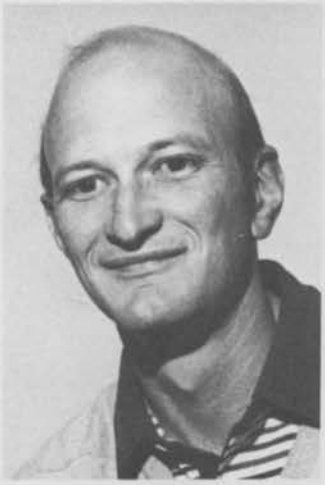
Northwest **TURFGRASS TOPICS**

Vol. 28, No. 1 PUYALLUP, WASHINGTON April 1985

PRESIDENT'S CORNER



Gary Sayre

With the advent of spring, many of us will be quite busy preparing our turfgrass areas for heavy summer use. Many of us look forward to seeing an increase in growth and the renewal process which takes place—a time that can be both invigorating and awe inspiring. The winter months have been relatively good for us and now it is time to shift gears. This also holds true with certain organizations such as the Northwest Turfgrass Association. At our last board meeting in March, we began to finalize plans relative to the growth and education of the membership of our association. Things are really coming into place and we are very excited about the upcoming events and activities of another Turfgrass Conference.

We would be remiss here if I did not mention that Mr. Bill Campbell and also Mr. Norm Whitworth had something to do with the continuation of some of their ideas that they began to institute while they were on the board of directors. Bill, of course, gave us good input and a great deal of work on bringing new members and also guiding the expansion of the turfgrass supplier participation and support of the NTA with the trade show and program advertising. Norm, through his communication with the members helped us see the need for combining the dues to include registration for the conference and also has been actively working on a special function which will help to put dollars into our coffers for research. Thank you so much for your continued work, Bill and Norm.

There are others out there who continue to work towards the betterment of our NTA and we would ask that if you wish to bring ideas to the directors we would appreciate it. Also, for you who wish to donate your time and resources to serve on the NTA board of directors, please contact Past President Ray McElhoe who is chairman of the nominating committee and discuss with him how you may serve.

We are looking forward to seeing many of you at the Turf Field Day in Puyallup in June.

ANNUAL TURFGRASS FIELD DAY

June 25 and 26 will mark the 27th consecutive Annual Turfgrass Field Day at the Western Washington Research and Extension Center at Puyallup, Washington. The Field Day will begin promptly at 10:00 a.m. at Farm 5 on Tuesday, June 25th, for all golf course superintendents; and on Wednesday, June 26th, from 10:00 a.m. to 1:00 p.m. for home owners, schools, parks, industry representatives, and others. The golf course field day on June 25th will be restricted to discussions of golf course problems, specifically, whereas June 26th will cover all other types of turfgrass management.

The following are only a few of the research areas that will be identified with signs for your inspection.

1. Turfgrass Establishment on Sand
2. Lysimeter Leaching Studies for Nitrogen, Phosphorus, and Sulfur
3. National Variety Tests
4. Growth Regulator Studies
5. Shattercore versus Hollow Tined Aerification
6. Slow Release Nitrogen Studies
7. Low Maintenance Studies and Poa Annual Control
8. Moss Control
9. Disease Control
10. Others

This is your opportunity to bring questions to the research and extension experts and firsthand to see what is happening in research studies in western Washington. Many of you have significantly contributed to the research programs and we welcome you to observe the products of your input.

If you are not sure how to find Farm 5, simply drive to the entrance of the research station on West Pioneer Avenue in Puyallup and there will be someone there to direct you to Farm 5 and give you a map to find it. We look forward to seeing you on June 25th and 26th.

39th NORTHWEST TURFGRASS CONFERENCE

September 23-26, 1985

Rippling River Resort
Welches, Oregon

WATCH YOUR MAIL FOR PROGRAMS AND REGISTRATION

IRON FERTILIZATION

By Scott Swope

Color, density, and texture are the criteria generally used to rate turfgrass quality. A dense, dark green turf is the goal of many homeowners and professionals involved with the maintenance of turfgrass. Nitrogen, an essential plant nutrient involved in chlorophyll production and photosynthesis, is the nutrient most commonly associated with the density and color desired in a high quality turf. Through the use of commercial fertilizers, it is applied in greater quantities than any other nutrient. The value of nitrogen cannot be overemphasized. However, the importance of iron is often overlooked as another vital element in a healthy, aesthetically appealing turf. Iron is necessary for the formation of chlorophyll, which is directly related to the intensity of the turf color. It is also indirectly related to turfgrass density via chlorophyll synthesis and subsequent production of carbohydrates for increased tillering.

Iron Deficiencies

Although iron is needed by the plant in very small amounts, it is the most deficient micronutrient in turf.(1) This is usually due to the lack of availability of iron in the soil, rather than a lack of soil iron. Most of the iron in the soil is present in the form of insoluble iron oxides which the plant cannot take up. This is especially true in soils with a pH of 7.5 or greater and high lime content.(4,6,7,8) ''Lime-induced chlorosis'' is common under these conditions. Other factors leading to a poor uptake of iron are cool temperatures and wet soil. These are conditions which inhibit the function of the roots in the absorption of nutrients. A high concentration of heavy metals such as copper and manganese can compete with the iron for absorption by the roots, thus limiting its uptake. Heavy phosphorus fertilization may cause an iron deficiency due to physiological processes in the plant which inactivate the absorbed iron.(4,6,7,8) An over abundance of nitrogen can lead to iron deficiency because the nitrogen greatly stimulates leaf growth at the expense of root growth and the root system cannot keep up with the increasing demand for iron. Effluent water used for irrigation is often high in bicarbonates which raises soil pH, increases the availability of phosphorus, and causes iron in solution to precipitate.(4,6,7,8).

Soil tests for pH and available soil iron can be valuable tools in the diagnosis of potential iron problems. Soils with a pH of 615 or lower should not have an iron availability problem. A DTPA soil test is a good indicator of available soil iron. If the test indicates a level of 10 ppm. or lower, a potential problem is likely. Levels from 10 ppm. to 15 ppm. could result in deficiency, and levels above 15 ppm. should be adequate.(8)

Iron Deficiency Symptoms

A lack of iron initially appears as a lime-green color. Yellowing, or ''chlorosis,'' between the veins of the youngest, most actively growing leaves follows as the deficiency worsens. The turf area will take on a mottled yellow appearance, with patches of yellowing being apparent. In the early stages, the turf density will not be affected. In the advanced stages of iron deficiency, the chlorosis will affect the older leaves, giving the entire area an ivory appearance. The plants will become weak, spindly, and may lay over, giving the turf area a matted appearance. In contrast, a nitrogen deficiency will show up as a uniform yellowing of the turf area, a reduction in density, and chlorosis first appearing in the older leaves.

(Continued on Page 3, Column 1)

(Continued from Page 2, Column 1)

Some turfgrass species are more susceptible to iron chlorosis than others. Of the cool season species, Kentucky bluegrass, annual bluegrass, perennial ryegrass, fine and tall fescues, and creeping bentgrass have all shown susceptibility. Cultivars of some of these species are more efficient users of iron than others. Among the better Kentucky bluegrass cultivars and blends are Adelphi, Sydsport, Windsor, Common+Kenblue, and Windsor+Merion. Top-performing perennial ryegrass cultivars are Citation, Derby, Yorktown, Diplomat, and Pennfine.(8)

Correcting Iron Deficiencies

Several methods can be employed to correct iron chlorosis. In areas where deficiency problems are persistent, planting cultivars that are more resistant may help alleviate the problem. Where a high soil pH is present, increasing the availability of soil iron by lowering the pH through the use of sulfur or acidifying fertilizers may be attempted. However, due to the high rates needed, this approach is not practical in the short term. A more successful approach has been to wait until early yellowing symptoms appear and then treat the symptoms with an application of iron fertilizer.(8) Several products are available, all showing advantages and disadvantages with compared to each other.

Ferrous (iron) sulfate is the most widely used source of iron. It has the advantages of being low in cost, may be applied in a granular form or in a spray solution, and gives a quick "greenup" effect. Its availability in the soil does not last as long as some of the other forms.

Ferrous ammonium sulfate has many of the same advantages as ferrous sulfate and is used in much the same way. It may, however, last longer in the soil.(4) This form includes nitrogen, which adds to the greening ability of the fertilizer. A disadvantage is that it can cause foliar burn if it is used in excess.

Chelated irons are synthetic organic complexes or natural organic complexes which have the advantages of being more mobile in the plant and lasting longer in the soil. A longer lasting response can be expected form them. Rates are usually lower than with other iron sources, however, the cost is generally somewhat higher.(3) Studies have shown that chelates may have an advantage of increasing root growth.(9) Chelates are generally applied as a foliar spray.

Timing and Rates of Application

Timing is important to the response seen from iron fertilizers. Application during cool, wet periods lasts only a short period of time, whereas application in cool, dry weather may give results which last for weeks.(10) Applications of ferrous sulfate or ferrous ammonium sulfate may be made during chlorotic periods to give a rapid greening response, but it is usually short lived. Foliar application of chelated iron in the fall or very early spring when the weather is cool and the grass is growing slowly may enhance spring green-up when used with nitrogen. These same applications during periods of active growth may actually decrease top growth.(9)

The rates of fertilizer used can be divided into two categories:

1. General turf *areas*: Areas which are maintained with a normal amount of care, such as home lawns, parks, commercial sites, and golf course fairways.

A study by Minner and Butler on high pH soils in Colorado provided the following recommendations, using iron sulfate.(7)

Soil Test Level	Rate of Application
Bentgrass	
15 ppm (low)	4 applications of 0.25 lb Fe/1000 sq ft
15-20 ppm (medium)	2-3 applications of 0.25 lb Fe/1000 sq ft
20 ppm (high)	with one application in the fall
Kentucky Bluegrass	
10 ppm (low)	2 applications of 0.5 lb Fe/1000 sq ft
10-15 ppm (medium)	1 application of 0.5 lb Fe/100 sq ft
15 ppm (high)	None

Continued on Page 4, Column 1)

IRON FERTILIZATION

(Continued from Page 3, Column 2)

Another study in Illinois comparing various rates of iron sulfate and chelated iron on Kentucky bluegrass indicated that chelated iron at a rate of 0.05 lb Fe/1000 sq ft (2.2 kg Fe/ha) gave the most favorable response. The same rate also gave the best response for the rates of ferrous sulfate tested.(10) Higher rates in this study indicated that over-application of iron is not lethal to turf, however, an unappealing, blackened color will result. The turf will eventually outgrow this problem.(10)

2. Areas of intensive VFT122XcultureVFT121X: Golf course putting greens, lawn bowling greens, and lawn tennis.

Beard recommends 2-3 ounces of iron carrier/1000 sq ft at 2-4 week intervals.(2) In severe cases of chlorosis, 3-6 ounces of iron carrier in 6 gallons of water/1000 sq ft may be needed. Rates should be reduced for bentgrass, and the applications should be made when the turf is dry. Results should be seen within one to two hours. Iron sulfate, chelated iron, or ferrous ammonium sulfate may be used, and all are applied as foliar applications.(2)

Hawes recommends the use of 2 ounces of ferrous iron sulfate in a maximum of 5 gallons water/1000 sq ft. The spray should not be watered into the turf. According to Dr. Hawes, this is a safer method of greening turf in mid-summer than applying nitrogen.(5)

When applying iron, it is vital to read the recommendations carefully. A distinction must be made between the amount of iron to be applied as a fertilizer carrier and the amount of elemental iron that is to be applied.

The use of iron as a supplement to nitrogen for obtaining high quality turf is a practice that is growing in popularity. The advantages it provides, such as rapid greening response, less top growth, ease of application, and relative safety to turfgrass may well be worth exploring.

References

1. Beard, James B. 1973. Turfgrass: Science and Culture. Prentice-Hall, Inc., Englewood Cliffs, NJ. p. 420.
2. Beard, James B. 1982. Turf Management for Golf Courses. Burgess Publishing Company. A publication of the United States Golf Association. p. 141.
3. Butler, J.D., and M.A. Harivandi. A Review of Turfgrass Iron Problems and Solutions. In the 24th Annual Rocky Mountain Regional Turfgrass Conference Proceedings. 1978. p. 75-59.
4. Gibeault, Victor, and Kenneth Mueller. An Evaluation of Some Soluble Iron Sources for Turf Fertilization. California Turfgrass Culture. 25:22-24.
5. Hawes, Dr. Douglas T. The Secrets of Putting Greens Revealed. U.S.G.A. Green Section Record. 22;No.6:1-4.
6. Ludwick, Albert E. Iron and Its Use in Turf Maintenance. In the 18th Annual Rocky Mountain Regional Turfgrass Conference Proceedings. 1972. p. 28-32.
7. Minner, David D. Iron: Problems and solutions in Turf. In the 28th Annual Rocky Mountain Regional Turfgrass Conference Proceedings. 1982. p. 51-58.
8. Minner, David D., and Jack D. Butler. Pumping Iron for Greener Turf. Grounds Maintenance. May 1983. p. 10.
9. Schmidt, R.E., and V. Snyder. Effects of N, Temperature, and Moisture Stress on the Growth and Physiology of Creeping Bentgrass and Response to Chelated Iron. Agron. J. 76:590-594.
10. Yust, A.K., D.J. Wehner, and T.W. Fermanian. Foliar Application of N and Fe to Kentucky Bluegrass. Agron. J. 76:934-938.

GCSAA NEWS

Statistics from the recently completed 56th Annual International Golf Course Conference and Show in Washington, D.C., sponsored by the Golf Course Superintendents Association of America (GCSAA), tell the story of another record-setting Conference.

Registration totaled nearly 9,000, breaking last year's Las Vegas record; Trade Show was 25 percent larger than last year's Las Vegas record, with almost 300 companies exhibiting their wares; 20 nations from around the globe were represented; 330 hours of instruction were offered by more than 110 of the most prominent golf course superintendents, educators, researchers and business representatives; former U.S. President Gerald R. Ford accepted the prestigious Old Tom Morris Award at the closing Banquet; a new, exciting and unique Mid-Year Turfgrass Conference and Show to be sponsored by GCSAA September 19-24 at the Hoosier Dome in Indianapolis was announced; and a grant of $10,000 was made by GCSAA to Dr. William A. Torello of the University of Massachusetts to continue research using tissue culture techniques in an effort to develop more tolerant turfgrasses requiring less resources, such as water, to survive.

The 1985 Conference marked the first time the American Society of Golf Course Architects met as an organization in conjunction with GCSAA's annual conference. It was the fifth year in a row that the USGA Green Section Educational Program was held at the GCSAA Conference. Also meeting in conjunction with GCSAA were representatives of the Golf Course Builders of America.

BOARD OF DIRECTORS RESTRUCTURE AND INCREASE MEMBERSHIP DUES

By Gene Howe

The Board of Directors of the NTA has approved the restructuring of dues by combining a single conference registration with their annual membership statement. This change was made, after recommendations by Association members, to streamline the budgeting and bookkeeping for everyone, and to increase conference attendance and membership participation.

Beginning with the next membership dues statement in August, 1985, the dues will be $75.00. This will provide a years membership *and* a conference registration for a single member.

This compares with the present $40.00 membership dues and $20.00 conference registration fee. The increase of fees was eminent to help the Association improve its annual conference and to defray other costs. The Board of Directors is confident that the continuing improvements of the annual conference will more than make up for this increase in dues.

Other changes made will raise the conference dues for additional attendees when accompanied by a member. Beginning at the 1985 conference, this will be $25.00 for early registration for each additional attendee and $30.00 for their late conference registration.

Applications received from new members after January 1st of each year will be placed in full member status until July 31st, 18 months later. Also, applications received between the annual conference and December 30th of each year will pay full membership fees and will be billed again on July 31st of the following year.

At their November '84 meeting, the Directors studied a summary of comments form the membership on the Spokane conference. It is our feeling that the NTA is heading in an excellent direction of providing its members with the information they request and in a format that provides the most exposure. Our conference speakers rate the NTA conference as one of the very best in the country. The Spokane suppliers exhibit was just the beginning of this long-awaited improvement to our conference. The Directors must rely on the general membership by taking their requests of conference topics and ideas in order to put on the great show that it is. It is our hope that this simplification of the dues structure will be one more way that YOUR Turfgrass Association can serve YOU. Please contact any Director with additional ideas and comments that you may have.

HOW MANY WAYS CAN YOU LOSE NITROGEN

By Dr. Roy L. Goss

Most people believe that nitrogen is lost by surface run off, utilization by the plant, or leaching from the root zone. Leaching is probably blamed too much for nitrogen losses or for lack of response to nitrogen applications. Usually, when we apply nitrogen and see little or no result, we blame it on this factor. Although biological fixation accounts for some temporary loss of nitrogen for plant growth and metabolism, it will become available for plant utilization at a later time.

There are two very important sources of nitrogen loss that have received greater attention in recent years and they are ammonia volatilization and denitrification. There has been a great deal of publicity given in recent years on the affect of the timing of applications of lime and nitrogen. It has been known for many years that applications of lime can increase the loss of nitrogen in the form of gaseous ammonia due to the presence of large amounts of carbonate from liming materials.

Dry or even liquid applications of urea that are left in the thatch of turfgrasses may be subjected to to very high ammonia losses. Titko, Street, and Logan, of Ohio State University, reported ammonia losses of as much as 55% of the applied nitrogen from granular urea and 26% of the applied nitrogen from liquid urea when applied to thatchy Kentucky bluegrass turf. Their studies showed that ammonia losses were higher at higher relative humidities, for instance 68% (as compared to lower humidities, 31%). Temperature strongly affects the loss of ammonia, as well. As the temperature increases, the rate of ammonia volatilization increases, as well. Wind speed, of course, is significant in the loss of ammonia, since the wind can carry it away and it is lost from the immediate area. These same researchers found that irrigation after urea application reduced losses by 96% and 66% for granular and liquid urea, respectively.

Denitrification

Research in recent years has shown that significant gaseous-nitrogen losses may occur in turfgrasses through denitrification. Recent research by Torello and Mancino of the University of Massachusetts has shown that as much as 63.3% of the applied nitrogen can be lost as nitrous oxide when soils are maintained in a saturated condition. Significant losses of nitrogen as nitrous oxide can be lost on the day of application from nitrate sources when soils are saturated. These same researchers found that seven day saturation periods increased denitrification microbial populations 87-fold in silt soil and 121-fold in silt-loam soils.

Summary

We can significantly increase the efficiency and effectiveness of nitrogen applications if we will remember only a few basic principles and they can be enumerated as follows:

1. Apply only recommended levels of nitrogen. Avoid heavy applications.
2. Less ammonia volatilization occurs for slow-release nitrogen products than with soluble materials.
3. When lime and nitrogen are applied reasonably close together, make sure the soluble nitrogen fertilizers are dissolved and washed into the soil profile.
4. Avoid soil saturation and prevent denitrification.
5. Never leave granular nitrogen compounds in the thatch without dissolving because enzynmatic activity in thatch significantly increases volatilization.

SAVING MONEY - FOR WHO

By Tom Wolff

Throughout our history, it has always been the the Golf Superintendent who has been trained to save money—it certainly beats wasting it, which seems to be a mortal sin. Where does the money go that you save the club? Your bonus? New chairs for the Men's Grill? Fixing up the Ladies' Locker Room? New carpet again? With a quick look, it can easily be found that what is saved by saving money (cutting corners, taking the lowest bid, getting along until next year) is actually a very small amount of our budget.

Does the Pro push cheap clubs on the membership? Does a club manager serve cheap steaks or other cheap food items? Does the club push cheap liquor? Of course not, are we actually deceiving the golfer by giving them a poor return on their money? I think so, and, in fact, I believe we are actually degrading ourselves and the club by lowering our standards.

Local, state and national associations are our basis for support; we can save money here, too, by not participating.

It's an easy trap.

We all need to spend our money wisely, but hopefully not the cheap way out—for the benefit of all of us.

DATES TO REMEMBER

Turfgrass Field Days
JUNE 25-26, 1985

39th Northwest Turfgrass Conference
SEPTEMBER 23-26, 1985