
- Overlaps safely.
- Safe to ornamentals, sidewalks, monuments, and other fixtures.
- Can be tank-mixed with fertilizer and commonly used turf herbicides for one-pass convenience.
- Easy to mix and apply.
- Available in quart or gallon size.
- Monsanto guarantees LIMIT will perform as promised on the label. (Always read and follow label directions.)

LIMIT
TURF REGULATOR
by Monsanto

Printed in U.S.A.
nest cutting jobs by half.

THE ONLY TURF REGULATOR THAT DOESN'T MIND THE RAIN.
Root uptake of LIMIT also means there's no wash-off worry. Let it rain. You can actually apply LIMIT while it's raining.

LIMIT IS SAFE EVEN WHEN YOU OVERLAP.
LIMIT is safe to turf, too. It's formulated to get consistent response and quality even where there's unavoidable overlapping; unlike other turf regulators that cause overlap browning.

What's more, LIMIT is harmless to ornamentals. And LIMIT won't stain monuments, sidewalks, or other fixtures.

EASY TO MIX, EASY TO APPLY.
Adding LIMIT to your current spraying program is easy. No special equipment is needed. Plus, LIMIT can be tank mixed with both fertilizer and commonly used herbicides, so you get one-pass efficiency.
And, compared with other turf regulators, LIMIT is unusually tolerant of mixing errors.

MONSANTO GUARANTEES LIMIT WORKS.
This Spring, cut your toughest mowing and trimming jobs by half.
Monsanto guarantees that spraying LIMIT before seedhead will slow grass growth for up to six weeks. Safely.
Try new LIMIT where you want to mow and trim less. A lot less. And give your crew better things to do.

DICK STEDMAN
President
Wright Lawn and Tree Care, Inc.
Clarence Center, NY

"We've had phenomenal results with LIMIT at two cemeteries. For the first time, we can tell our accounts we have a product that will consistently work."

PHIL PIRRO
Lawn Service Manager,
Landscaping, Inc.,
West Hartford, CT

"With LIMIT, I cut my mowing in half and freed up my personnel to do more detail work that my customers notice."

MONSANTO TURF REGULATOR BY Monsanto
As sure as grass grows, you need LIMIT.

- One application controls growth for up to six weeks.
- Labeled for repeat applications.
- Reduces mowing and trimming by half.
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For more information, contact your local LIMIT dealer.
Or call this toll-free number for the LIMIT dealer nearest you.

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(except Nebraska and Alaska)

Get a free quart of Roundup® when you buy LIMIT.

For every 1 gallon of LIMIT® turf regulator you buy between November 1, 1985 and June 15, 1986, (Postmark extension until July 15, 1986) you get 1 quart of Roundup® herbicide free! This purchase may include any combination of quart or gallon containers of LIMIT. One quart of Roundup for each whole gallon of LIMIT purchased.

Please use the attached business reply envelope to take advantage of this offer.
WEED FREE

For scenic roadsides, deeply-rooted plants are needed to successfully battle weeds for water and nutrients. That means developing a sound fertilizer program.

by C. Robert Staib, Nor-Am Chemical Co.

A merica the Beautiful is an appropriately descriptive phrase, in part because of the country's highway system. Miles and miles of weed-free scenic roadsides are taken for granted by the traveling public. Only the landscape manager realizes the complexities of establishing and maintaining "that to which we have become so accustomed."

Developing a sound fertilizer program can help the landscape architect and horticulturist or agronomist achieve their goals. Besides the beauty and functionality of roadside plantings, more vigorous growth helps keep a weed-free environment less dependent on expensive herbicide applications.

Healthy root systems

The long-term success of the roadside landscape is dependent on many factors, including availability of water, good drainage, and ability of plants to withstand effects of salt, auto exhaust emissions, and herbicides.

Roadside developers and agronomists know full well that maintenance resources are limited, and many times their plantings will have to fare for themselves. This is only possible when plant roots are firmly established, and thriving as deep as possible in the soil profile. The growth of plant vegetation is accompanied by a corresponding demand for carbohydrate reserves from the root system.

Healthy, deep roots, therefore, are vital to foster vigorous growth and plant density for long periods in diverse soils and weather conditions.

Key macro-nutrients

Most commercial fertilizers used in the landscape consist of synthetic organic nitrogen (urea, slow-release or coated products) plus reacted or mined phosphate and potassium sources (potassium chloride, also known as muriate, or potassium sulfate).

Nitrogen, phosphorus, and potassium, the major nutrients, are required by plants in the greatest quantity. Of these, nitrogen is the most important, and is required in the highest amounts. Next in importance is potassium, required to sustain cellular structure and strength of the cell wall. Phosphorus, vital in the process of energy transfer within all living tissue, is nevertheless used in much smaller amounts.

Research shows that potassium levels of 50 percent of applied nitrogen (or even higher) are highly beneficial to turf. Except in extreme situations, residual soil phosphorus is generally sufficient to meet the needs of grasses and groundcovers once they become established.

Secondary nutrients

Calcium, magnesium, and sulfur are important in carrying out or supporting metabolic processes. These nutrients are also important in the development of soil characteristics favorable for plant growth.

Only slow-release nitrogen should be used in the planting hole. This is also the best time to incorporate phosphorus in the planting medium.

Studies have shown that low rates of water-insoluble nitrogen applied in the sodbed prior to laying sod encourages rapid root growth. A firm early knit of sod is important on erosion-prone cut and fill slopes along roadsides.

C. Robert Staib, senior sales representative for Nor-Am Chemical Co., is based in Des Moines, Iowa. He is involved in sales and technical service to the turf and ornamentals market. This article was prepared for presentation to the National Roadside Vegetation Management Association, Kansas City, Mo., Oct. 8, 1985.
Calcium and magnesium are important components of organic matter which provide stability to soil aggregates.

These elements in the carbonate form help achieve a more neutral pH in acid soils, while sulfur is used to lower the pH of alkaline soils. A nearly neutral pH allows maximum availability and utilization of plant nutrients.

Minor plant nutrients include iron, manganese, zinc, copper, boron, and molybdenum. Except in very unusual situations, iron is the minor element most likely to be deficient.

High pH and high phosphorus levels in the soil can create iron deficiency. In both cases, iron is precipitated to insoluble, unavailable salts. Correcting soil pH and applying iron in fertilizer or as foliar sprays will correct the situation.

**Nitrogen availability**

The process by which fertilizer nitrogen becomes available in soil is called mineralization.

The rate at which urea mineralizes to ammonium ions (which then nitrolyze to nitrate nitrogen) is quite rapid, occurring over two to seven days at temperatures above 50 degrees F.

Nitrate (NO₃⁻) nitrogen is the form most rapidly absorbed into the plant system. Highly water-soluble nitrate ions are subject to leaching, and in coarse soils excessive moisture can result in significant nitrogen loss.

Another avenue of N loss is via ammonia volatilization. In addition to ammonium ions (NH₄⁺) which are absorbed on clay and organic matter particles, some urea may hydrolize to ammonia (NH₃) which is subject to volatilization.

This is more pronounced in high pH soils, and can account for 25 percent or higher nitrogen loss. Nitrogen fertilizer made from ammonium salts, (e.g. ammonium sulfate, di-ammonium phosphate, ammonium nitrate, etc.), though water-soluble, are less subject to volatilization than urea.

**Fertilizer programs**

Few soils in a new right-of-way or rest area contain adequate major plant nutrients to forego applying commercial fertilizer. The establishment phase of roadside landscaping is the most critical in terms of assuring vigorous growth and long-term survival.

Spring is a good time to apply nitrogen, phosphorus, and potassium, and may be the only time that many miles of roadside vegetation will ever receive these important nutrients.

This is all the more reason to consider a nitrogen program that encourages strong rooting and extended availability over many months of growing season, though fall fertilization on cool-season grasses is also recommended if possible.

Commercial farm-grade nitrogen fertilizers are inexpensive and easily obtainable. However, they are water-soluble, release nitrogen rapidly, and generally have high salt indexes which can off-set their beneficial effect on new seedlings and small plants.

Besides the possibility of nitrogen loss, the faster release of N from these sources encourages too rapid growth of vegetative tissue. The consequences can be a shallow, less developed root system, poorly equipped to sustain grasses, trees, and shrubs through years of varied, often stressful growing conditions.

As previously mentioned, it is particularly important to get phosphorus down at the time of planting so that it has its greatest influence on seedling establishment and root formation.

Since neither phosphorus or potassium move rapidly through the soil, regular farm-grade sources of these nutrients are both efficient and economical.

Low or no-N, high P-K fertilizers such as 6-24-24 or 0-20-20 are ideal sources of phosphorus and potassium, and are easily obtainable through farm fertilizer distribution channels.

Potassium’s role in plants, both constructive and protective, is important in maintaining rigidity and integrity of cell walls, and helps to protect plants from disease and environmental stress.

Phosphorus is a key element in cell metabolism and energy transfer. Once plants become established under adequate levels of N, P, and K, the natural recycling of these nutrients from soil to plant to soil helps to satisfy long-term requirements.

Potassium’s role in plants, both constructive and protective, is important in maintaining rigidity and integrity of cell walls, and helps to protect plants from disease and environmental stress.

Phosphorus is a key element in cell metabolism and energy transfer. Once plants become established under adequate levels of N, P, and K, the natural recycling of these nutrients from soil to plant to soil helps to satisfy long-term requirements.

The major nutrient

Nitrogen is so important in plant growth that it demands primary consideration when choosing a fertilizer. Several slow-release N sources are popularly used in landscape design.

If multiple applications of fast-release N sources are impractical, slow-release N fertilizers become a logical alternative.
Now. Take your best shot against insects and mites.

No matter what you're taking care of, MAVRIK AQUAFLOW® Insecticide will take care of your insects and mites.

There has never been a single product that handles so many pests, while being so convenient to use and so safe to plants. MAVRIK is a non-restricted material, and it has been tested on more than a hundred ornamental species without a report of any phytotoxicity.

MAVRIK is a water-based flowable, so it's convenient to mix, and there is no odor and very little visible residue. The dilution range is flexible—use more for mites, less for most other pests.

Use MAVRIK on trees, shrubs, lawns. Use it on aphids, thrips, whiteflies, worms, blackvine weevils, two-spotted and European red mites. Once applied, MAVRIK won't hurt bees or most other beneficials.

You won't find the convenience and broad spectrum coverage of MAVRIK in any other product. And since MAVRIK is available at your local distributor, all you have to do is ask for it.

Zoecon Corporation, a Sandoz Company
Crop Protection Division
Palo Alto, California 94304

Use pesticides effectively. Read and follow label directions carefully.

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How much N, P and K?

Because of the author's experiences, recommendations are based on using ureaform nitrogen in a single application at planting time, or once a year or less often under maintenance conditions.

Other slow-release N sources are suitable for long-term effects, and should be considered over fast-release fertilizers for these infrequent applications. For the purpose of clarification, “luxury turf” is defined as that composed of improved varieties of turfgrass cultivars mowed and maintained for aesthetic appearance near buildings and along urban parkways.

**Seedbeds, luxury turf**
400 lbs. ureaform, 38-0-0, (152 lbs. N) + 400 lbs. 6-24-24 (or other high P-K fertilizer) per acre, applied separately* or blended.

**Seedbeds, low-maintenance grasses and groundcovers**
200-lbs. ureaform, 38-0-0, (76 lbs. N) + 200 lbs. 6-24-24 (or other high P-K fertilizer) per acre, applied separately* or blended.

(* In seedbeds, phosphorus and potassium will be more efficiently utilized over a longer period if incorporated in the top three-to-four inches of the soil prior to seeding. The nitrogen fertilizer should be surface-applied for best results. Mulching or slight incorporation will help prevent rainfall from moving particles away from the site of application.)

**Under sod**
115 lbs. ureaform, 38-0-0, (44 lbs. N) + 200 lbs. 6-24-24 (or other high P-K fertilizer) per acre. Equivalent to 1 lb. N per 1000 sq. ft. Slightly incorporate into the soil surface prior to laying the sod.

**Established luxury turf**
400 lbs. ureaform, 38-0-0, (152 lbs. N) + 200 lbs. potassium sulfate, 0-0-50, (or 150 lbs. potassium chloride, 0-0-60) per acre. Apply in spring or early fall.

**Established low-maintenance grasses and groundcovers**
200 lbs. ureaform (76 lbs. N) + 100 lbs. potassium sulfate, 0-0-50, (or 75 lbs. potassium chloride, 0-0-60) per acre. Apply separately or blended, spring or early fall.

**Tree establishment (bare root or ball and burlap)**
1/2 lb. ureaform, 38-0-0 + 1/2 lb. single super-phosphate, 0-20-0, per 1/4-inch trunk diameter.
Mix fertilizer with backfill to be replaced in the planting hole. **Application technique tip:** Mark out the planting hole locations with pre-measured amounts of fertilizer. Power-auger directly through the pile, automatically blending the fertilizer with the back-fill as the hole is dug.

A soil test may indicate that levels of phosphorus and/or potassium are adequate to sustain growth. If so, apply ureaform only. If potassium is required, it is best to apply it on the surface in order to dilute the salt concentration in the vicinity of the newly planted roots.

**Seeding trees and shrubs**
2 ozs. ureaform, 38-0-0, + 2 ozs. of a high P-K fertilizer, surface broadcast around each planting. In an area of many closely spaced plantings, surface broadcast 400 lbs. ureaform, 38-0-0, + 400 lbs. of 6-24-24 (or other high P-K fertilizer) per acre. Apply separately or blended.

**Established trees and shrubs**
Surface apply 1/3 lb. ureaform, 38-0-0, per inch of trunk diameter uniformly beneath the canopy.

Trees and shrubs almost always will exhibit a response to nitrogen fertilization. Trees showing an unusually pale leaf color may be suffering from iron chlorosis. This is mostly a problem in alkaline soils. It can be corrected with iron chelate.

—C. Robert Staib.