Green World

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TURFGRASS HALL OF FAMER – Dr. Howard B. Sprague, left, accepts a plaque from Past President Roy Bossolt after being selected as the second member of the New Jersey Turfgrass Hall of Fame at the annual Expo. Dr. Sprague joins at former associate, James Smith Jr. in the select circle of persons honored by the N.J.T.A.

Dr. Sprague Named to Turfgrass Hall Of Fame

The 1975 New Jersey Turfgrass Hall of Fame Award was given to Dr. Howard B. Sprague at the 1975 New Jersey Turfgrass Expo in December at Cherry Hill. Dr. Sprague is the second recipient of the award. James Smith, Sr. of Rahway, an associate of Dr. Sprague, was given the award in 1974.

Dr. Sprague is a native of Nebraska and received his Bachelors and Masters Degrees at the University of Nebraska. After receiving his Ph.D. in Agronomy at Rutgers University, he served as agronomist and chairman of the Agronomy Department. While serving as chairman, his leadership led to establishment of the turfgrass Agronomists position and he created a lasting enthusiasm for turfgrass science. After leaving Rutgers, Dr. Sprague served as agronomist with the United States Air Force. Following this, he became director of the Texas Research Foundation. He left this position to become chairman of the Agronomy Department of Penn State University. He retired from this position and now serves as Agricultural Consultant with AID, which takes him to many foreign countries.

WROTE BETTER LAWNS

Dr. Sprague was awarded Fellow by the American Society of Agronomy. He served as president of the society and the Crop Science Society. His turfgrass writing at Rutgers University was the original core of the long list of New Jersey turfgrass bulletins and circulars. His book BETTER LAWNS was one of the early popular turfgrass texts.

While the vast work of Dr. Sprague has served New Jersey turf and agriculture so very well, he is not content to rest on his laurels. His AID work that serves international agriculture is still a full-time devotion. We understand that he eases his schedule occasionally to play nine holes of golf in the evenings after work.

Our greatest appreciation to you Dr. Sprague, fellow Turfgrassman and Agronomist.

"Lime Substitute" Put on N. J. Market

Roy L. Flannery
Specialist in Soils,
Cook College,
Rutgers University

A new product labeled "Liqui-Lime or Patterson's Green-Up" has been registered and is being offered for sale in New Jersey as a "Lime Substitute."

It is being recommended by the distributors for use on lawns, gardens, parks, golf courses, nurseries, and athletic fields. The label and literature describing and referring to the use of the product state that "one gallon (approximately 10 pounds) of the product covers 10,000 sq. ft. of area and is comparable to or will substitute for 500 pounds of calcium carbonate."

Information supplied by the manufacturer shows "Liqui-Lime" to be a mixture of trihydroxy glutaric acid ($C_5H_8O_7$) and calcium hydroxide ($Ca(OH)_2$). Limited amounts of data supplied by the manufacturer indicates this product to be considerably more efficient than commonly used pulverized limestone.

There are many benefits derived from liming acid soils at the normally recommended rates of pulverized limestone, that lead to the improvement in soil conditions for plant growth. Some of these benefits are:

- neutralization of soil acids or pH adjustment;
- an increase in the availability of soil phosphorus and molybdenum;
- an increase in available supplies of calcium and magnesium, both essential nutrients for plant growth;
- makes soil conditions more favorable for growth and activity of microorganisms, which aids in the decomposition of soil organic matter and nitrogen release;
- improves the physical condition of fine textured soils by helping form

(Please turn to pg. 6)

Comments and Opinions

USE MORE CERTIFIED SEED

New Jersey was the first state to certify cool-season grass sod. This was not done to claim a first. It was hoped that certifying sod would: (1) raise the standard of sod sold in New Jersey and (2) give a standard for evaluating sod used in bidding and completion of contracts.

It appears the program was very successful on improving sod quality, but far too many contracts are awarded without certified sod. I can see no way that equivalent bidding and reasonable assurance of good sod will occur on large open-bid contracts if a certified level of product is not given.

I am not proposing exclusive use of certified sod, but I am saying there are too many sod contracts that are filled with whatever sod is delivered rather than a product of known quality.

REE

WHO MADE ALL THE DDT?

Many have complained that too many chemicals have been banned because they increase cancer in rats at ridiculously high dosages. Adding to this point of controversy is the fact that such a chemical as DDT is reported in damaging quantities in the natural waters such as the Great Lakes, Arctic Ocean, etc. If we calculate the vast tonnage of DDT that is required to contaminate the earth's waters at a fraction of a part per million, we could ask who made all the DDT?

All the used DDT is not in the water as those of us in turf know because this chemical would stay in the soil long enough to give Japanese beetle grub control for several years or more. All associated with turf have been and are deeply concerned about the environment, but we would like to see more realism and facts.

The following comments by soil scientist Dr. Russell Adams of the University of Minnesota are taken from WEEDS, TREES AND TURF, December 1969. This give us some explanation on why reports on DDT make it sound so very ubiquitous and overwhelming in quantity.

"Pesticides such as DDT are normally used over limited areas", Adams says. "For them to be distributed all over the globe would require some means of transport, either by atmospheric or water routes. "Most pesticides used eventually reach the soil through direct application or they are washed from plants by rain. Much of the pesticide reaching the soil is then broken down by micro-organisms or it reacts chemically with soil moisture.

"Under the right conditions, DDT may bind itself to soil particles. But because DDT doesn't dissolve easily in water or cling to soil particles too readily, it often escapes into the air as a vapor. Once it reaches the atmosphere, DDT is often destroyed by the sun's ultraviolet rays.

"If DDT is truly present in the Antarctic snowcap, the only way it could have arrived there is through the atmosphere. But neither the mechanisms of atmospheric distribution nor the stability of pesticides in the atmosphere has been studied well enough outside the laboratory to make any firm conclusions.

"Even scientists who are familiar with methods used to measure pesticides find it difficult to interpret how important these small amounts are. Also, there are many naturally occurring compounds, and some synthetic organic compounds being added to our environment that look like pesticides when they pass through the gas chromatograph.

"Carrots, for example, may contain natural compounds, which mimic aldrin and dieldrin, two chemical relatives of DDT. Gas chromatographs are sometimes unable to single out and measure natural compounds when the man-made chemicals are also present. This fact has been known for years. Yet some pesticide analysts still appear to be unaware of it.

"A number of other compounds that are easily confused with DDT have been detected in birds and fish. These compounds are commonly used in petroleum products, rubber, coolants, and several other materials. Since these compounds resist chemical breakdown and are used extensively, some early findings that pointed to widespread DDT contamination are open to question."

– REE

SUSTAINING MEMBERS

Our sustaining membership list continues to grow, and the N.J.T.G.A. again expresses thanks for the continued support of these members.

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Liming For Better Turf

PROPER PROGRAM CRUCIAL TO COMBAT SOIL ACIDITY

Dr. Henry W. Indyk
Extension Specialist in Turfgrass Management, Cook College, Rutgers University

A number of physical and chemical characteristics of the soil are important in the satisfactory performance of turfgrasses. Among the chemical characteristics, soil acidity is of major importance, not only in the establishment but also in the maintenance of lawns, as well as other turfgrass areas.

Several factors alone or in combination contribute to the acidity of the soil. They include the following:

- **Leaching of calcium and magnesium by rainfall and/or artificial watering. Development of acidity through this process is most rapid in the sandy textured soils.**
- **Erosion of soil by water or wind. This factor would be of little or no significance except in areas of very poor turf.**
- **Plant growth. Considerable quantities of calcium and magnesium are removed from the soil by plants and utilized in their growth processes. Removal of clippings tends to reduce the supply of these nutrients in the soil.**
- **Acid-forming fertilizers. Fertilizers that provide nitrogen in the form of ammonia or others with sources of nitrogen that are converted to ammonia after application will leave an acid residue on the soil.**

An estimated 90-95% of the acidity in the soil is attributed to the effects of leaching, erosion, and clipping removal, whereas only 5-10% is attributed to the use of acid fertilizers.

HIGH ACIDITY IN NE

Leaching is the major contributing factor to the formation of soil acidity. Soil acidity is a natural condition in high rainfall regions. Most of the soils in the Northeast region are too acid for proper growth of turfgrasses. The correction of soil acidity is a prime consideration in providing a suitable medium for the establishment and growth of turfgrasses. Neturalization of soil acidity can be accomplished relatively simply, safely, and economically with the use of lime.

The benefits of using lime for improvement of soils for plant growth have been established by prominent soil scientists many years ago and still holds true today in spite of recent technological advances. Many benefits which directly or indirectly favor the growth of turfgrasses may be attributed to the neutralization of soil acidity with the proper use of lime. Among the many benefits of lime, the more important ones include:

- **Provides calcium and magnesium as essential plant nutrients.**
- **Reduces the availability of iron and aluminum below concentrations toxic to growth of turfgrasses.**
- **Increases the availability of essential plant nutrients – phosphorus in particular.**
- **Facilitates the utilization of nitrogen.**
- **Increases microbial activity that is very influential in:**
  a. **Breakdown of organic matter resulting in release of nitrogen and other nutrients for plant growth.**
  b. **Breakdown of organic nitrogen fertilizer for utilization in growth of turfgrasses.**
  c. **Control of thatch formation.**
- **Improves the structure of heavy textured soils.**

The benefits of the lime are expressed in a deeper, healthier, and more extensive root system of the turfgrass. When lime is lacking, the grass roots are very shallow, short and sluggish. Symptoms of soil moisture stress on turfgrass growth not only become evident sooner but also more markedly when lime is deficient in the soil. The grass blades tend to be weak and discolored. In very acid soils, turfgrass plants from either seeding or sodding are unable to survive for any length of time. The effects of soil acidity also may contribute to weed infestation as a result of reduced vigor and density of the turfgrasses.

When establishing new turfgrass areas from seed or sod, adequate use of lime becomes an important consideration that cannot be overlooked in soil preparation procedures. Soil pH can be the dominant or controlling factor determining the success or failure of seeding or sodding. Situations have been observed in which the establishment of a high quality seed or sod on a well fertilized and prepared soil failed as a result of acid soil conditons. Correction of an acid soil condition becomes difficult or impossible after the site is prepared since movement of lime through the soil profile is very slow. Incorporation of adequate lime into the soil to a depth of at least 6 inches as a part of the soil preparation procedure will provide the best opportunity to neutralize the unfavorable

acid condition within the major portion of the turfgrass root zone.

The desirable soil pH for turfgrasses range from 6.0 to 7.0, ideally 6.3-6.5. The amount of lime needed to produce this favorable soil condition for growth of turfgrasses depends upon the pH of the soil and the type of soil. The acidity of the soil can be determined most accurately with a pH meter. Sandy soils will require less lime than heavier textured soils to achieve the same neutralization effect. Once the soil pH has been adjusted with lime to the ideal range (6.3 to 6.5) for growth of turfgrasses, most soils will require about 25 pounds per 1000 square feet (1/2 ton per acre) annually to maintain the pH of the soil in the ideal range.

ANNUAL APPLICATIONS BEST

In the maintenance of the soil pH within the ideal range for turfgrasses, annual applications of lime are preferred to periodic applications such as every 3 years. One of the major reasons for a program of annual application is the fact that lime is relatively slow acting and may move only one or two inches per year in the soil. Annual applications will tend to keep the soil adequately supplied with lime at all times, thereby avoid the fluctuation of the pH from the ideal range to the unfavorable range. In addition, there is less likelihood of forgetting this essential aspect of a turfgrass program is performed on an annual basis. It would be advisable to obtain a pH test once every 3 to 5 years as a check on the lime status of the soil and, if necessary, make any necessary corrections in the liming program.

Two major sources of liming material are calcitic limestone and dolomitic limestone. Dolomitic limestone is suggested in situations where magnesium may be found to be deficient in a soil test. Each of these limestones is available as hydrated, burnt or pulverized (ground). The most common and practical form is the pulverized limestone. In exceptional cases, hydrated may be suggested where a rapid change in pH is desired. It should be used only when based upon soil test information.

The coarseness of the pulverized limestone affects its rate of availability. Finely ground particles are faster acting than the coarse particles and, therefore, fineness of grind would be a primary consideration in very acid soil situations. Particle size is measured in terms of mesh. Specifications for a relatively quick acting limestone material would be one in which all particles would pass through a 20-mesh screen and at least 60% through a 100-mesh. A liming material ground so fine that 100% passes through a 100-mesh screen would approximate the rate of reaction of hydrated lime. Liming materials promoted as granular lime contains a high percent of coarse textured particles which tends to make such materials slower acting than the pulverized limestones. Such materials can be used very effectively in the establishment or maintenance of turfgrass areas where a quick major adjustment in soil pH is not required. The coarser texture of the granular liming materials improves flowability which facilitates application, particularly with the "fan type" spreading equipment.

The timing of application of pulverized limestone is not a critical factor except in situations where a soil acidity problem exists. As a general maintenance practice, pulverized limestone may be applied whenever it can be conveniently fitted into the program. An ideal time is to apply it during the late fall-early winter period. In situations where soil acidity is known to be a problem, it should be applied as far as possible in advance of actual need because of its slowness of action.

In conclusion, proper use of lime is basic for the improvement of most soils in New Jersey for the establishment and maintenance of our turfgrass areas.

RESEARCH ABSTRACTS

TURFGRASS WEAR TOLERANCE MECHANISMS IN TURFGRASS RESEARCH (3 Papers by R. C. Shearman and J. B. Beard, Gron. Journ. 67: 208-218, 1975.)

Wear studies were conducted in both the fields and laboratories at Michigan State University. A sled device and a wheel were used for wear on plots of seven grasses. Wear tolerance of these grasses were evaluated on the basis of (1) visual ratings involving five prescribed categories; (2) % total cell wall content, a laboratory analysis of foliage that remained green; (3) % verdure, which entailed weighing clippings from plugs or injured turf vs those from check plots; and (4) chlorophyll content of shoots from plugs as for % verdure. Rankings of grasses by the four methods were similar, but % verdure proved simpler and more objective. Manhattan ryegrass was most tolerant to wheel wear. K-31 tall fescue and Italian ryegrass were intermediate, while Cascade Chewings fescue and rough stalked bluegrass were least wear tolerant. Tolerance to sled wear showed slight variations from the above order depending on the evaluation procedure employed. Rankings of grasses by the four methods were similar but % verdure proved simpler and more objective. Manhattan ryegrass was most tolerant to wheel wear. K-31 tall fescue and Merion Kentucky bluegrass ranked second. Pennlawn red fescue and Italian ryegrass were intermediate, while Cascade Chewings fescue and rough-stalked bluegrass were least wear tolerant. Tolerance to sled wear showed slight variations from the above order depending on the evaluation procedure employed.

Several tissue constituents of these grasses were examined in an effort to determine why grasses differed in wear tolerance. Total cell wall lignocellulose, cellulose, hemicellulose and lignin were determined on a % and a weight per unit area basis. Total cell wall contents on a weight per unit area basis accounted for 98% of the variation in wear tolerance of the seven grasses tested. This analysis also proved to be the preferred technique because of its simplicity and adaptability to screening large numbers of entries as in breeding trials. Wear tolerant grasses such as K-31 and Manhattan had high contents of cell wall constituents. Verdure, shoot density, leaf width, load bearing capacity, leaf tensile strength, percent moisure, and percent relative turgidity did not correlate with species wear tolerance. K-31 tall fescue and rough-stalked bluegrass were analyzed for percent sclerenchyma fibers and lignified cells. These constituents were high in the former (wear tolerant) grass and low in the latter (wear susceptible) grass.

COMMENTS

These studies confirm findings reported by others on wear tolerance, but more importantly provide specific data on techniques of wear testing and the role of the cell wall in wear tolerant turfgrasses. Such contributions provide the criterion for testing turfgrasses that will be developed into varieties of superior wear tolerance for the future.

– Robert W. Duell

NITROGEN TRANSFORMATIONS IN SOIL AS AFFECTED BY THE FUNGICIDES BENOMYL, DYRENE, AND MANEB. A. R. Mazur and T. D. Hughes, Agron. J. 67: 755-758

The frequency and extent of fungicide use on putting green turfgrasses prompted investigations to determine the effect of three commonly used fungicides on N transformations in soil. Laboratory and field studies were conducted to study the effect of the following fungicides on nitrification and N mineralization in soil: *benomyl, Dyrene* and *Maneb.*

In laboratory studies, almost no effect on NH^{+}_{4}-N and (NO^{-}_{2} + NO^{-}_{3})-N was detected for benomyl, but a complete blockage of these transformations occurred with the rate of *Maneb* used. *Dyrene* had an intermediate effect. In the field on a creeping bentgrass *Agrostis palustris* Huds. golf green, there was no effect of any of the fungicides on nitrification but enhanced N mineralization occurred with the application of all three fungicides.

The differences in the effects of these fungicides on nitrification and N mineralization in laboratory as compared with field applications were considered to be associated in part with the size and number of fungicide applications used in applying the respective totals.

COMMENTS

This study shows that fungicides can affect the amount of nitrogen available. This will not cost the grower any more for nitrogen, but it suggests that a fungicide's effectiveness on a given disease could be enhanced by its causing a temporary reduction in available nitrogen. This is an interesting point to consider from both the turf grower's and research worker's point of view.

– Ralph E. Engel

NEW FUNGUS

A new fungus disease has made its appearance on the Chicago scene and already it appears to be a shoo-in for rookie-of-the-year honors.

It is called *Pythium graminicola* and it can be controlled very easily with Tersan SP. (Koban would probably also do the job). That sounds easy, but the problem is that *P. graminicola* symptoms do not look anything like the symptoms of *P. ultimum*, the normal Pythium we can expect in this area. In fact, the symptoms look very much like those associated with Red Leafspot. The turf begins to turn yellowish to brownish as if it were starved and begins to thin out rapidly. There is no grease spotting or distinctive mycellium, only a severe thinning of the turf.

Spraying with any of the leafspot fungicides will only slow the disease down, it will not stop it. Try some Tersan SP or Koban.

Believe me gentlemen, I know of what I speak. I had some greens that were being attacked by *P. gramincola*, but I thought it was Red Leafspot. I was nearly to the point of pouring Daconil straight out of the bottle on them and I still couldn't stop the disease.

Dr. Al Turgeon from the University of Illinois thought it might be *P. gramincola* and suggested that I try a Pythium control fungicide. I applied 6

(Please turn to pg. 6)

"Lime Substitute" Questioned

(Continued from pg. 1)

more stable soil aggregates, thereby improving soil oxygen and water relationships for good plant root development, which often increase plant drought tolerance;

- reduces the amount of soluble aluminum in the soil which often restricts plant root development.

RECOMMENDED AMOUNT DOUBTED

Does "Liqui-Lime" used at the one gallon recommended rate per 10,000 sq. ft. of area provide the same benefits as derived from 500 pounds of pulverized limestone as enumerated above? Leading agronomists throughout the country have serious doubts about the ability of "Liqui-Lime", when used at the rate recommended, to provide the same benefits as derived from much larger applications of agricultural limestone.

A one gallon application of "Liqui-Lime" cannot possibly supply the same quantity of calcium and magnesium to the soil as a 500 pound application of dolomitic limestone. In fact, "Liqui-Lime" contains little or no magnesium and will supply only about one percent of the amount of calcium supplied in a 500 pound application of a good grade calcitic limestone.

Laboratory tests made show that one gallon of "Liqui-Lime" is equivalent in neutralizing value to approximately five pounds of calcium carbonate, not 500 pounds as claimed by the product label. The manufacturer and distributors of "Liqui-Lime" claim that a laboratory titration test is not a true and valid measurement of the real strength and value of their product, because it reacts differently in soils than it does in laboratory titration measurements. This debatable point cannot be resolved until more work has been done with soils to thoroughly evaluate the product.

TESTS LIMITED

"Liqui-Lime" has been tested by private laboratories and by representatives of the parent company under field conditions on a limited scale. However, the product has not been thoroughly or widely tested by independent researchers at any leading state university. If so, I am not aware of the existing data. I am aware of a limited number of laboratory and field tests that have been, or are presently being, conducted, but have not yet yielded sufficient data for proper evaluation of the product. More research data is needed on field soils to confirm or refute what appear to be fantastic claims being made for the product.

The New Jersey Cooperative Extension Service cannot endorse the use of or make recommendations regarding the use of Liqui-Lime or Green-Up until such time that there are sufficient data available for properly evaluating the product.

Getting the message: Little 5-year-old Betty was taken to church for the first time. As she walked out of the church with her parents, the preacher stopped her, leaned over and asked her how she liked church.

"I liked the music okay," said Betty, "but the commercial was too long."

—National Future Farmer

PAST ISSUES ....

Some of you may wish to obtain back issues of GREEN WORLD. A limited number are available. If you wish a single copy of all back issues, the cost is $3.50. A single copy is $ .25.

Send any request to: N.J. Turfgrass Association, P.O. Box 231, New Brunswick, N.J. 08903.

(Continued from pg. 5)

ounces per thousand of Tersan SP and stopped the disease in its tracks. In about five days, my greens had almost fully recovered. Thank you Dr. Al.

K. Quanot, Editor
THE VERDURE (1975), Chicago Gold Course Superintendents

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